

**SECTION 01 1000
SUMMARY OF CONTRACT**

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 PROJECT

- A. Project Name: Capital Improvement Rehabilitation Phase 3
- B. Owner's Name: Yonkers Public Schools.
- C. Architect's Name: Fuller and D'Angelo, P.C., Architect and Planners
- D. The Project consists of the Capital Improvement Rehabilitation Phase 3, Charles E. Gorton High School , 100 Shonnard Place, Yonkers, NY 10701.

1.3 PROJECT

- A. The work includes but not limited to:
 - 1. Asbestos Abatement,
 - 2. Removals.
 - 3. New Passenger Elevator.
 - 4. Excavation.
 - 5. Concrete.
 - 6. Roofing.
 - 7. Masonry.
 - 8. Metal doors and frames.
 - 9. FRP doors and aluminum frames.
 - 10. Removal and replacement of existing flooring finishes within the Cafeteria and Serving Area.
 - 11. Removal and replacement of existing ceilings and lighting within the Serving Area and Kitchen.
 - 12. Select ventilation system equipment and control upgrades.
 - 13. Electrical.
 - 14. Signage.
 - 15. Painting.
 - 16. Plaster repairs.

1.4 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price including asbestos abatement as described in School Facilities Management Contract Manual And Specifications.
- B. The work of the Contractor is identified in this Project Manual and on the Drawings.
- C. Summary by References: Work of the Contract can be summarized by reference to the School Facilities Management Contract Manual And Specifications, Specification Sections, Drawings, or Addenda 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 Contract is unavoidably affected or influenced by governing regulations, natural phenomenon, including weather conditions, and other forces outside the contract documents.

1.5 RELATED REQUIREMENTS

- A. School Facilities Management Contract Manual And Specifications .

- B. Attachment B including, Division 01 General Requirements and Technical Specification.

1.6 JURISDICTIONAL DISPUTES

- A. The Contractor shall ensure that its work continues uninterrupted during the labor dispute and will be liable to the Owner for all damages suffered by the Owner occurring as a result of work stoppages, slowdowns, disputes or strikes

1.7 SUBCONTRACTORS/SUPPLIERS

- A. All subcontractors shall be submitted to YPS Office of Facilities Management and Fuller and D'Angelo, P.C. for approval.

1.8 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of demolition and removal work is shown on drawings.
- B. Scope of alterations work is indicated on drawings.
- C. HVAC: Alter existing system and add new construction, keeping existing in operation.
- D. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing in operation.
- E. Fire Alarm: Alter existing system and add new construction, keeping existing in operation.

1.9 OWNER OCCUPANCY

- A. Yonkers Public Schools intends to not occupy portions of the existing building during the entire construction period.
- B. Yonkers Public Schools intends to occupy the Project upon Substantial Completion.
- C. Cooperate with YPS Office of Facilities Management to minimize conflict and to facilitate Yonkers Public Schools's operations.

1.10 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Arrange use of site and premises to allow:
 - 1. Work by Yonkers Public Schools.
- C. Provide access to and from site as required by law and by YPS Office of Facilities Management:
 - 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 YPS Office of Facilities Management.
- E. Contractors shall comply with Local Noise Ordinance. Work disrupting the community must be performed with the following hours:
- F. During the entire construction period the contractor shall have the use of the premises for construction operations, including use of the site as indicated in schedule of work and work time included in this section.
 - 1. General: Limitations on site usage as well as specific requirements that impact utilization are indicated on the drawings and/or by other contract documents. In addition to these limitations and requirements, the Contractor shall administer allocation of available space equitably among the separate sub 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.
 - 2. The Contractor shall limit their use of the premises to the work indicated, so as to allow for Owner occupancy and use by the public during the period when the Owner occupies the building.
 - 3. Contractor shall to maintain clear and unobstructed paths of exit discharge from all existing exits.

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4. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner at all time. Do not use these areas for parking or storage of materials.
 5. Lock automotive type vehicles such as passenger cars and trucks and other types of mechanized and motorized construction equipment, when parked and unattended, to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place.
- 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. Site work shall be scheduled and coordinated with YPS Front End Documents. The Owner decisions shall be final and binding on all contractors.
1. Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project construction
- I. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas designated by YPS Office of Facilities Management. If additional storage is necessary obtain and pay for such storage off-site.
- J. 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 YPS Office of Facilities Management which may be withheld in the sole discretion of the Owner.
- K. 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, each 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..
- L. Without prior approval of the YPS Office of Facilities Management, 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 YPS Office of Facilities Management. 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 YPS Office of Facilities Management 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 YPS Office of Facilities Management 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 YPS Office of Facilities Management may, in the YPS Office of Facilities Management'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.
- M. 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.
- N. Keep public areas such as hallways, stairs, elevator lobbies, and toilet rooms free from accumulation of waste material, rubbish or construction debris.

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- O. Smoking, drinking of alcoholic beverages or open fires will not be permitted on the project site.
- P. Utility Outages and Shutdown:
 - 1. Limit disruptions, shut downs, switch overs, etc. of utility services to hours the building is unoccupied, Saturdays, Sunday and/or holidays.
 - 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers, fire alarm system, electrical, data, and heating system, without 7 days notice to Owner's Representative and Construction Manager and authorities having jurisdiction.
 - 3. Prevent accidental disruption of utility services to other facilities.

1.11 COMPLETION OF WORK AFTER SCHEDULED COMPLETION DATE

- A. Contractor(s) shall perform work only within these limitations and all manpower, equipment, etc., shall be provided as required to complete the work as per schedule. In the event the contractor does not complete the work as scheduled all work to be performed shall be performed after 4:30 PM when the building is unoccupied and approved by the YPS Office of Facilities Management. All costs shall be borne by the Contractor.
- B. The Contractor shall provide necessary manpower, equipment, etc., as required to maintain schedule developed within the time limitations as described above.

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. Section 01 5000 - Temporary Facilities and Controls.
- C. Section 01 7800 - Closeout Submittals for additional requirements for Final Payment.
- D. 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 Allowances specified in this section. 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 or buildings provide separate payment applications, or provide sub-schedules showing values correlated with each building.
 - 1. For public school projects identify each application with the SED Project number for each building and Fuller and D'Angelo'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% of contract amount).
 - 4. Each allowance.
 - 5. Meeting attendance.
 - 6. As-built Drawings.
 - 7. Punch list.
 - 8. Final Cleaning.
 - 9. Closeout Documents (5% of contract amount).

10. 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 Construction Manager
- 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. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 6. 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.
 - 7. 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.

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- 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, shall be available for review by Yonkers Public Schools 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

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 Yonkers Public Schools 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

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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 6000.

- F. Computation of Change in Contract Amount:
 - 1. Refer to Article 21 and 22 of General Engineering Agreement.
- G. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. For change requested by Fuller and D'Angelo, P.C. for work falling under a fixed price contract, the amount will be based on Contractors 's price quotation.
 - 2. For change requested by the contractor, the amount will be based on the Contractor 's request for a Change Order as approved by Fuller and D'Angelo, P.C. .
 - 3. For pre-determined unit prices, unit costs, allowance and quantities, the amount will based on the fixed unit prices, unit costs, allowance.
 - 4. For change ordered by Fuller and D'Angelo, P.C. without a quotation from , the amount will be determined by Fuller and D'Angelo, P.C. based on the Contractor's substantiation of costs as specified for Time and Material work.
- H. 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.
- I. 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.
- J. 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.
- K. 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.
- L. 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.

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1.10 APPLICATION FOR PAYMENT AFTER SCHEDULED COMPLETION DATE

- A. In the event the work is not completed by the schedule date, listed in Section 01 1000 - Summary, and in addition to the other remedies described, the Architect 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. Comply with Section 01 7800 - Closeout Submittals.
- B. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- C. 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 "punch list" items have been completed.
- D. It is understood by the Contractor that the maximum payment due the contractor prior to final payment shall be Ninety (95%) of the Contract amount and the final Five (5%) will be due only after the above is satisfied.

END OF SECTION

**SECTION 01 2005
PARTIAL RELEASE OF LIEN**

CONTRACTOR/SUBCONTRACTOR/VENDOR'S LETTERHEAD

Name of Facility: Charles E. Gorton High School

Address: 100 Shonnard Place

Name of Owner: Yonkers Public Schools

Name of the Contractor/Subcontractor/Vendor: _____

Address: _____

Trade/Vendor: _____

Application # _____ Dated _____.

We certify that we have completed _____ % of our Contract.

Prior to this requisition we have received payment equal to _____ % of our contract amount.

The undersigned, upon receipt of the above requisition payment hereby releases and discharges the Owner of and from any liability or obligation in any way related to or arising out of this project up to and including the date of this document.

The undersigned further covenants and agrees that it shall not in any way claim or file a mechanic's or other lien against the premises of the above designated project, or any part thereof, or against any fund applicable thereto for any of the work, labor, materials heretofore furnished by it in connection with the improvement of said premises.

The undersigned further warrants that, in order to induce the Owner to release this partial payment, they have paid all claims for labor, material, insurance, taxes, equipment, etc., employed in the prosecution of the work above, to date of this requisition.

The undersigned hereby releases and agrees to hold the Owner harmless from any and all claims in connection with the furnishing of such labor and materials, etc., for the construction of the aforementioned project.

The undersigned further guarantees that all portions of the work furnished and/or provided by them are in accordance with the contract and that the terms of the contract with respect to these guarantees will hold for the period specified in said contract. Refer to ARTICLE 79 PAYMENTS GENERAL ENGINEERING AGREEMENT for additional requirements.

IN WITNESS WHEREOF, we have executed under seal this release on the above date and to be legally bound hereby:

WITNESS: _____ FIRM: _____

BY: _____

State of New York, County of _____ subscribed and sworn to before me this ____ day of _____ 201____

Notary public

My commission expires _____

END OF SECTION

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**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. Progress meetings.
- C. Submittals for review, information, and project closeout.
- D. Number of copies of submittals.
- E. 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 3553 - Site Safety and Security Procedures.
- D. Section 01 7000 - Execution: Additional coordination requirements.
- E. Section 01 7800 - Closeout Submittals:

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 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. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

1.5 PROJECT COORDINATOR

- A. Project Coordinator: YPS Office of Facilities Management.
- B. Coordination: The contractor shall coordinate its construction operations with those of other subcontractors and entities to ensure efficient and orderly installation of each part of the Work. The 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, field offices, and sheds.
- E. 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.
- F. 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 1000 - Summary of Contract.
- G. Make the following types of submittals to YPS Office of Facilities Management and Fuller and D'Angelo, P.C.
 - 1. Requests for Interpretation.
 - 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. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 10. Closeout submittals.

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. Contractor and field superintendent.
- C. Agenda:
 - 1. Execution of Yonkers Public Schools- Contractor 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, .
 - 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. Security and housekeeping procedures.
 - 15. Procedures for maintaining record documents.

- 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. 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 at two week intervals.
- B. Attendance Required:
 - 1. Contractor(s).
 - 2. Fuller and D'Angelo, P.C.
 - 3. Consultants.
 - 4. Contractor's Superintendent.
 - 5. 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 delivery schedules.
 - 7. Review construction safety programs.
 - 8. Review exiting and separation of construction
 - 9. Maintenance of progress schedule.
 - 10. Corrective measures to regain projected schedules.
 - 11. Planned progress during succeeding work period.
 - 12. Maintenance of quality and work standards.
 - 13. Effect of proposed changes on progress schedule and coordination.
 - 14. 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 shall distribute to all entities of the Contractor affected by decisions made.

3.3 WEEKLY COORDINATION MEETINGS

- A. The Contractor 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 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.

3.6 SUBMITTALS FOR REVIEW

- A. All submittals are the product and the property of the Contractor. The YPS Office of Facilities Management and Fuller and D'Angelo, P.C. 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

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- 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 roofing 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 01 7800 - Closeout Procedures.
- 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.** The Architect 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.

3.7 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:

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ARCHITECTS AND PLANNERS

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 Yonkers Public Schools. No action will be taken.

3.8 SUBMITTALS FOR PROJECT CLOSEOUT

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

3.9 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. 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 Rev1.pdf 07 5323 Bond AdhRev1.pdf
 4. Use capital letters and spaces to make the names "readable" do not use special characters, underscores, hyphens, etc.
 5. Keep the file names short, no more than 25 characters.
 6. Provide a transmittal with each electronic submittal and list each item that's included.
 7. Provide a Cover Sheet with each item - in the same file as the technical submittal.
 8. Do not add dates to the file names, the files are automatically dated when created..
 9. Do not zip the files, and do not put the files in Folders.
 10. Do not email electronic submittal attachments larger than 5 MB.
 11. Do not email multiple electronic submittals- rather burn the submittals on a CD and send the CD via FedEx or other overnight mail.
 12. Make all technical submittals at one time per trade- refer to the specification for additional submittal requirements for example:
 - a. Concrete; Masonry; Miscellaneous Fabrications; Roofing; etc.
 13. 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.
- B. 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 TBD unless specifically so stated.
 4. Submit with each sample, in electronic PDF, data, cuts, photos, color, charts, etc.

3.10 SUBMITTAL PROCEDURES

- A. General Requirements:
- B. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 2. Do not reproduce the Contract Documents to create shop drawings.
 3. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- C. Transmit each submittal with a copy of approved submittal form attached to this section .
- D. Identify Project, TBD, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- E. 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.
1. Contractor's submittal of shop drawings certifies that the contractor has reviewed and coordinated this shop drawing and they are in conformance to the plans, specifications, applicable codes and other provisions of the Contract Documents.
- F. All submitted shop drawings shall be stamped and signed by the Contractor with the following note:
1. "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."
- G. Deliver submittals to Fuller and D'Angelo e-mail address and/or Consultants when directed.
- H. Schedule submittals to expedite the Project, and coordinate submission of related items.
- I. For each submittal for review, allow 10 days excluding delivery time to and from the TBD.
- J. Resubmittals: Contractor shall resubmit within 5 working days after receiving submittal.
- K. Allow 5 working days for processing each re submittal.
- L. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- M. Provide space for Fuller and D'Angelo, P.C. and Consultants review stamps.
- N. When revised for resubmission, identify all changes made since previous submission.
- O. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- P. Submittals not requested will not be recognized or processed.

3.11 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. General: Except for submittals for the record and similar purposes, where action and return on submittals is required or requested, the Architect/Engineer will review each submittal, mark with appropriate "Action".
- C. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
- D. Final Unrestricted Release: Where the submittals are marked as follows, 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.
1. Marking: "No Exceptions Taken"
- E. 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

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on the submittal and with the requirements of the contract documents; acceptance of the work will depend on that compliance.

1. Markings: "Make Correction Noted"
- F. 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.
1. Marking: "Revise and Resubmit"
- G. Marking: "Rejected".
- H. Other Action: Where the submittal is returned, marked with the Architect/Engineer's explanation, for special processing or other Contractor activity, or is primarily for information or record purposes, the submittal will not be marked.

SUBMITTAL COVERSHEET

Yonkers Public Schools

Capital Improvement Rehabilitation Phase 3

Charles E. Gorton High School

ARCHITECT:

Fuller and D'Angelo, P.C.

45 Knollwood Rd.

Elmsford, NY10523

OWNER:

Yonkers Public Schools

1 Larkin Center

Yonkers, NY 10701

CONTRACTOR: _____ **CONTRACT:** _____

ADDRESS: _____

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

Facility Name: Charles E. Gorton High School

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 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. The 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. The 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 shall resolve a provide direction which is in the best interest on the District.
- B. 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.
- C. 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. Within fifteen (15) days after date Notice of Award, submit preliminary schedule .
- B. If preliminary schedule requires revision after review, submit revised schedule within 5 days.
- C. Within 5 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
- D. Within 10 days after joint review, submit complete schedule.

- E. Submit updated schedule with each Application for Payment.
- F. Submit under transmittal letter form specified in Section 01 3000 - Administrative Requirements.
- G. 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 Contractor and the 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 building 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 schedule , secure critical time commitments for performing major elements of all the work.

3.2 GENERAL CONTENT.

- A. The 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, Completion of Punch List, Final Completion, 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. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- F. 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

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. Contractor 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: The 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. The Contractor shall be responsible to ensure that activities and materials which result in "off-gassing" of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc., are scheduled, cured or ventilated in accordance with 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 subcontractor 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 3553
SITE SAFETY AND SECURITY 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. The safety requirements, which must be followed by the Contractor during the execution of this contract.
- B. The Contractor agrees that the work will be completed with the greatest degree of safety and:
 - 1. To conform to the requirements of the Occupational Safety and Health Act (OSHA) and the Construction Safety Act including all standards and regulations that have been or shall be promulgated by the governmental authorities which administer such acts, and shall hold the Owner, Owner's Representative, the Architect, and all their employees, consultants and representatives harmless from and against and shall indemnify each and everyone of them for any and all claims, actions, liabilities, costs and expenses, including attorneys fees, which any of them may incur as a result of non-compliance.
- C. Security measures including entry control, personnel identification, and miscellaneous restrictions.

1.3 REFERENCES:

- A. Code of Federal Regulations OSHA Safety and Health.

1.4 RELATED REQUIREMENTS

- A. Articles 68 and 73 of General Engineering Agreement for additional requirements.
- B. Section 01 5000 - Temporary Facilities and Controls 01 5000: Barriers and enclosures.

1.5 DEFINITIONS

- A. Public shall mean anyone not involved with or employed by the contractor to perform the duties of this contract.
- B. Site shall mean the limits of the work area.
- C. Contractor shall mean the contractor, his/her subcontractors and any other person related to the contract execution.

1.6 SECURITY PROGRAM

- A. Security and Protection Facilities and Services shall be the responsibility of the Contractor and all costs shall be included in their bid.
- B. Protect Work, existing premises and Yonkers Public Schools's operations from theft, vandalism, and unauthorized entry.
- C. Coordinate with YPS Office of Facilities Management's security program.
- D. Initiate program in coordination with Yonkers Public Schools's existing security system at project mobilization.
- E. Maintain program throughout construction period until directed by YPS Office of Facilities Management .

1.7 ENTRY CONTROL

- 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

- B. Restrict entrance of persons and vehicles into Project site and existing facilities.
- C. Allow entrance only to authorized persons with proper identification.
- D. YPS Office of Facilities Management will control entrance of persons and vehicles related to Yonkers Public Schools's operations.
- E. Coordinate access of Yonkers Public Schools's personnel to site in coordination with YPS Office of Facilities Management and Yonkers Public Schools and security forces.
- F. Traffic Control
 - 1. Contractor shall maintain access for emergency vehicles, fireman and pedestrians and protect from damage all persons and property within the limits of and for the duration of the contract;
 - 2. Conduct construction operations so that the traveling public and pedestrian safety is subjected to a minimum of hazard and delay.
 - 3. Contractor shall perform the following minimum requirements as directed by YPS Office of Facilities Management.
 - a. Keep the surface of the traveled way free from mounds, depressions, and obstructions of any type which could present hazards or annoyance to traffic.
 - b. Keep the surface of all pavements used by the public free and clean of all debris, masonry, stucco, and concrete or other obstructions to provide safe traveled ways.
 - c. Control dust and keep the traveled way free from materials spilled from hauling and construction equipment.
 - d. Provide all cones, barricades, signs and warning devices as may be required and/or as ordered by 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.
 - 4. Ingress and Egress
 - a. 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.
 - 5. If, upon notification by YPS Office of Facilities Management, and the contractor fails to correct any unsatisfactory condition within 24 hours of being so directed, YPS Office of Facilities Management 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
 - 6. All traffic control costs shall include the base bid 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 .

1.8 FIRE PREVENTION AND CONTROL

- A. The Contractor shall provide Fire Extinguishers as follows: Provide type "A" fire extinguishers for temporary offices and similar spaces where there is minimal danger of electrical fires or grease-oil-flammable liquid fires. In other locations provide either type "ABC" dry chemical extinguishers, or a combination of several extinguishers of NFPA recommended types for the exposures in each case.
 - 1. All required exits, fire alarm, security, automatic temperature control, PA, sprinkler and similar systems shall be maintained and operable throughout the entire construction contract.
 - a. Contractor(s) will be back-charged for all fines imposed for false alarms or service calls.
- B. Free access to fire hydrants and standpipe connections shall be maintained at all times during construction operations. Portable fire extinguishers shall be provided by the the Contractor and made conveniently available throughout the construction site. Contractor(s) shall notify their employees of the location of the nearest fire alarm box at all locations where work is in progress.

- C. The Contractor shall take all possible precautions for the prevention of fires. Where flame cutting torches, blow torches, or welding tools are required to be used within the building, their use shall be as approved by the Construction Manager at the site. When welding tools or torches of any type are in use, have available in the immediate vicinity of the work a fire extinguisher of the dry chemical 20 lbs. Type. The fire extinguisher(s) shall be provided and maintained by the Contractor doing such work.
- D. Fuel for cutting and heating torches shall be gas only and shall be contained in Underwriters laboratory approved containers.
- E. Storage of gas shall be in locations as approved by the Owner and subject to Fire Department regulations and requirements.
- F. No volatile liquids shall be used for cleaning agents or as fuels for motorized equipment or tools within a building except with the express approval of the Owner and/or Architect and in accordance with local codes. On-site bulk storage of volatile liquids shall be outside the buildings at locations directed by the Owner, who shall determine the extent of volatile liquid allowed within the building at any given time.

1.9 PERSONNEL IDENTIFICATION

- A. Provide identification badge or other approved identification to each person authorized to enter premises.
 - 1. Badge To Include: Personal photograph, name and employer.
- B. Maintain a list of accredited persons, submit copy to Yonkers Public Schools on request.

1.10 RESTRICTIONS

- A. Do not allow cameras on site or photographs taken except by written approval of Yonkers Public Schools.

PART 2 PRODUCTS -

2.1 MATERIALS

- A. Refer to Section 01 5000 - Temporary Facilities and Controls for additional barrier requirements.
- B. 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 GENERAL

- A. In the performance of its contract, the Contractor shall exercise every precaution to prevent injury to workers and the public or damage to property.
 - 1. The Contractor shall, at their own expense, provide temporary structures, place watchmen, design and erect barricades, fences and railings, give warnings, display such lights, signals and signs, exercise such precautions against fire, adopt and enforce such rules and regulations, and take such other precautions as may be necessary, desirable or proper or as may be directed.
 - 2. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work to be done under this contract. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss including but not limited to:
 - a. All employees working in connection with this contract, and other persons who may be affected thereby.
 - b. All the work materials and equipment to be incorporated therein whether in storage on or off site; and including trees, shrubs, lawns, walks, pavements, facilities not designated for removal, relocation or replacement in the course of construction.
- B. The Contractor's duties and responsibilities for the safety and protection of the work: shall continue until such time as all the work is completed and contractor has removed all workers, material and equipment from the site, or the issuance of the certificate of final completion, whichever shall occur last.

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- C. The Contractor shall use only machinery and equipment adapted to operate with the least possible noise, and shall so conduct his operations that annoyance to occupants of the site and nearby homes and facilities shall be reduced to a minimum
- D. It shall be the responsibility of the Contractor to insure that all employees of the contractor and all subcontractors, and any other persons associated with the performance of their contract shall comply with the provisions of this specification.
- E. The Contractor shall clean up the site daily and keep the site free of debris, refuse, rubbish, and scrap materials. The site shall be kept in a neat and orderly fashion. Before the termination of the contract. The Contractor shall remove all surplus materials, falsework, temporary fences, temporary structures, including foundations thereof.
- F. The Contractor shall follow all rules and regulations put forth in the Code of Federal Regulations (OSHA Safety and Health Standards).

END OF SECTION

**SECTION 01 3554
PREVAILING WAGE RATES**

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 PROVISIONS OF LAW DEEMED INSERTED

- A. Each and every provision of law and clauses required by law to be inserted in the Contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party the Contract shall forthwith be physically amended to make such insertion.
- B. The Contractor and subcontractors shall comply with applicable provisions of the Labor Law and all other state laws and Federal and Local statutes ordinances, codes, rules and regulations and orders which are applicable to the performance of this contract. The Contractor shall likewise require all sub-contractors to comply therewith. The attention of the Contractor is particularly, but not exclusively, directed to Sections 220 through 223 of the New York State Labor Law and Sections 109 of the New York State Municipal Corporations Law and the following:
1. The Contractor shall post the prevailing wages in a conspicuous place on the job site.
 2. Posters shall list the Department of Labor's Public work field offices with telephone numbers.
- C. All contractors and subcontractors shall furnish each of its workers with written notification of the applicable prevailing wage rates and supplements at the commencement of and at periodic intervals during the performance of the Work as required by the New York Labor Law
- D. The Contractor shall provide and keep certified payroll records at the job site.
- E. Prevailing Wages Schedule for this project can be obtained by the bidders on the DOL web site as follows:
1. <http://www.labor.ny.gov/workerprotection/publicwork/PWContents.shtm>.
 2. Click on: "Request for Wage and Supplement Information" (PW39).
 3. View "Previously Requested Prevailing Wage Schedule" using PRC# 2021012021
- F. NOTE THESE WAGE RATES ARE EFFECTIVE UNTIL JUNE 30, of each year. Updated schedules will be available on the Department of Labor web site: www.labor.state.ny.us

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. References and standards.
- C. Control of installation.
- D. Mock-ups.
- E. Tolerances.
- F. Manufacturers' field services.
- G. Defect Assessment.

1.3 RELATED REQUIREMENTS

- A. "Article 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 C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2015a, with Editorial Revision (2016).
- B. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2015.

1.5 DEFINITIONS:

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

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. 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, or for Yonkers Public Schools's information.
- C. 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. When requested by YPS Office of Facilities Management and Fuller and D'Angelo, P.C. provide interpretation of results.
2. Test report submittals are 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 or for Yonkers Public Schools's information.
- D. Certificates: When specified 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..
- E. 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.
- F. 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 YPS Office of Facilities Management and Fuller and D'Angelo, P.C..
- 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.
 - 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.7 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.

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 individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.
- C. 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.
- D. Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.
- E. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- F. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- G. Accepted mock-ups shall be a comparison standard for the remaining Work.
- H. 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 CONTRACTOR'S TESTING AND INSPECTION

- A. Testing and Inspections shall be conducted by a qualified testing agency or special inspector as required by authorities having jurisdiction and as indicated in individual Specification Sections as the contractor's responsibility including:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 - 2. 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.
 - 3. 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.
 - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and re-inspecting corrected work.
7. All design mixes.
8. Testing Fire Alarm
9. Electrical systems.
10. Electrical Certification: The contractor shall obtain UL Certification or Inspection from a Certified Electrical Organization for electrical installation.
11. Testing as required by individual specification sections.

3.5 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, concrete repairs 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.

3.6 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 and Fuller and D'Angelo, P.C. , it is not practical to remove and replace the work, YPS Office of Facilities Management and Fuller and D'Angelo, P.C., Fuller and D'Angelo, P.C. 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. The 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 Codes.
- C. Regulatory requirements applicable to this project are the following:
- D. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.
- E. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. New York State Uniform Fire and Building Codes known as the "Building Codes of the State of New York" and consist of the following:
 - 1. Building Code of New York State
 - 2. State Education Department Planning Standards, including Commissioner's Regulation Part 155.5, 155.7
 - 3. Energy Conservation Construction Code of New York State
 - 4. Fire Code of New York State
 - 5. Fuel Gas Code of New York State
 - 6. Mechanical Code of New York State
 - 7. Plumbing Code of New York State
 - 8. Utility Company Regulations and Requirements.
 - 9. Classification of Construction: _____.
 - 10. Occupancy Classification: Education E
 - 11. 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
- G. Electrical Certification: The Contractor's sub-contractor shall obtain UL Certification or Inspection from a Certified Electrical Organization for certification of electrical installations.
- H. 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.
- I. The work shall not be deemed to have reached a state of completion until the certificates have been delivered
- J. EPA - Environmental Protection Agency.

- K. OSHA Part 1926 Safety and Health Regulations for Construction.
- L. 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
- M. 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.
- B. All contractors and their subcontractor's project superintendent, employees, directly or indirectly employed by the contractor to work on the project must at all times, whenever on the school property, wear an ID badge, safety vest, hard hat, etc. and all other required personal protective equipment as required by OSHA

1.4 RELATED REQUIREMENTS

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

1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Where delegated engineering design is to be performed under the construction contract provide the direct supervision of a Professional Engineer experienced in design of this type of work and licensed in State of New York .

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 4533
CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

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 GENERAL REQUIREMENTS

- A. Special Inspections and Structural Testing shall be in accordance with Chapter 17 of the New York State Uniform Code (NYSUC).

1.3 DEFINITIONS

- A. Registered Design Professional: Licensed Professional Engineer or Registered Architect whose seal appears in the Construction Drawings.
- B. Special Inspector (SI): Professional Engineer licensed in the State of New York, acting on behalf of the Owner, that implements the Special Inspection Program for the project.
- C. Testing/Inspecting Agency: Agent retained by Special Inspector or Owner and coordinated by Special Inspector to perform some inspection services on behalf of Special Inspector.
- D. Schedule of Special Inspections: An itemized list of inspections, verifications, and tests (including frequency) required for the project and individuals, agencies, or firms who will be retained to perform these services. The Schedule of Special Inspections is located in in this specification.
- E. Inspect and Inspection: Visual observation of materials, equipment, or construction work as defined in the Statement of Special Inspections, to determine that the work is in substantial conformance with the requirements of the Contract Documents.
- F. Continuous Special Inspection: Full-time observation of work by the Special Inspector or Testing Agency while the work is being performed.
- G. Periodic Special Inspections: Part-time or intermittent observation of work by the Special Inspector or Testing Agency for work that has been or is being performed and at completion of work.

1.4 SECTION INCLUDES

- A. Code-required special inspections.
- B. Testing services incidental to special inspections.
- C. Submittals.

1.5 RESPONSIBILITY

- A. All Code required testing will be performed and paid for by the Owner.

1.6 RELATED REQUIREMENTS

- A. Section 00 7200 - General Conditions: Inspections and approvals required by public authorities.
- B. Section 01 3000 - Administrative Requirements: Submittal procedures.
- C. Section 01 4000 - Quality Requirements.
- D. Section 01 4219 - Reference Standards.
- E. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.7 GENERAL REQUIREMENTS

- A. Special Inspections and Structural Testing shall be in accordance with Chapter 17 of the Building Code of New York State (BCNYS).
- B. Owner's Representative will schedule a Special Inspections preconstruction meeting at least 7 days prior to initial planned date for start of construction.

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1. Discussions shall include the following:
 - a. Review of specifications and Schedule of Special Inspections for work requiring Special Inspections.
 - b. Responsibilities of the Prime Contractors, Owner, Testing Agency, Special Inspector, and Registered Design Professional.
 - c. Notification and reporting procedures.
2. Attendees shall include Owner's Representative, Contractor, Testing Agency, and Special Inspector.

1.8 DEFINITIONS

- A. Code or Building Code: ICC (IBC)-2015, Edition of the International Building Code and specifically, Chapter 17 - Special Inspections and Tests.
- B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.
 1. Including New York State Department of Education (SED).
- C. Registered Design Professional (RDP): Licensed Professional Engineer or Registered Architect whose seal appears in the Construction Drawings. Unless noted otherwise, references to the Registered Design Professional (RDP) in this section refer to Fuller and D'Angelo, P.C. for building design.
- D. Owner's Representative: The term Owner's Representative shall mean YPS Office of Facilities Management.
- E. Testing/Inspecting Agency: Agent retained by Owner and coordinated by Owner's Representative to perform some inspection services on behalf of Owner.
- F. Continuous Special Inspection: Testing Agency and Special Inspector to perform full-time observation of work while the work is being performed.
- G. Periodic Special Inspections: Part-time or intermittent observation of work by the Special Inspector or Testing Agency for work that has been or is being performed and at completion of work.

1.9 REFERENCE STANDARDS

- A. TMS 402/ACI 530/ASCE 5) Building Code Requirements and Specification for Masonry Structure
- B. AISC 341 - Seismic Provisions for Structural Steel Buildings; 2016.
- C. AISC 360 - Specification for Structural Steel Buildings; 2016.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018, with Editorial Revision (2018).
- E. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2018b.
- F. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete; 2014a.
- G. 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.
- H. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2018.
- I. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2015.
- J. ASTM E605/E605M - Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993, with Editorial Revision (2015).
- K. ASTM E736/E736M - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2017.
- L. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestops; 2018.

FULLER AND D'ANGELO, P.C.
ARCHITECTS AND PLANNERS

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- M. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers; 2010a (Reapproved 2015).
- N. ASTM E2570/E2570M - Standard Test Methods for Evaluating Water-Resistive Barrier (WRB) Coatings Used under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage; 2007, with Editorial Revision (2014).
- O. AWCI 117 - Technical Manual 12-B; Standard Practice for the Testing and Inspection of Field Applied Thin Film Intumescent Fire-Resistive Materials; an Annotated Guide; 2014.
- P. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- Q. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- R. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; 2011.
- S. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2017.
- T. IAS AC291 - Accreditation Criteria for Special Inspection Agencies; 2017.
- U. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- V. ICC (IBC)-2015 - International Building Code; 2015.

1.10 QUALIFICATIONS

- A. Testing Agency shall be accepted by the Owner's Representative and Architect.
- B. Special Inspections shall be performed by agents who have relevant experience for each category of inspections indicated in the drawings.

1.11 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Qualification Statement: Manufacturer shall submit documentation of manufacturing capability and quality control procedures.
- C. Fabricator's Qualification Statement: Fabricator shall submit documentation of fabrication facilities and methods as well as quality control procedures.
- D. Special Inspection Reports: After each special inspection, Special Inspector shall promptly submit one electronic copy of report, in PDF format, to Owner's Representative, Architect, and Contractor .
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of Special Inspector.
 - d. Date and time of special inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of special inspection.
 - h. Date of special inspection.
 - i. Results of special inspection.
 - j. Compliance with Contract Documents.
 - 2. Final Special Inspection Report: Document special inspections and correction of discrepancies prior to the start of the work.
- E. Fabricator Special Inspection Reports: After each special inspection of fabricated items at the Fabricator's facility, Special Inspector shall promptly submit one electronic copy of report, in PDF format to Owner's Representative, Architect, and Contractor .
 - 1. Include:
 - a. Date issued.

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- b. Name of Special Inspector.
 - c. Date and time of special inspection.
 - d. Identification of fabricated item and specification section.
 - e. Location in the Project.
 - f. Results of special inspection.
 - g. Verification of fabrication and quality control procedures.
 - h. Compliance with Contract Documents.
 - i. Compliance with referenced standard(s).
- F. Test Reports: After each test or inspection, promptly submit one electronic copy, in PDF format, to Owner's Representative, Architect, and Contractor .
- 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 or inspection.
 - h. Date of test or inspection.
 - i. Results of test or inspection.
 - j. Compliance with Contract Documents.
 - 2. Compliance with referenced standard(s).
- G. Certificates: When specified in individual special inspection requirements, Special Inspector shall submit certification by the manufacturer, fabricator, and installation subcontractor to Owner's Representative, Architect, and Contractor , 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 Owner's Representative and Architect .
- H. Manufacturer's Field Reports: Submit reports to Owner's Representative and Architect
- 1. Submit report in, electronic copy, in PDF format, within 30 days of observation to Owner's Representative and Architect for information.
 - 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in Contract Documents.
- I. Fabricator's Field Reports: Submit reports to Owner's Representative and Architect
- 1. Submit report, in PDF format, within 30 days of observation to Owner's Representative and Architect for information.
 - 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in Contract Documents.

1.12 TESTING AND INSPECTION AGENCIES

- A. Owner's Representative will employ services of an independent testing agency to perform additional testing and sampling associated with special inspections but not required by the building code or specification.
- B. Employment of agency in no way relieves TBD of obligation to perform work in accordance with requirements of Contract Documents.

1.13 QUALITY ASSURANCE

- A. Special Inspection Agency Qualifications:

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1. Independent firm specializing in performing testing and inspections of the type specified in this section.
 2. Accredited by IAS according to IAS AC291.
- B. Testing Agency Qualifications:
1. Independent firm specializing in performing testing and inspections of the type specified in this section.
 2. Accredited by IAS according to IAS AC89.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 SCHEDULE OF SPECIAL INSPECTIONS, GENERAL

- A. Frequency of Special Inspections: Special Inspections are indicated as continuous or periodic.
1. Continuous Special Inspection: Special Inspection Agency is required to be present in the area where the work is being performed and observe the work at all times the work is in progress.

3.2 SPECIAL INSPECTIONS FOR STEEL CONSTRUCTION (INCLUDING METAL DECK)

- A. Structural Steel: Comply with quality assurance inspection requirements of ICC (IBC).
- B. Testing Agency shall perform the following:
1. Verify Fabricator maintains detailed fabrication and Quality Control procedures:
 - a. Review procedures for completeness and adequacy relative to code requirements.
 - b. If Fabricator is designated as AISC-Certified Fabricator, Special Inspection for shop-fabricated members and assemblies is not required.
 - c. If Fabricator is not designated as AISC-Certified Fabricator, Contractor shall reimburse Owner via execution of credit change order for cost of Special Inspections and testing in Fabricator's shop.
 2. Review manufacturer's Certificates of Compliance for high-strength bolts and weld filler material.
 3. Review certified mill test reports.
 4. Inspect steel frame joint details for compliance with approved Construction Documents.
- C. Structural Steel and Cold Formed Steel Deck Material:
1. Structural Steel: Verify identification markings comply with AISC 360, Section M3.5; periodic.
 2. Other Steel: Verify identification markings comply with ASTM standards specified in the approved Contract Documents; periodic.
 3. Submit manufacturer's certificates of compliance and test reports; periodic.
- D. Weld Filler Material:
1. Verify identification markings comply with AWS standards specified in the approved Contract Documents and to AISC 360, Section A3.5; periodic.
 2. Submit manufacturer's certificates of compliance; periodic.
- E. Welding:
1. Structural Steel and Cold Formed Steel Deck:
 - a. Complete and Partial Joint Penetration Groove Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
 - b. Multipass Fillet Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
 - c. Single Pass Fillet Welds Less than 5/16 inch Wide: Verify compliance with AWS D1.1/D1.1M; periodic.
 - d. Plug and Slot Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
 - e. Single Pass Fillet Welds 5/16 inch or Greater: Verify compliance with AWS D1.1/D1.1M; continuous.
 - f. Floor and Roof Deck Welds: Verify compliance with AWS D1.3/D1.3M; continuous.

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2. Reinforcing Steel: Verify items listed below comply with AWS D1.4/D1.4M and ACI 318, Section 3.5.2.
 - a. Verification of weldability; periodic.
 - b. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames as well as boundary elements of special structural walls of concrete and shear reinforcement; continuous.
 - c. Shear reinforcement; continuous.
 - d. Other reinforcing steel; periodic.

3.3 SPECIAL INSPECTIONS FOR CONCRETE CONSTRUCTION

- A. Reinforcing Steel, Including Placement: Verify compliance with approved contract documents and ACI 318, Sections 3.5 and 7.1 through 7.7; periodic.
- B. Anchors Installed in Hardened Concrete: Verify compliance with ACI 318, Sections 3.8.6, 8.1.3, and 21.2.8; periodic.
- C. Concrete Sampling Concurrent with Strength Test Sampling: Each time fresh concrete is sampled for strength tests, verify compliance with ASTM C172/C172M, ASTM C31/C31M and ACI 318, Sections 5.6 and 5.8 and record the following, continuous:
 1. Slump.
 2. Air content.
 3. Temperature of concrete.
 4. Verify use of required design mix.
 5. Sample and test concrete during placement as follows. Test shall be taken at point of discharge into structure:
 - a. Record specific locations where concrete was placed. Refer to column lines where possible.
 - b. For each truck, record time concrete is batched as shown in truck ticket, time placement begins/sample time, and time truck is emptied.
 - c. For each truck, sample fresh concrete in accordance with ASTM C 172, except modified for slump to comply with ASTM C 94.
 - d. For each truck, perform slump test in accordance with ASTM C 143. Perform two slump tests for pumped concrete; one at truck and one at point of discharge.
 - e. For each truck for self-consolidating concrete, measure slump flow and record visibility stability index in accordance with ASTM C 1611/C 1611M. Slump cone may be in the upright or inverted position. Use same cone position for the entire project for consistency.
 - f. For normal-weight concrete, measure air content in accordance with ASTM C 231, pressure method. For lightweight concrete, measure air content in accordance with ASTM C 173, volumetric method. Perform one test for each truck for air-entrained and non-air-entrained concrete.
 - g. Record temperature of concrete for each truck. Test in-place concrete temperature hourly when ambient temperature is 40 degrees F and below and when 80 degrees F and above.
 - h. Record air temperature and general weather conditions (cloudy, windy, sunny, etc.).
 - i. Record unit weight of fresh normal-weight concrete in accordance with ASTM C 138. Record unit weight of lightweight concrete in accordance with ASTM C 567. Perform one test for each 50 cubic yard of concrete.
 - j. Perform concrete compressive tests as follows:
 - a) Prepare compressive test specimens in accordance with ASTM C 31. Take a set of four - 6" x 12" cylinders for each 50 cubic yards of concrete or each 5,000 square feet of slab area for each type of concrete. Store undisturbed in insulated box during cold weather. Deliver to laboratory between 16 and 32 hours after making. Perform compressive tests in accordance with ASTM C 39: one 6 x 12 specimens tested at 7

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- days, two 6 x 12 specimens tested at 28 days, and one 6 x 12 specimens retained for later testing if required.
- b) In cold weather or whenever steel erection is scheduled to commence less than 14 days after placement of supporting foundation concrete, cast additional set of four - 6" x 12" cylinders for each 50 cubic yard or fraction thereof of supporting foundation concrete. Field-cure cylinders, and test two 6 x 12 specimens at 7 days, retaining two 6 x 12 specimens for later testing if required. Steel erection may not begin until supporting concrete obtains 75 percent of its design strength. Contractor, at their cost, may perform additional tests to determine concrete strength.
 - k. If concrete will be placed in separate buildings on a given project, make individual compressive strength test cylinders for each building.
 - l. Perform additional testing as follows if required:
 - a) If total time period between batching and completing placement has exceeded ACI-recommended, 90-minute-maximum time limit the batch shall be rejected..
 - 6. Inspect concrete placement for proper application techniques.
 - 7. Inspect for maintenance of specified curing temperature and techniques.
 - 8. Perform moisture vapor emission and alkalinity testing in accordance with ASTM F 1869 and ASTM F 710, respectively, as follows:
 - a. Perform testing after building is enclosed, prior to installation of adhered floor finishes, and once HVAC systems are operational.
 - b. Test results must be reviewed and accepted by floor finish installer.
 - D. Concrete: Verify application techniques comply with approved contract documents and ACI 318, Sections 5.9 and 5.10; continuous.
 - E. Specified Curing Temperature and Techniques: Verify compliance with approved Contract Documents and ACI 318, Sections 5.11 through 5.13; periodic.
 - F. Formwork Shape, Location and Dimensions: Verify compliance with approved Contract Documents and ACI 318, Section 6.1.1; periodic.
 - G. Materials: If the TBD cannot provide sufficient data or documentary evidence that concrete materials comply with the quality standards of ACI 318, the AHJ will require that the Special Inspector verify compliance with the appropriate standards and criteria in ACI 318, Chapter 3.

3.4 SPECIAL INSPECTIONS FOR MASONRY CONSTRUCTION

- A. Masonry Structures Subject to Special Inspection:
- B. Verify each item below complies with approved Contract Documents and the applicable articles of TMS 402/602.
 - 1. Inspections and Approvals:
 - a. Verify compliance with the required inspection provisions of the approved Contract Documents; periodic.
 - b. Verify approval of submittals required by Contract Documents; periodic.
 - c. Verify Proportions of site-prepared mortar.
 - d. Verify Proportions of site-prepared grout.
 - e. Observe preparation of required mortar specimens, grout specimens, or prisms in accordance with ASTM C 780, ASTM C 1019, and ASTM C 1314 Rev B.
 - f. Field Quality Control Testing: Perform tests and evaluations listed below during construction for each 5,000 square feet of wall area or portion thereof.
 - a) Sample and evaluate mortar composition and properties in accordance with ASTM C 780.
 - b) Sample and test grout compressive strength in accordance with ASTM C 1019.

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2. Compressive Strength of Masonry: Verify compressive strength of masonry units prior to start of construction unless specifically exempted by code; periodic.
3. Slump Flow and Visual Stability Index (VSI): Verify compliance as self consolidating grout arrives on site; continuous.
4. Joints and Accessories: When masonry construction begins, verify:
 - a. Proportions of site prepared mortar; periodic.
 - b. Construction of mortar joints; periodic.
 - c. Location of reinforcement, connectors, and anchorages, etc; periodic.
5. Structural Elements, Joints, Anchors, Protection: During masonry construction, verify:
 - a. Size and location of structural elements; periodic.
 - b. Type, size and location of anchors, including anchorage of masonry to structural members, frames or other construction; periodic.
 - c. Size, grade and type of reinforcement, anchorages, and anchor bolts; periodic.
 - d. Welding of reinforcing bars; continuous.
 - e. Preparation, construction and protection of masonry against hot weather above 90 degrees F and cold weather below 40 degrees F; periodic.
6. Grouting Preparation: Prior to grouting, verify:
 - a. Grout space is clean; periodic.
 - b. Correct placement of reinforcing, connectors, prestressing tendons and anchorages; periodic.
 - c. Correctly proportioned site prepared grouts; periodic.
 - d. Correctly constructed mortar joints; periodic.
7. Preparation of Grout Specimens, Mortar Specimens and Prisms: Observe preparation of specimens; periodic.

3.5 SPECIAL INSPECTIONS FOR SOILS

- A. Materials and Placement: Verify each item below complies with approved construction documents and approved geotechnical report.
 1. Design bearing capacity of material below shallow foundations; periodic.
 2. Identify soils requiring undercutting and replacing while observing proof rolling and when subgrade is exposed.
 3. Verify footing bearing strata.
 4. Review and accept materials proposed by Contractor for use as compacted fill based on test data and information submitted by Testing Agency. Material approval shall be based on requirements and recommendations stated in Project Geotechnical and Subsurface Investigation.
 5. Design depth of suitability of material at bottom of footings; continuous.
 6. Design depth of excavations and suitability of material at bottom of excavations; periodic.
 7. Materials, densities, lift thicknesses; placement and compaction of backfill: Continuous.
 8. Subgrade, prior to placement of compacted fill verify proper preparation; periodic.
 9. Observe and accept preparation of slab-on-grade subgrade and subbase.
- B. Testing Agency shall perform field density tests for building subgrades and for fill materials including slab subbase within building area in accordance with ASTM D 6938 as follows:
 1. Testing: Classify and test excavated material; periodic.
 2. Footing subgrade and each stratum of soil on which footings will be placed.
 3. Building subgrade including slab subbase and each lift of compacted material.
 4. Inspect each subgrade and fill layer before further backfill or construction work is performed. Approval shall be based on satisfactory achievement of compaction criteria.
 5. Verify use of fill material and lift thicknesses in field.
 6. Perform moisture content testing of slab subbase in accordance with ASTM D 6938.

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3.6 SPECIAL INSPECTIONS FOR FIRE RESISTANT PENETRATIONS AND JOINTS

- A. Verify penetration firestops in accordance with ASTM E2174.
- B. Verify fire resistant joints in accordance with ASTM E2393.

3.7 CONTRACTOR DUTIES AND RESPONSIBILITIES

- A. TBD Responsibilities, General:
 - 1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
 - 2. Cooperate with agency and laboratory personnel; provide access to approved documents at project site, to the work, to manufacturers' facilities, and to fabricators' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to work to be tested or inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
 - c. To facilitate tests or inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify Owner's Representative and laboratory 24 hours prior to expected time for operations requiring testing or inspection services.
 - 5. Arrange with Owner's Representative pay for additional samples, tests, and inspections required by TBD beyond specified requirements.

3.8 MANUFACTURERS' AND FABRICATORS' FIELD SERVICES

- A. When specified in individual specification sections, require material suppliers, assembly fabricators, or product manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, to test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Owner's Representative and Architect 30 days in advance of required observations.
 - 1. Observer subject to approval of Owner's Representative and Architect .
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

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. Temporary electric power and light.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Vehicular access and parking.
- E. Temporary enclosures.
- F. Hoists and temporary elevator use
- G. Waste removal facilities and services.
- H. Field offices.
- I. Rodent and pest control.
- J. Construction aids and miscellaneous services and facilities.
- K. Sidewalk bridge
- L. Snow Removal.

1.3 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements for submittals.
- B. Section 01 7000 - Execution progress cleaning.
- C. Section 01 3553 - Security and Site Safety Procedures.

1.4 REFERENCES

- A. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Refer to guidelines for Bid Conditions for "Temporary Job Utilities and Services" as prepared jointly by AGC and ASC for recommendations.

1.5 QUALITY ASSURANCE

- A. Regulations: The 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. Utility company regulations.
 - 4. Police, fire department and rescue squad rules.
 - 5. Environmental protection regulations
- B. Standards: The 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."

1.6 PROJECT CONDITIONS

- A. General: The 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 Owner'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.

1.7 TEMPORARY UTILITIES

- A. Yonkers Public Schools 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. Provide and pay for all temporary electrical power, water, and ventilation required for construction purposes.
 - 1. Existing facilities may be used.
- C. Use trigger-operated nozzles, with back flow devices, for water hoses, to avoid waste of water.

1.8 DIVISION OF RESPONSIBILITIES

- A. The 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 or temporary elevator power.
 - 5. Its own field office complete with necessary furniture, utilities, and telephone service.
 - 6. Its own storage and fabrication sheds.
 - 7. All hoisting and scaffolding for its own work.
 - 8. Collection and disposal, off site, of its own waste material.
 - 9. Collection of general waste and debris and disposing into containers provided by the Contractor.
 - 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.
- B. The Contractor is responsible and pays all costs for the following:
 - 1. Temporary telephone service.
 - 2. Temporary toilets, including disposable supplies.

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3. Temporary wash facilities, including disposable supplies.
 4. Containerized bottled-water drinking-water units.
 5. Temporary daily janitorial services.
 6. Temporary heat.
 7. First Aid Station and Supplies.
 8. Containers for non-hazardous waste and debris.
 9. Disposal of wastes containers.
 10. Rodent and pest control.
 11. Barricades, warning signs, and lights.
 12. Sidewalk bridge and fence.
 13. Security enclosure and lockup.
 14. Temporary Fire Protection
 15. Temporary Protection for existing flooring, from altered areas to exits.
 16. Construction aids and miscellaneous services and facilities.
 17. Temporary dust control.
- C. Water Service: The Contractor shall provide and pay all costs to install distribution piping of sizes and pressures adequate for construction .
1. Provide backflow devices to prevent water from re-entering the potable system.
 2. Maintain hose connections and outlet valves in leak-proof condition. Where finish work below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize the possibility of water damage. Drain water promptly from drip pans as it accumulates.
- D. The Contractor is responsible and pays all costs for the following:
1. Temporary heat.
 2. Maintaining existing heating system in service during the period between September 15 and June 15. Contractor shall provide all piping, valves, controls, etc., and labor and materials required to maintain operation of existing heating system where affected by the work.
- E. Temporary Electric Power Service: Contractor shall provide and pay all costs to provide a weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of work during the construction period . .
1. Connect temporary service to Owner's existing main in the manner directed by Owner's Representative.
 2. The Contractor shall maintain all parts of the electrical system temporary and permanent active and in-service at all times throughout the contract duration. All temporary lighting and power to be controlled by standard switches per code (outside of power panels) at no additional charge.
 3. Temporary Service: Install service and grounding in compliance with the National Electric Code (NFPA 70). Include necessary meters, transformers, overload protected disconnect and main distribution switch gear. Comply with all NECA, NEMA and UL Standards.
 4. Provide temporary service with an automatic ground-fault interrupter feature, activated from the circuits of the system.
 5. Contractor shall provide temporary generator power where Owner's electricity in not available. Contractor shall include required fuel for operation.
 6. For power hand tools and task lighting, provide temporary 4-gang outlets at each floor level, spaced so that a 100 foot extension cord can reach each work area. Provide separate 110-120 Volt, 20 Amp circuit for each 4-gang outlet (4 outlets per circuit). GFCI protected.
- F. Temporary Lighting: General 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 .

1.9 TELECOMMUNICATIONS SERVICES

- A. The contractor shall provide and pay for its own telephone service. Provide mobile phone service for all field superintendents and foreman.

1.10 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: The Contractor is responsible for temporary sanitary facilities and their maintenance, including supplies.
 - 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.

1.11 BARRIERS

- A. Responsibility: General construction barriers required for the project shall be the responsibility of the Contractor
- B. Barricades, Warning Signs and Lights: Comply with recognized standards and code requirements for erection of substantial, structurally adequate barricades where needed to prevent accidents and losses. Paint with appropriate colors, graphics and warning signs to inform personnel at the site and the public, of the hazard being protected against. Provide lighting where appropriate and needed for recognition of the facility, including flashing red lights where appropriate
 - 1. Sign Materials: For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1, of sizes and thickness indicated. Provide exterior grade acrylic-latex-base enamel for painting sign panels and applying graphics.
- C. 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 .
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.12 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot high fence around any materials or equipment stored on-site.; equip with vehicular and pedestrian gates with locks.
- C. 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.

1.13 SITE SAFETY AND SECURITY PROCEDURES- See Section 01 3553

1.14 VEHICULAR ACCESS AND PARKING

- A. Responsibilities: The Contractor is responsible for vehicular access and parking and all costs shall be included in their bid.

- B. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- C. Coordinate access and haul routes with governing authorities and Yonkers Public Schools.
- D. Provide and maintain access to fire hydrants, free of obstructions.
- E. Provide means of removing mud from vehicle wheels before entering streets.
- F. Existing parking areas may be used for construction parking unless designated and approved by the YPS Office of Facilities Management .

1.15 WASTE REMOVAL

- A. The Contractor shall provide containers, at grade, 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. The 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.
- C. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- D. Provide containers with lids. Remove trash from site periodically.
- E. The 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.
- F. 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.
- G. Provide rodent proof containers located on each floor level to encourage depositing of garbage and similar wastes by construction personnel.
- H. Site: The Contractor shall maintain Project site free of waste materials and debris.
- I. Installed Work: Keep installed work clean. The 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. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- K. Work Areas: The 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.
- L. The Contractor is responsible to provide dust protection for their construction-related activities.
- M. If daily cleaning and dust protection is not provided the Contractor will be back charged for cleanup performed by employees of the Owner or a separate contractor retained by the Owner.

1.16 FIELD OFFICES - See Section 01 5213

- A. Locate field offices, storage and fabrication sheds and other facilities for easy access to the work and as approved by the YPS Office of Facilities Management. Position offices so that window gives the best possible view of construction activities.
- B. Field offices, storage and fabrication sheds and other facilities constructed of combustible material shall not be located closer than 15' from existing buildings.
- C. Maintain field offices, storage and fabrication sheds, temporary sanitary facilities, waste collection and disposal system, and project identification and temporary signs until near substantial completion. Immediately prior to substantial completion remove these facilities.
- D. Contractor's Field offices: General: The Contractor, at their option, shall provide a temporary field office of sufficient size to accommodate required office personnel at the project site with work-stations furnished and equipped as required.
- E. Storage and Fabrication Sheds: Install storage and fabrication sheds, properly sized, furnished and equipped, as required to accommodate work. Comply with applicable provisions specified elsewhere for distribution and use of temporary utilities. Sheds may be open shelters or fully enclosed spaces, within the building construction area or elsewhere on the project site as approved by the YPS Office of Facilities Management.

1.17 HOISTS

- A. The 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

1.18 MISCELLANEOUS PROVISIONS

- A. Temporary Roof Drainage: The Contractor shall provide temporary drainage until roofing or similar waterproof deck construction is completed and prior to connection and operation of permanent drainage piping system
 - 1. Dispose of rainwater in a lawful manner, which will not result in flooding of the project site or adjoining property, or endanger either permanent work or temporary facilities
- B. Snow Removal: The Contractor shall be responsible for the removal of snow from the contract area to included access roads, excavations, floor and roof deck areas, roof areas to provide access for roof curbs and equipment work. and exits from occupied areas to legal exitways.
 - 1. Provide salting / sanding as required to keep staging area and all walking areas safe for foot traffic.
 - 2. Provide snow removal, salting, sanding at Construction Manager's field office trailer.

1.19 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Clean and repair damage caused by installation or use of temporary work.
- B. Restore existing facilities used during construction to original condition.
- C. Restore new permanent facilities used during construction to specified condition.
- D. Unless the YPS Office of Facilities Management requests that it be maintained for a longer period of time, remove each temporary service and facility promptly when the need for it has ended, or when it has been replaced by authorized use of a permanent facility, or no later than the time of substantial completion. Complete or, if necessary, restore permanent work which may have been delayed because of interference with the temporary service or facility. Repair damaged work, clean exposed surfaces and replace work which cannot be satisfactorily repaired

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION -

3.1 STORAGE FACILITIES

- A. The 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.
- 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, the 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. The Contractor(s) shall provide temporary protection on any existing roof surface when it is necessary for work to take place on completed sections.

3.4 FIRE PREVENTION AND CONTROL

- A. Refer to Section 01 3553 - Site Safety and Security Procedures.

3.5 DISCONTINUE, CHANGES AND REMOVAL

- A. The Contractors 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 ENVIRONMENTAL PROTECTION:

- A. The Contractor 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.

3.7 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 5050
PIPE SCAFFOLDING**

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 DESCRIPTION OF WORK

- A. Pipe Scaffolding: Install and maintain pipe scaffolding where new masonry work is specified until all work and punch list work is complete and approved by the Architect.
 - 1. Scaffolding may be installed and removed in phases as the work progresses, at the Contractor's option and approved by the Fuller and D'Angelo, P.C.
- B. Install and maintain warning signs, and snow fence and saw horse barricades to alert persons on or about the site, and direct them away from the work areas. Comply with Section 01 3553 - Site Safety and Security Procedures.
 - 1. Maintain the safety fence and scaffold until all work is complete.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01 3553 - Site Safety and Security Procedures.
- B. Section 01 5000 - Temporary Facilities and Controls
- C. Section 03 0100 - Maintenance of Concrete
- D. Section 04 2000 - Unit Masonry
- E. Section 01 7000 - Execution
- F. Section 09 2750 - Exterior Portland Cement Stucco.

1.4 QUALITY ASSURANCE

- A. Obtain all components of safety fence and scaffold from a single source supplier or manufacturer.
 - 1. Install the safety fence and scaffold using personnel thoroughly skilled and competent in the work.
 - 2. Perform the work causing as little inconvenience to the public and building occupants as possible.
 - 3. Furnish and install all scaffold, including supports, fastenings, connections, and details that are designed, sealed and signed by a New York State licensed Professional Engineer, utilizing a minimum safety factor of not less than four times the maximum weight intended to be placed thereon when in use.
 - 4. Post signage on the scaffold, to indicate the safe permissible scaffold design load. Do not load the scaffold or sidewalk bridges in excess of the safe design loads.

1.5 SUBMITTALS

- A. Manufacturer's technical product data, specifications, and installation instructions for all components of pipe scaffolding and sidewalk bridges.
 - 1. Shop drawings showing the locations, dimensions, and details for all components and assemblies of the pipe scaffolding and sidewalk bridges, signed, sealed and stamped by a professional engineer licensed in New York State.
 - 2. Evidence that all wood products used (for example planking) are fire retardant where required by code.

1.6 PROJECT CONDITIONS

- A. Bidders must visit the work site to determine the existing conditions and take whatever measurements are needed before submitting bids.

PART 2 - PRODUCTS

2.1 MATERIALS FOR PIPE SCAFFOLDING

- A. Pipe scaffolding shall be constructed of tubular metal sections, or other non-combustible material, to meet at a minimum the NYS Building Code, and OSHA requirements.
 - 1. Lumber used in the erection of the scaffold or sidewalk bridges shall be at least equal in strength and quality to construction grade Douglas fir, and treated with a recognized fire retardant.
 - 2. Fasteners to secure lumber and timber shall be galvanized nails or bolts of a suitable size to produce a secure joint capable of withstanding the design load.
 - 3. Mud sills shall be 2 X 10 inch wood planks.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPE SCAFFOLDING

- A. Except as otherwise indicated, install planks to overhang their end supports at least 6 inches, and fasten them securely to prevent dislodgement. Do not allow planks to overhang in excess of 18 inches. Lay planks tight together, to form a full scaffold width platform.
- B. Install guardrails and toe boards on the sides and ends of every scaffold platform.
- C. Install wire screening along the outside edge of scaffold to prevent debris and material from falling off.
- D. Install cross bracing supports in all scaffold bays.
- E. Install at one set of scaffold access stairs from grade to each work level, at each section of the building where / when work is underway. Provide a 12 foot high plywood fence, and a hinged gate with a padlock to secure the bottom of each set of stairs. Distribute twelve padlock keys to representatives of the Owner, Architect and other authorized personnel.
- F. Install plywood to cover the bottom 8 feet of scaffold in all areas.

3.2 MAINTENANCE

- A. Maintain work areas free of waste materials, debris and rubbish. Maintain the site in a clean and orderly condition.
 - 1. Immediately provide temporary measures to safe guard any safety fence and scaffold, which is damaged or otherwise adversely effected for any reason, and persons on or about the site, and repair or replace the effected portions of scaffolding and/ or bridging within 48 hours, but before any further use.

3.3 OWNER & ARCHITECT ACCESS

- A. Permit representatives of the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. access to the scaffold at all times.

3.4 DISMANTLING AND REMOVAL

- A. Carefully dismantle and remove scaffolding, fencing and sidewalk bridges only after all work, and all Punch List work is complete and approved in writing by the YPS Office of Facilities Management and Fuller and D'Angelo, P.C.
 - 1. Remove scaffold material from the site the same day it is disassembled. Do not store material at the site except with the specific prior permission of the YPS Office of Facilities Management.
 - 2. Post signs, erect barricades, and station flag man around the site to prevent accidents and to insure the protection of the public.
 - 3. Clean and repair damage caused by the installation and removal of the safety fence and scaffold. Restore existing facilities used or affected by construction activities to their original condition.

END OF SECTION

FULLER AND D'ANGELO, P.C.
ARCHITECTS AND PLANNERS

**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. Substitution limitations and procedures.
- E. Maintenance materials, extra materials.

1.3 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary of Contract.
- B. Section 01 4000 - Quality Requirements: Product quality monitoring.
- C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- D. 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 pipe insulation and joints on this project contain no 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. 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 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. **Fuller and D'Angelo, P.C. will consider requests for substitutions only within 30 days after date Letter of Award.**
- B. Substitutions will not be considered during the bidding phase.
- C. A request for substitution constitutes a representation that the bidder:
 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 2. Agrees to provide the same warranty for the substitution as for the specified product.
 3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Yonkers Public Schools.
 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 5. Agrees to reimburse YPS Office of Facilities Management, Fuller and D'Angelo, P.C., and Consultant for review or redesign services associated with re-approval by authorities.

3.2 SUBSTITUTION SUBMITTAL PROCEDURE AFTER BIDDING PHASE

- A. Substitution Request Form: Use form provided in this Section.
- B. Submit in electronic PDF format one copy of request for substitution for consideration. Limit each request to one proposed substitution.
- C. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
- D. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 30 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 1. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

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. See Section 01 7419.
- 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 TBD 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.

SUBSTITUTION REQUEST FORM

SUBSTITUTION REQUEST No. _____

(After the Bidding Phase)

Project: Capital Improvement Rehabilitation Phase 3

Substitution Request Number: _____

From: _____ Tele #. _____

Date: _____

A/E Project Number: 20373.00

Specification Title: _____ Description: - _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution:

Manufacturer: _____ Address: _____ Phone: _____

_____ model no.: _____

Installer: _____ Address: _____ Phone: _____

History: _____ New product _____ 2-5 years old _____ 5-10 yrs old _____ More than 10 years old

Differences between proposed substitution and specified product:

Point-by-point comparative data attached - REQUIRED

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

Date Installed: _____

Proposed substitution affects other parts of Work: ___ No ___ Yes; explain

Savings to Owner for accepting substitution: _____ (\$ _____)

Proposed substitution changes Contract Time: ___ No ___ Yes Add _____ Deduct _____ days.

Supporting Data Attached: ___ Drawings ___ Product Data ___ Samples ___ Tests Reports

The Undersigned certifies:

Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.

Same warranty will be furnished for proposed substitution as for specified product.

Same maintenance service and source of replacement parts, as applicable, is available.

Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.

Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.

Proposed substitution does not affect dimensions and functional clearances.

Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

YONKERS PUBLIC SCHOOLS
CAPITAL IMPROVEMENT REHABILITATION PHASE 3
CHARLES E. GORTON HIGH SCHOOL YPS #10909
PRODUCT REQUIREMENTS

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

Attachments:

A/E's REVIEW AND ACTION

____ Substitution approved - Make submittals in accordance with Specification Section 01330

____ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.

____ Substitution rejected - Use specified materials.

____ Substitution Request received too late - Use specified materials.

: _____ Date: _____

Additional Comments: __ Contractor __ Subcontractor __ Supplier __ Manufacturer __ A/E

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, substitutions and product options, delivery, storage, and handling.
- D. Section 07 9200 - Joint Sealants: Emissions-compliant sealants.

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.
 - 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.

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CAPITAL IMPROVEMENT REHABILITATION PHASE 3
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VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

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. BIFMA M7.1 - Standard Test Method for Determining VOC Emissions from Office Furniture Systems, Components, and Seating; 2011 (Reapproved 2016).
- E. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; 2017, v1.2.
- F. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.
- G. CHPS (HPPD) - High Performance Products Database; Current Edition at www.chps.net/.
- H. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.
- I. GreenSeal GS-36 - Adhesives for Commercial Use; 2013.
- J. SCAQMD 1113 - Architectural Coatings; 1977 (Amended 2016).
- K. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).
- L. SCS (CPD) - SCS Certified Products; Current Edition.
- M. 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 SCS (CPD) Floorscore certification.
 - c. Current SCS (CPD) Indoor Advantage Gold certification.
 - d. Current listing in CHPS (HPPD) as a low-emitting product.
 - e. Current CRI (GLP) certification.
 - f. 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.

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- 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. Furnishings Emissions Standard and Test Method: BIFMA e3 Sections 7.6.1 and 7.6.2, tested in accordance with BIFMA M7.1.
 - 1. Evidence of Compliance:
 - a. Test report showing compliance and stating exposure scenario used.
- D. 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.

YONKERS PUBLIC SCHOOLS
CAPITAL IMPROVEMENT REHABILITATION PHASE 3
CHARLES E. GORTON HIGH SCHOOL YPS #10909
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

- F. Paints and Coatings: Provide products having VOC content as specified in Section 09 9113 - Exterior Painting 09 9123 - Painting.
- G. Carpet and Adhesive: Provide products having VOC content not greater than that required for CRI Green Label Plus certification.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Current Green Label Plus Certification.
 - b. Report of laboratory testing performed in accordance with requirements.
- H. Carpet Tile and Adhesive: Provide products having VOC content as specified in Section 09 6813.
- I.

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 TBD.

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. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective removals .
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. General installation of products.
- F. Progress cleaning.
- G. Protection of installed construction.
- H. Correction of the Work.
- I. Dust control
- J. Cleaning and protection.
- K. Starting of systems and equipment.

1.3 RELATED REQUIREMENTS

- A. YPS General Engineering Aggrement for additional requirements.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.
- D. Section 01 3553 - Site Safety and Security Procedures .
- E. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties .
- F. Section 01 7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
- G. Section 07 9200 - Joint Sealants.
- H. Individual Product Specification Sections:
 - 1. Advance notification to other sections of openings required in work of those sections.
 - 2. Limitations on cutting structural members.

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. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:

1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Include in request:
 - a. Necessity for cutting or alteration.
 - b. Description of proposed work and products to be used.

1.6 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Dust Control: 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. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Charles E. Gorton High School Yonkers Public Schools.
- C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations when the facility is occupied.
 1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.
 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.

1.7 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. Coordinate completion and clean-up of work of separate sections.
- E. 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.
- F. General: The 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.
- G. 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.

1.8 CODES, PERMITS, FEES

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

1.9 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. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. 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 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 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.
 - 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.
 3. Contractor shall provide labor for daily cleanup on the interior and the exterior of the building as required or directed by the Owner's Representative. 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 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 wiped.

3.5 CHEMICAL FUMES AND OTHER CONTAMINATES

- A. The 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. The Contractor shall be responsible to ensure that activities and materials which result in "off-gassing" of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc., are scheduled, cured or ventilated in accordance with manufacturer's recommendations before a space can be occupied.

3.6 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.

3.7 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 and Fuller and D'Angelo, P.C. 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 still occupied.
 - 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 Electrical): 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. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Fuller and D'Angelo, P.C.
- 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.

3.8 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 1. Complete the work.
 2. Fit products together to integrate with other work.
 3. Provide openings for penetration of electrical and other services.
 4. Match work that has been cut to adjacent work.
 5. Repair areas adjacent to cuts to required condition.
 6. Repair new work damaged by subsequent work.
 7. Remove samples of installed work for testing when requested.
 8. Remove and replace defective and non-complying work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Patching:
 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 2. Match color, texture, and appearance.
 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
- I. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

3.9 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.

3.10 VERMIN CONTROL

- A. All piping, ducts and the like passing through non rated walls, floors, slabs, ceilings and other solid construction, shall be sealed to prevent the passage of vermin and rodents.
 1. These seals shall be by means of Johns-Manville Uni-seal or Duxseal packed sleeves or other approved construction. Philip Carey Corp., and 3M Company, shall be considered equal.
- B. All piping, ducts and the like passing through rated walls, floors, slabs, ceilings and other solid construction, shall be fire stopped in accordance with Section 07 8400 - Firestopping.

3.11 WATCHMAN

- A. The Owner 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.

3.12 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.

3.13 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. The 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.

3.14 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.
- E. The Contractor is responsible for their own daily debris removal into containers provided by the Contractor. Working areas are to be broom swept on a daily basis by the Contractor.
- F. The Contractor is responsible to provide dust protection for their construction-related activities.
- G. If daily cleaning and dust protection is not provided the Contractor will be back charged for cleanup performed by employees of the Owner or a separate contractor retained by the Owner.

3.15 PROTECTION OF INSTALLED WORK

- A. The 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, the Contractor shall keep the parts of the work and the buildings free from accumulation of water no matter what the source or cause.

- B. The 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.
- C. Protect installed work from damage by construction operations.
- D. Provide special protection where specified in individual specification sections.
- E. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- F. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- G. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- H. 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.
- I. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.16 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify YPS Office of Facilities Management and Fuller and D'Angelo, P.C. seven days prior to start-up of each item.
- 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. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.17 DEMONSTRATION AND INSTRUCTION

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

3.18 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.19 FINAL CLEANING

- A. Final cleaning shall be the responsibility of the contractor and all costs for final cleaning shall be included in the Base Bid. Final cleaning responsibility shall be limited to all new additions and 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 site; sweep paved areas, rake clean landscaped surfaces.
- F. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
- G. 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.

- H. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
- I. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
- J. Remove snow and ice to provide safe access to building.
- K. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- L. Sweep concrete floors broom clean in unoccupied spaces.
- M. 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
- N. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
- O. Leave Project clean and ready for occupancy.

3.20 CLOSEOUT PROCEDURES Refer to Section 01 7800

3.21 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

END OF SECTION

**SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

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 WASTE MANAGEMENT REQUIREMENTS

- A. Yonkers Public Schools requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
 - 1. Aluminum and plastic beverage containers.
 - 2. Corrugated cardboard.
 - 3. Wood pallets.
 - 4. Clean dimensional wood.
 - 5. Land clearing debris, including brush, branches, logs, and stumps; see Section 31 1000 - Site Preparation and Clearing for use options.
 - 6. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - 7. Gypsum drywall and plaster.
 - 8. Plastic buckets.
 - 9. Paint.
 - 10. Mechanical and electrical equipment.
 - 11. Fluorescent lamps (light bulbs).
 - 12. Acoustical ceiling tile and panels.
- E. The Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
- F. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- G. Regulatory Requirements: The Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.3 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

- B. Section 01 5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- C. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- D. Section 01 7000 - Execution: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.4 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
 - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
 - 2. Submit Report on a form acceptable to Owner's Representative.
 - 3. Landfill Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.

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- c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
4. Incinerator Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards, of trash/waste material from the project delivered to incinerators.
 - c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
5. Recycled and Salvaged Materials: Include the following information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
6. Material Reused on Project: Include the following information for each:
 - a. Identification of material and how it was used in the project.
 - b. Amount, in tons or cubic yards.
 - c. Include weight tickets as evidence of quantity.
7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 2 PRODUCTS NOT USED

PART 3 EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

- A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 5000 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 7000 for trash/waste prevention procedures related to removals, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, YPS Office of Facilities Management and Fuller and D'Angelo, P.C..
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 1. Prebid meeting.
 2. Preconstruction meeting.
 3. Regular job-site meetings.

FULLER AND D'ANGELO, P.C.
ARCHITECTS AND PLANNERS

YONKERS PUBLIC SCHOOLS
CAPITAL IMPROVEMENT REHABILITATION PHASE 3
CHARLES E. GORTON HIGH SCHOOL YPS #10909
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. Provide containers as required.
 - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

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. Warranties and bonds.

1.3 RELATED REQUIREMENTS

- A. YPS General Engineering Agreement Article 81 for additional requirements.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. 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. Advise Owner's Representative and Architect of pending insurance changeover requirements.
 - 2. Obtain and submit releases permitting Owner's Representative and Architect unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 3. Substantial Completion shall be when all work is completed, including all punch lists.
- B. Prior to issuance of the Certificate of Substantial Completion, submit, in writing, a request to the Owner's Representative and Architect a request to perform site inspection for the purpose of preparing a "punch list".
- C. Certificate of Substantial Completion will be issued **after completion of all punch list items** or Owner's Representative and Architect will notify Contractor of items, either punch list or additional items identified by Architect, **that must be completed or corrected before certificate** will be issued. After completion of "punch list" items submit the following:
 - 1. Application for Payment showing 100 percent completion for portion of the Work claimed as substantially completed the following:
 - 2. Manufacturer's Warranties (guarantees).
 - 3. Contractor's Warrantee (Five Years) and extended warranties.
 - 4. Manifest for disposal of Hazardous material.
 - 5. Final cleaning.
 - 6. List of incomplete Work, recognized as exceptions to Owner's Representative and Architect's "punch list".
 - 7. Owner's Representative and Architect's punch list certifying all punch list items have been completed with each item signed off by the Owner's Representative and Contractor.
 - 8. Removal of temporary facilities and services.
 - 9. Removal of surplus materials, rubbish and similar elements.

10. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 11. As Built Drawings.
 12. Project Record Documents.
- D. 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 COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Owner's Representative and Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will not process a final Certificate for Payment until after the inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - a. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
- B. Following Final Inspection acceptance of work submit the following:
1. Submit a final Application for Payment according to Section 01 2000 - Price and Payment Procedures.
 2. Submit certified copy of Architect's Substantial Completion punch list items endorsed and dated Contractor and Owner's Representative certifying each item has been completed or otherwise resolved for acceptance.
 3. Update final statement, accounting for final changes to the Contract Sum.
 4. Final Release of liens from contractor and all entitles of the contractor.
 5. Consent of Surety to Final Payment, AIA Document G707
 6. Final Liquidated Damages settlement statement.
 7. Contractor's Affidavit of Release of Liens (AIA G706A).
 8. Contractors Affidavit of Payment of Debts and Claims (AIA G706).
 9. Contractor's Certification of Payment of Prevailing Wage Rates.
 10. Contractor's Certified Statement that no asbestos containing material was incorporated into the project.
 11. Asbestos manifest.
 12. Underwriters 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 seven 7 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 Yonkers Public Schools.
- 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. The 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. Revisions to details shown on Drawings.
 2. Revisions to electrical circuitry.
 3. Changes made by Change Order or Construction Change Directive.
 4. Changes made following Architect's written orders.
 5. 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 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 Architect and Owner's Representative.
 - d. Name of Contractor.
 - e. Contractor shall certify and sign each drawing

3.4 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.

3.5 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 three D side ring binders with durable plastic covers; 2 inch 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 Owner's Representative, Fuller and D'Angelo, P.C., Consultants, Construction Manager, Contractor, and Subcontractors , 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 24 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. 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.

3.6 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 Yonkers Public Schools'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.

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

A. **PROJECT:** Capital Improvement Rehabilitation Phase 3.

BOARD OF EDUCATION BID NUMBER;

CLOSE-OUT SUBMITTALS: (As Applicable)

- PREVAILING WAGE CERTIFICATION.**
- UL CERTIFICATION**
- ALL APPROVED SHOP DRAWINGS.**
- CERTIFICATES OF COMPLIANCE AND INSPECTION. (WHERE APPLICABLE MANUFACTURER'S REPORTS, ELECTRIC, ELEVATOR, ETC.)**
- 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 SECTION 01 7800 PAR 1.4 AND 1.5 FOR ADDITIONAL REQUIREMENTS. FINAL PAYMENT WILL NOT BE PROCESSED UNTIL ALL ITEMS INDICATED ARE RECEIVED IN ACCORDANCE WITH SECTION 01 7800 - CLOSEOUT SUBMITTALS.

END OF SECTION

SECTION 02080
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 on the Drawings is provided for guidance only. The Contractor shall be responsible for establishing exact quantities and locations for abatement. The project will take place at Charles E. Gorton Hight School, 100 Shannard Place Yonkers, New York 10703.

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

The project shall be conducted as follows:

- Window Lintel Waterproofing - South East Wing 1st Floor and 2nd Floor (20 SF)
- Window Caulking - South East Wing 2nd and 1st Floor (64 LF)
- Tar on Deck - Roof L (4800 SF)
- Flashing Tar - Roof L (490 SF)
- Deck Leveling Compound - Roof L (4800 SF)

Note: Following materials were not tested and will be assumed to contain asbestos: assumed asbestos containing ceiling tiles in the ground floor Cafeteria and Kitchen (3000 SF), assumed asbestos containing floor tiles in the ground floor Cafeteria (2800 SF), assumed asbestos containing ceiling plaster in the Gym (4800 SF). Materials will be sampled and tested, and if found to be negative for asbestos then we will request and change order for the asbestos contractor.

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. Once the project is started the Contractor shall be responsible for the removal of all asbestos containing materials at the contractors cost regardless of differences in the stated quantities provided in this specification.**

- 2) **In the event that clearance samples do not pass, the Asbestos Abatement Contractor will be responsible for all costs associated with resampling.**
- 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 back 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 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.
- 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.
- 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

- 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;
 - 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;
 - 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. Mount Vernon School District and its employees
- b. Peter Gisolfi Associates and its employees
- c. Warren & Panzer Engineers 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:

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.

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
 - 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
 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 -

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

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.

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.

- END OF PART 2 -

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.

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;

- 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.

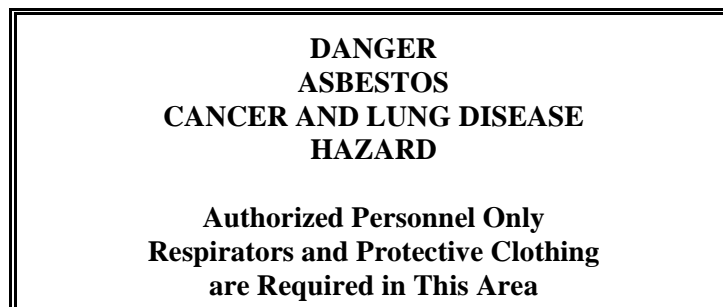
3.03 Work Zone Preparation

- 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.

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.

- 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:



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.

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

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.

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.
 - 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;
 - 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 and SECTION 02080 –

**SECTION 03 0100
MAINTENANCE OF 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. Cleaning of existing concrete surfaces.
- B. Repair of exposed structural, shrinkage, and settlement cracks in floor slabs.
- C. Additional Scope of Work: As indicated on drawings.

1.3 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.
- B. Section 03 5400 - Cast Underlayment.
- C. Section 09 6500 - Resilient Flooring.

1.4 PRICE AND PAYMENT PROCEDURES

- A. Repair Surface: By the square foot. Includes surface preparation, repair, finishing.

1.5 REFERENCE STANDARDS

- A. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).
- B. ASTM C1260 - Non-reactive Aggregate
- C. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.
- C. Manufacturer's Qualification Statement.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten (10) years of documented experience.

1.8 MOCK-UP(S)

- A. Test each type of maintenance procedure required on each type of existing construction, to determine the most appropriate procedures to use and as a record of expected results.
- B. Crack Injection: Prepare one sample of each type of injection.
- C. Horizontal Surface Repair: Total of 10 foot square area, demonstrating each type of repair.
- D. Where color or texture matching is required, first prepare a small size sample on cementitious board.
- E. Locate mock-up(s) where directed by the YPS Office of Facilities Management .

- F. Re-work mock-up(s) until satisfactory to YPS Office of Facilities Management and Fuller and D'Angelo, P.C..
- G. Satisfactory mock-up(s) may remain as part of the work.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturers' instructions for storage, shelf life limitations, and handling of products.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS

- A. Degreaser:
 - 1. Manufacturers:
 - a. SpecChem, LLC; Orange Peel-Citrus Cleaner: www.specchemllc.com.
 - b. W. R. Meadows, Inc: www.wrmeadows.com.
 - c. Substitutions: 01 6000 - Product Requirements.
- B. Detergent: Non-ionic detergent.

2.2 POLYURETHANE PATCHING AND REPAIR MATERIALS

- A. Manufacturers:
 - 1. ARDEX Engineered Cements: www.ardexamericas.com.
- B. Polyurethane Repair Gel:
 - 1. 100% solids for no shrinkage
 - 2. Service temperature range of -35° to 110°F (-37° to 43°C),
 - 3. Two-part polyurethane repair compound.
 - 4. Manufacturers:
 - a. ARDEX Engineered Cements; ARDEX ArdiFix: www.ardexamericas.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.3 ACCESSORIES

- A. Water: Clean and potable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

- A. Prepare concrete surfaces to be repaired according to manufacturer's application instructions..

3.3 CLEANING EXISTING CONCRETE

- A. Surface must be clean and sound. Remove all deteriorated concrete, dirt, oil, grease, and other bond-inhibiting materials from the area to be repaired.
- B. Preparation work should be done by high pressure water blast, scabbier, or other appropriate mechanical means. Obtain an exposed aggregate surface with a minimum surface profile of $\pm 1/8"$ (3 mm) (CSP-6) on clean, sound concrete.
- C. To ensure optimum repair results, the effectiveness of decontamination and preparation should be assessed by a pull-off test.

3.4 APPLICATION

- A. The prepared mortar must be scrubbed into the substrate, filling all pores and voids. Force material against edge of repair, working toward center.
- B. After filling repair, consolidate, then screed.

- C. Allow mortar to set to desired stiffness, then finish.
- D. Mixing, placing and finishing should not exceed 45 minutes

3.5 CURING TREATMENT

- A. Moist cure with wet burlap and polyethylene, or a fine mist of water.
- B. Moist curing should commence immediately after finishing. Protect freshly applied mortar from direct sunlight, wind, rain and frost

END OF SECTION

**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 for composite floor construction.
- D. Elevated concrete slabs.
- E. Floors and slabs on grade.
- F. Concrete foundation walls, footings, grade beams, and elevator pit.
- G. Concrete reinforcement.
- H. Waterstops.
- I. Joint devices associated with concrete work.
- J. Concrete curing.
- K. Sump pits.
- L. Mix design.
- M. Vapor Retarder.
- N. Concrete materials.
- O. Placement procedure.
- P. Field Quality Control.

1.3 RELATED REQUIREMENTS

- A. Section 03 0100 - Maintenance of Concrete
- B. Section 07 1300 - Sheet Waterproofing.
- C. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
- D. Section 31 2316 - Excavation for drainage fill under slab-on grade..
- E. Section 33 4100 - Subdrainage for underground foundation drainage systems.

1.4 REFERENCE STANDARDS

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
- B. ACI 301 - Specifications for Structural Concrete; 2016.
- C. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.
- 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. ACI 347R - Guide to Formwork for Concrete; 2014.
- J. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018, with Editorial Revision (2018).
- L. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2017.
- M. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2014.
- N. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- O. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).
- P. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.
- Q. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2018.
- R. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- S. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- T. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.
- U. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.
- V. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- W. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.
- X. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2015.
- Y. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014a.
- Z. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting; 2015.
- AA. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop; 1974.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

- A. Preconstruction Testing: Contractor shall employ Testing Agency acceptable to Owner's Representative to perform material evaluation tests and evaluate concrete mixes prior to submitting.
 - 1. Testing Agency shall be qualified according to ASTM C 1077 and ASTM E329.
- B. Submit concrete testing service qualifications demonstrating experience with similar projects.
- C. 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, Fuller and D'Angelo, P.C., and Testing Agency prior to discharging concrete into structure.
 - 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.

- D. Testing Agency will visit construction site at appropriate intervals to determine if work is in general conformance with Contract Documents and specifications. Notify YPS Office of Facilities Management 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 YPS Office of Facilities Management and 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. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
 - 1. Shoring and Restoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing restoring.
- D. 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. Include foundation plans and elevations.
 - 2. Indicate all penetrations and sleeve location and reinforcing.
 - 3. Identify areas of exposed surfaces and finish.
- E. Mix Design: Submit proposed concrete mix design with NY State PE seal and signature.
 - 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. Samples: Submit samples of underslab vapor retarder to be used.
- G. Test Reports: Submit report for each test or series of tests specified.
- H. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
- I. Qualification Data: For installer, testing agency, and concrete supplier.
- J. 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.
 - c. Form materials and form-release agents.
 - d. Steel reinforcement and accessories.
 - e. Waterstops.
 - f. Curing compounds.
 - g. Bonding agents.
 - h. Semirigid joint filler.
 - i. Joint-filler strips.
 - j. Repair materials.

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 and Fuller and D'Angelo, P.C.. 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. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- G. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- H. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- I. Preinstallation Conference: Conduct conference at Project site to comply with requirements.-
 - 1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Concrete subcontractor.
 - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold and hot weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, concrete repair procedures, and concrete protection.
- J. 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.

- B. Contractor shall be responsible for correction of concrete work not conforming to specified requirements, including strength, tolerances, and finishes. Correct deficient concrete as directed by YPS Office of Facilities Management and Fuller and D'Angelo, P.C..
- C. Remove work found to be defective. Replace with new acceptable work

PART 2 PRODUCTS

2.1 FORMWORK

- A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
 - 1. 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.
 - 2. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.
 - 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.
 - a. Formulate form release agent with rust inhibitor for steel form-facing materials
 - 4. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off, metal form ties, designed to prevent form deflection and spalling concrete upon removal. Provide units that will leave no metal closer than 1 inch to exposed surface.
- C. 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).
 - 1. Type: Deformed billet-steel bars.
 - 2. Finish: Unfinished, unless otherwise indicated.
- B. Steel Welded Wire Reinforcement (WWR): Plain type, ASTM A1064/A1064M.
 - 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 gage, 0.0508 inch.
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
 - a. Concrete bricks may be used to support footing reinforcing. Stagger brick locations.
 - b. Do not use clay bricks.
 - 3. Provide stainless steel or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

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. Gradations:

- a. For footings, foundation walls, piers, grade beams, basement walls, retaining walls, and interior walls:

Sieve Size	Percent Passing
2 inch	100
1-1/2 inch	95 to 100
3/4 inch	35 to 70
3/8 inch	10 to 30
No. 4	0 to 5

- b. For Slabs on Grade:

Sieve Size	Percent Passing
1 inch	95 to 98.5
3/4 inch	75 to 94
1/2 inch	25 to 50
3/8 inch	10 to 25
No.4	0 to 10

- c. For Slabs on Metal Deck:

Sieve Size	Percent Passing
1 inch	95 to 100
3/4 inch	82 to 94
1/2 inch	40 to 68
3/8 inch	20 to 44
No.4	0 to 10

- 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.
- C. Prohibited Admixtures: Calcium chloride, thiocyanates, and admixtures containing more than 0.05 percent water-soluble chloride ions by weight of cement or more than 0.3 percent thiocyanates by weight of cement shall not be permitted.

2.5 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder: Sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
1. Installation: Comply with ASTM E1643.
 2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
 3. Manufacturers:
 - a. "Griffolyn T-65G" by Reef Industries In, three-ply, nylon- or polyester-cord-reinforced, high-density polyethylene sheet; laminated to a nonwoven geotextile fabric, 30 mils (0.76 mm) thick.
 - b. Substitutions: 01 6000 - Product Requirements
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
1. Grout: Comply with ASTM C1107/C1107M.
 2. Height Change, Plastic State; when tested in accordance with ASTM C827/C827M:
 - a. Maximum: Plus 4 percent.

- b. Minimum: Plus 1 percent.
 3. Minimum Compressive Strength at 48 Hours, ASTM C109/C109M: 2,000 pounds per square inch.
 4. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
 5. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch.
 6. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
 7. Products containing aluminum powder are not permitted.
 8. Flowable Products:
 - a. Five Star Products, Inc; Five Star Fluid Grout 100: www.fivestarproducts.com.
 - b. Kaufman Products Inc; SureGrout: www.kaufmanproducts.net.
 - c. The QUIKRETE Companies; QUIKRETE® Exterior Use Anchoring Cement: www.quikrete.com/#sle.
- C. 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.

2.6 BONDING AND JOINTING PRODUCTS

- A. Epoxy Bonding System:
1. Complying with ASTM C881/C881M and of Type required for specific application.
 2. Manufacturers:
 - a. Adhesives Technology Corporation; Crackbond SLV-302, Crackbond LR-321, Crackbond LR-321 LPL, Ultrabond 2100 LPL, Ultrabond 2100, Ultrabond 1, Ultrabond 2, or Ultrabond HS200: www.atcepoxy.com.
 - b. Euclid Chemical Company: www.euclidchemical.com.
 - c. Dayton Superior Corporation: www.daytonsuperior.com.
 - d. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
 - e. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
 - f. Substitutions: 01 6000 - Product Requirements.
- B. Waterstops: PVC, complying with COE CRD-C 572.
1. Configuration: As indicated on drawings.
 2. Size: As indicated on drawings.
 3. Manufacturers:
 - a. "Greenstreak® PVC Waterstop", Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071
- C. Slab Isolation Joint Filler: 1/4 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
1. Material: ASTM D1751, cellulose fiber.
 2. Manufacturers:
 - a. W. R. Meadows, Inc; Fiber Expansion Joint Filler with Snap-Cap: www.wrmeadows.com.
 - b. Substitutions: See Section 01 2500 Substitution Procedures.

2.7 CURING MATERIALS

- A. Moisture-Retaining Sheet: ASTM C171.
- B. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, clear.

- C. Water: Potable, not detrimental to concrete.

2.8 REPAIR MATERIALS

- A. Concrete Patching and Repair: One-component, early strength gaining, cementitious, patching material.
 - 1. Flexural Strength (ASTM C-293): 28 days 850 psi.
 - 2. Splitting Tensile Strength (ASTM C-496): 28 days 550 psi.
 - 3. Bond Strength (ASTM C-882 modified): 28 days 1,800 psi.
 - 4. Compressive Strength (ASTM C-109): 28 days 7,000 psi.
 - 5. Color Concrete gray
 - 6. Manufacturers:
 - a. Acceptable Products: SilkaRepair 223
 - b. Substitutions: See Section 01 2500 Substitution Procedures..

2.9 CONCRETE MIX DESIGN

- A. Identify sources of all products used in design mixes.
- B. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- C. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds per square inch.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
 - 4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
 - 5. Water-Cement Ratio: Maximum 0.50.
 - 6. Total Air Content: 6 percent, determined in accordance with ASTM C173/C173M.
 - 7. Maximum Slump: 4 inches.
 - 8. Maximum Aggregate Size: 3/4 inch.
- D. Pumping of concrete is permitted only if mix designs specifically prepared and used previously for pumping are submitted. Mix designs not previously used for anticipated pump line lengths shall be tested by Contractor to verify suitability for project before use at site. Pump line shall have 5-inch-minimum inside diameter and be used with 5-inch pumps

2.10 MIXING

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

2.11 REINFORCING FABRICATION

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice." Fabricate bars to required lengths, shapes, and bends. Do not rebend or straighten reinforcement in manner that could weaken material.

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. Verify that forms are clean and free of rust before applying release agent.
- C. Clean and coat forms before erection. Do not coat forms in place.

- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, etc., for easy removal.
- E. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- F. Chamfer exposed corners and edges as indicated using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- G. Fit corners and joints with gaskets or tape to prevent leakage.
- H. 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.
- I. 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.
- J. Penetrations shall not occur through footings, piers, columns, beams, joists, grade beams, or supported slabs unless shown in structural drawings
- K. 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.
- L. 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.
- M. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
- N. Seal vapor retarder to walls and penetrations with manufacturer-recommended mastic to form continuous barrier.
- O. Seal vapor retarder to walls and penetrations with manufacturer-recommended mastic to form continuous barrier.

3.3 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement
- B. 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.
- C. 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.
- D. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- E. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

- F. 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.
- G. 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.
- H. Use of nails in forms and use of clay brick to support reinforcement is prohibited.

3.4 WATERSTOPS

- A. Flexible Waterstops: Install in construction joints, all joints between foundation walls and footing or slab and as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's written instructions.

3.5 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify Owner's Representative not less than 24 hours prior to commencement of placement operations.
- D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- E. Ensure reinforcement, waterstops, and formed construction joint devices will not be disturbed during concrete placement.
- F. Repair underslab vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight
- G. 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. Slabs on Grade: Use strip pour methods and mechanical vibratory screed whenever possible.
 - 2. Deposit and consolidate concrete in continuous operation within limits of construction joints until placing of panel or section is complete.
 - 3. Consolidate concrete during placing operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 4. 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.
- H. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.
- I. 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.
- J. Do not use vibrators to transport concrete inside formwork.
- K. 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.
- L. 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.
- M. Do not allow vibrator to come in contact with form.

3.6 SLAB JOINTING

- A. Locate joints as indicated on drawings or as recommended by ACI 302.
- B. For placement of slabs that will be subsequently concealed with an architectural finish material place slabs with few construction joints or as recommended by ACI 302.
- C. Anchor joint fillers and devices to prevent movement during concrete placement .
- D. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
 - 1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
 - 2. Place joint filler in floor slab pattern placement sequence. Set top to required elevations.
 - 3. Install joint devices in accordance with manufacturer's instructions.
 - 4. Apply sealants in joint devices in accordance with Section 07 9200 - Joint Sealants.

3.7 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.

3.8 DEFLECTIONS FOR ALL METAL DECK/CONCRETE WORK:

- A. It shall be the Contractor's responsibility and choice as to how the proper elevations or grades are to be accomplished at the top of the slab. Where concrete is poured over metal deck and steel framing it must be assumed that the composite deck, beams, and girders will deflect as the wet concrete is placed unless shored. The contractor shall provide shoring or additional concrete, or both to bring the slab up to the proper grade at no additional cost to the Owner. Monitor top of slab elevation continuously during pour from a fixed position to assure flatness criteria are met.

3.9 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 or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. 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.
- E. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Surfaces to Receive Thick Floor Coverings: "Scratch" as described in ACI 302.1R; thick floor coverings include quarry tile and Portland cement terrazzo with full bed setting system.
 - 2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include exposed to view, resilient flooring, resinous matrix terrazzo, and thin set quarry tile.
 - a. Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
 - 3. Broom Finish: Apply a broom finish to exterior sidewalks, concrete platforms, steps, and ramps, and elsewhere as indicated.

- a. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Fuller and D'Angelo, P.C. before application.

3.10 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. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
 2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by saturated burlap.
 - a. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
 3. Final Curing: Begin after initial curing but before surface is dry.
 - a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.

3.11 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 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.

3.12 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to YPS Office of Facilities Management and Fuller and D'Angelo, P.C. and TBD 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 and Fuller and D'Angelo, P.C.. The cost of additional testing shall be borne by TBD when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of YPS Office of Facilities Management and Fuller and D'Angelo, P.C. for each individual area.

3.13 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 07 9513 - Expansion Joint Cover Assemblies.
- C. Section 09 6500 - Resilient Flooring.

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 C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- C. ASTM C 580 Flexural Strength
- D. ASTM D 3931 Bond Strength (concrete).
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- F. ASTM F-2170 Relative Humidity in Concrete
- G. 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, 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 01300 Administrative Requirements

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep dry and protect from direct sun exposure, freezing, and ambient temperature greater than 105 degrees F.

1.8 REGULATORY REQUIREMENTS

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

1.9 MOCK-UP

- A. Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Prepare mock-up in location designated by YPS Office of Facilities Management.
 - 2. Area: 6 ft by 6 ft.
 - 3. Do not proceed with underlayment work until workmanship of mock-up has been approved by Fuller and D'Angelo, P.C.
 - 4. If YPS Office of Facilities Management and Fuller and D'Angelo, P.C. determines that mockups do not meet requirements, demolish and remove them from the site and cast others until mockups are approved.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- B. Mock-up may remain as part of the Work.

1.10 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 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

1.11 WARRANTY

- A. Provide manufacturer's comprehensive 10 year warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Cementitious Underlayment:
 - 1. ARDEX Engineered Cements; ARDEX K 15 with ARDEX P51 Primer: www.ardexamericas.com.
 - 2. Substitutions: 01 6000 - Product Requirements.

2.2 MATERIALS

- A. 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 5000 pounds per square inch after 28 days, tested per ASTM C109/C109M.
 - 2. Flexural Strength: Minimum 1250 psi 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: 1-1/2 to 2 hours, maximum.
 - 8. Thickness: Capable of thicknesses from feather edge to maximum 3-1/2 inch.
 - 9. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E84.
- B. Aggregate: Dry, well graded, washed silica aggregate, approximately 1/8 inch in size and acceptable to underlayment manufacturer.
- C. Reinforcement: Galvanized metal lath complying with recommendations of underlayment manufacturer for specific project circumstances.
- D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to underlayment mix materials.
- E. Moisture mitigation: TEC The LiquiDAM®
 - 1. 100% solids epoxy
 - 2. "0" VOC
 - 3. Use for applications reading up to and including 20 lbs. per 1000 sq. ft. per 24 hours vapor emission per ASTM 1869, or 98% Relative Humidity per ASTM F2170.
- F. Primer: Manufacturer's recommended type.
- G. Joint and Crack Filler: Latex based filler, as recommended by manufacturer.
- H. Acrylic-Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.3 MIXING

- A. Site mix materials in accordance with manufacturer's instructions.
- B. Add aggregate for areas where thickness will exceed 1/2 inch. Mix underlayment and water for at least two minutes before adding aggregate, and continue mixing to assure that aggregate has been thoroughly coated.
- C. Standard Mix: Mix in accordance with manufacturer's instructions.
 - 1. Slowly add a 50 lb. bag into water while mixing.
 - 2. Use 4.75 - 5.25 quarts of water per 50 lb. bag.
 - 3. Use cool water not over 70 degrees F.
 - 4. Mix using a 1/2 inch heavy-duty drill with blending paddle at a minimum of 650 rpm. Mix thoroughly for approximately 2-3 minutes. Scrape containers sides and remix to ensure a lump-free consistency.
- D. Aggregate Mix: For areas to be installed over 1/2 inch thick.
 - 1. Mix as specified for standard mix.
 - 2. Add from 1/3 to 1 part by volume of 1/8 inch or larger aggregate and mix thoroughly to evenly coat all aggregate.
 - 3. Do not use sand.
- E. Pumped Mix:

1. Mix as specified for standard mix. Do not over water.
 2. Check the consistency of the product with a Slump test.
- 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.
- B. Notify the Owner's Representative or Construction Manager 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. For installation over cutback adhesive, remove adhesive by scraping until all that remains is a thin transparent layer of adhesive residue.
- D. Existing Concrete: Remove existing surface treatments and deteriorated and unsound concrete. Mechanically abrade all 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.
- E. Install joint-filler strips where topping abuts vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with topping surface, unless otherwise indicated.
 2. Terminate full-width joint-filler strips 1/2 inch below topping surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- F. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.
- G. Vacuum clean surfaces.
- H. Prime substrate in accordance with manufacturer's instructions. Allow to dry.
- I. Close former roof and floor openings where items and equipment have been removed and as indicated..

- J. Close floor openings.

3.3 APPLICATION OF PRIMER

- A. Install products in accordance with manufacturer's instructions.
- B. Prime standard subfloors with P51 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 indicated thickness, with top surface level to 1/16 inch in 10 ft.
- E. For final thickness over 1-1/2 inches, 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. Construction Joints: Construct joints true to line with faces perpendicular to surface plane of topping, at locations indicated or as approved by Owner's Representative, Architect, or Construction Manager.
 - 1. Coat face of construction joint with epoxy adhesive at locations where topping is placed against hardened or partially hardened topping.
- I. Contraction Joints: Form weakened-plane contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before topping develops random contraction cracks.
 - 1. Form joints in topping over contraction joints in base slabs, unless otherwise indicated.
 - 2. Construct contraction joints for a combined depth equal to topping thickness and not less than one-fourth of base-slab thickness.
 - 3. Construct contraction joints for a depth equal to one-half of topping thickness, but not less than 1/2 inch deep
- J. 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.
- C. Begin curing immediately after finishing topping. Cure by one or a combination of the following methods, according to topping manufacturer's written instructions:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with water, continuous water-fog spray or absorptive cover, water saturated and kept continuously wet. Cover topping surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in two coats in continuous operations by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period

3.6 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
MASONRY MAINTENANCE**

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. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules, and keynotes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Remove and restore exterior stucco where new cap flashings are being installed.
 - 2. Install two heavy brush coats of cement based masonry waterproofing on new stucco - where existing stucco is removed and restored.
 - 3. Related Requirements
 - a. Mortar and Grouts - Section 04 0511
 - b. Unit Masonry - Section 04 2000
 - c. Carpentry - Section 06 1000
 - d. EPDM Roofing - Section 07 5323
 - e. Sheet Metal Flashing & Specialties - Section 07 6200
 - f. Roof Accessories - Section 07 7200

1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a full time supervisor in the work area when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 - c. Submit the Supervisor's resume upon request.
 - d. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within a fifty mile radius of this project, which may be observed by representatives of the Owner:
 - a) The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
 - b) Submit the reference list upon request.
- B. Material Quality: Obtain each type of material from a single source to ensure consistent quality, color, pattern, and texture.
- C. Pre-construction conference: Attend the pre-construction meeting and discuss the following:
 - 1. How and when masonry work will be performed.
 - 2. How the masonry work will be coordinated with other work.
 - 3. How roof & building surfaces will be protected, and how the building will be kept watertight as masonry work progresses.
 - 4. Weather to anticipate during construction.

5. The availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
6. A schedule for Manufacturer and Architect inspections.

1.4 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any other work on site:
 1. A pre-work site and building inspection report with photos, to document conditions before any other work starts on site.
 2. Manufacturer's technical literature for all materials.
 3. Test reports and certifications substantiating compliance with specification requirements if requested by the Architect.
 4. Samples to show sizes, grade and color, prior to mock-up erection, of each new exposed masonry material. Include the full range of colors and textures needed in the samples.
 - a. Stucco: 6 inch square or round samples to show color and surface finish.
 - b. Anchors: four pieces of each type of anchor.
 5. Simultaneously provide all technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
 - a. Submittals shall be prepared and made by the firm that will perform the actual work.
 - b. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program is not established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
 - c. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders.
 6. Payment requisitions will not be processed until all submittals are received and approved.

1.5 JOB MOCK UPS

- A. Prepare mock-ups of masonry work in actual job locations.
 1. For stucco - provide 2 foot square mockups to show color and surface finish.
- B. Construct each mock up with its associated roof and wall flashings, to show the following:
 1. The color, size and type of each masonry unit and mortar used to set it.
 2. Workmanship quality.
 3. The size and spacing of weep inserts.
 4. Flashings built into the masonry.
 5. Related materials and their installation techniques to fully establish a quality standard for the work.
- C. Mock-ups shall be constructed to establish the minimum acceptable standard of materials and workmanship, and to assure that completed work which matches the mock ups will be fully functional and serve the purpose for which it was designed.
- D. Approved mock-ups may be left in place and incorporated into the permanent installation. Rejected mock-ups shall be removed and replaced until an acceptable mock up is approved.
- E. Do not proceed with masonry work until mock-ups are installed, inspected and approved in writing.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Carefully pack, handle, and ship masonry units and accessories 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 types 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 intermixture 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.
- F. Protect roof surfaces where material and equipment is placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.7 GUARANTEE

- A. Provide a written Contractor's Guarantee which guaranties that all work will remain free of material and workmanship defects and in a watertight condition for a five year period beginning upon Final Completion:
 - 1. Defects include but are not limited to the following: leakage, delamination, lifting, loosening, splitting, cracking, joint separation and movement.
 - 2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as guaranteed at his own expense:
 - 3. Guarantee coverage shall include removing and replacing items installed as part of the original work, if removal is needed to make repairs.
- B. Provide one Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- C. The Guarantee shall take effect no more than 30 days before the satisfactory completion of all punch list work.
- D. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Performance Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.

1.8 JOB CONDITIONS

- A. Perform masonry work only when the air temperature is 40 degrees F and above and will remain so until the masonry has dried, but for not less than 72 hours after work ends.
- 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. Protect roof surfaces where material and equipment is placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.
- E. Coordinate masonry removal and restoration with the installation of new flashings.
- F. Prevent masonry work from rapid drying during hot weather. Use burlap to shield fresh masonry from direct sunlight, and mist fresh masonry with potable water so it cures slowly for at least 72 hours.
 - 1. Remove and replace any new masonry that develops shrinkage cracks, or isn't bonded well to adjoining masonry.

PART 2 PRODUCTS

2.1 STUCCO

- A. Premixed stucco:
 - 1. Scratch, brown and top coat application meeting ASTM C926 using premixed stucco as manufactured by Quikrete.
 - 2. Clean potable water, free of oils, acids, alkalis and organic matter.

2.2 MISCELLANEOUS MATERIALS

- A. Anchors and mesh: Fabricated from Type 304 stainless steel to match existing.
- B. Sealant: High performance, solvent free, formulated and moisture curing silyl-terminated polyether sealant, ASTM C-920, Type S, Grade NS, Class 25, NovaLink construction sealant by ChemLink, color as selected.
- C. Backer Rod: Closed cell polyethylene foam, non-absorbent, compressible, chemically inert rod.
- D. Cement Based Waterproofing: Portland cement based factory blended dry powder product mixed with potable water and an acrylic based waterproofing bonding agent equal to Thoroseal and Acryl 60 as manufactured by Thoro System Products, color as selected.

PART 3 EXECUTION

3.1 GENERAL

- A. Carefully perform work so the structural integrity of masonry adjoining the work is preserved. Simultaneously remove only limited sections of existing masonry; support and protect masonry remaining next to and above the removal areas.
- B. Completely remove and replace any existing masonry that moves, or if cracks form in the mortar joints between the masonry units, or within the masonry units.
- C. Cure all mortar by misting it with potable water to maintain it in a damp condition for not less than 72 hours. Shield fresh mortar from direct sunlight with wet burlap, and prevent fresh mortar from prematurely drying during the curing period. Remove and replace mortar joints that dry pre-maturely.
- D. Cut and remove existing masonry using hand and machine methods. Equip each cutting machine with a separate dedicated vacuum and manufacturer's blade guard vacuum attachment, and control the amount of dust produced so there are no visible plumes. Comply with OSHA crystalline silica standards for construction.
- E. Do not overcut brick head joints and allow the blade to nick the bricks; remove and replace bricks damaged during the cutting and repointing preparation process at no cost to the Owner.

3.2 STUCCO REMOVAL AND REPLACEMENT

- A. Remove loose stucco and back up material to expose solid masonry in areas where new cap flashings are being installed.
- B. Install new copper cap flashings (see Section 07 6200).
- C. Install scratch, base and finish coats of new masonry stucco, in maximum 1/2 inch thick layers, to finish flush with the adjoining stucco surface. Allow each layer to set, a minimum of 24 hours before installing subsequent layers.
- D. Float finish the new stucco to match the existing stucco surface.

3.3 WATERPROOFING

- A. Install new waterproofing on the new stucco.
- B. Prepare and clean the stucco surfaces to receive waterproofing utilizing hand, chemical and pressure water methods as needed to remove all dirt, dust efflorescence, mold, salt, grease, oil, asphalt, laitance, paint and other foreign materials.
- C. Dampen the surface with potable water before applying waterproofing.
- D. Mask and protect adjoining surfaces i.e., the roof, flashings, windows, side walls and site plantings from splatter.
- E. Mixed the waterproofing to a smooth thick heavy batter consistency, and apply two heavy brush coats of waterproofing, about 2 hours apart, brushing each coat thoroughly into the substrate surface.

- F. Maintain cement waterproofing damp, by misting it with potable water, to enable it to cure slowly for at least 48 hours. Shield fresh waterproofing from direct sunlight with wet burlap, and prevent it from drying during the curing period.

3.4 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Inspect the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work on site.
- B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leaks and damage that weren't documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- E. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site presents a neat, orderly and workmanlike appearance. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- F. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

END OF SECTION

**SECTION 04 0511
MORTAR AND MASONRY GROUT**

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. Mortar for masonry.
- B. Grout for masonry.

1.3 RELATED REQUIREMENTS

- A. Section 04 0100 - Maintenance of Masonry: Bedding and pointing mortar for masonry restoration work.
- B. Section 04 2000 - Unit Masonry: Installation of mortar and grout.
- C. Section 08 1113 - Hollow Metal Doors and Frames: Products and execution for grouting steel door frames installed in masonry.

1.4 REFERENCE STANDARDS

- A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements For Masonry Structures; American Concrete Institute International.
- B. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.
- C. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- D. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- E. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- F. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- G. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar; 2015.
- H. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- I. ASTM C476 - Standard Specification for Grout for Masonry; 2018.
- J. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2018a.
- K. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- L. ASTM C1019 - Standard Test Method for Sampling and Testing Grout; 2016.
- M. ASTM C1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2013, with Editorial Revision (2014).
- N. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2018.
- O. ASTM E518/E518M - Standard Test Methods for Flexural Bond Strength of Masonry; 2015.
- P. IMIAWC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council; 1993.
- Q. IMIAWC (HW) - Recommended Practices & Guide Specifications for Hot Weather Masonry Construction.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.
- C. Samples: Submit two samples of mortar, illustrating mortar color and color range.
- D. Reports: Submit reports on mortar indicating compliance of mortar to property requirements of ASTM C270 and test and evaluation reports per ASTM C780.
- E. Reports: Submit reports on grout indicating compliance of component grout materials to requirements of ASTM C476 and test and evaluation reports to requirements of ASTM C1019.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Manufacturer's Installation Instructions: Submit packaged dry mortar manufacturer's installation instructions.

1.6 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

1.7 PRECONSTRUCTION TESTING

- A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01 4000 - Quality Requirements.
- B. Mortar Mixes: Test mortars prebatched by weight in accordance with ASTM C780 recommendations for preconstruction testing.
 - 1. Test results will be used to establish optimum mortar proportions and establish quality control values for construction testing.
- C. Grout Mixes: Test grout batches in accordance with ASTM C1019 procedures.
 - 1. Test results will be used to establish optimum grout proportions and establish quality control values for construction testing.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.
- B. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
 - 1. Store materials in a dry location, covered with a tarp or other suitable covering

1.9 FIELD CONDITIONS

- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.
- B. IMIAC Recommended Practices and Guide Specification for Cold Weather Masonry Construction.
- C. IMIAC Recommended Practices and Guide Specification for Hot Weather Masonry Construction

PART 2 PRODUCTS

2.1 MORTAR AND GROUT APPLICATIONS

- A. Mortar Mix Designs: ASTM C270, Property Specification.
 - 1. Exterior Masonry Veneer: Type N.
 - 2. Exterior Cavity Walls: Type S mortar with Type N pointing mortar.
 - 3. Exterior, Loadbearing Masonry: Type N.
 - 4. Exterior, Non-loadbearing Masonry: Type N.
 - a. Average compressive strength at 28 days: 750 psi.

5. Colored Mortar: Proportion selected pigments and other ingredients to match existing, without exceeding manufacturer's recommended pigment-to-cement ratio.
- B. Grout Mix Designs:
1. Bond Beams Lintels and CMU Cells: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 94/C 94M.

2.2 MATERIALS

- A. Packaged Dry Material for Mortar for Unit Masonry: Premixed masonry cement and mason's sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
1. Color: Mineral pigments added as required to produce approved color sample.
- B. Portland Cement: ASTM C150/C150M.
1. Type: Type I - Normal; ASTM C150/C150M.
 2. Color: Color as required to produce approved color sample.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
1. Color(s): Match existing..
 2. Manufacturers:
 - a. Davis Colors: www.daviscolors.com/#sle.
 - b. Substitutions: 01 6000 - Product Requirements
- G. Water: Clean and potable.
- H. Bonding Agent: Epoxy type.
- I. Cold-Weather Admixture:
1. Accelguard 80; Euclid Chemical Co.
 2. Morseled; W. R. Grace & Co., Construction Products Division.
 3. Trimix-NCA; Sonneborn, Div. of ChemRex, Inc

2.3 MORTAR MIXING

- A. Spec Mix, Inc: 2025 Centre Pointe Blvd., Suite 150, Mendota Heights, MN 55120; Telephone: (888) 773-2649; Fax: (888) 329-7732; E-mail: webmaster@specmix.com; website: www.specmix.com
- B. Thoroughly mix mortar ingredients in accordance with ASTM C270 and in quantities needed for immediate use.
- C. Maintain sand uniformly damp immediately before the mixing process.
- D. Do not use anti-freeze compounds to lower the freezing point of mortar.
- E. If water is lost by evaporation, re-temper only within two hours of mixing.

2.4 GROUT MIXING

- A. Mix grout in accordance with ASTM C94/C94M.
- B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.
- C. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.1 PREPARATION

- A. Apply bonding agent to existing masonry surfaces.
- B. Plug clean-out holes for grouted masonry with brick masonry units. Brace masonry to resist wet grout pressure.

3.2 INSTALLATION

- A. Install mortar and grout to requirements of section(s) in which masonry is specified.
- B. Work grout into masonry cores and cavities to eliminate voids.
- C. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.
- D. Do not displace reinforcement while placing grout.
- E. Remove excess mortar from grout spaces.

3.3 GROUTING

- A. Use either high-lift or low-lift grouting techniques, at Contractor's option, subject to other limitations of contract documents.
- B. Low-Lift Grouting:
 - 1. Limit height of pours to 12 inches.
 - 2. Limit height of masonry to 16 inches above each pour.
 - 3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
 - 4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.
- C. High-Lift Grouting:
 - 1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
 - 2. Place grout for spanning elements in single, continuous pour.

3.4 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field tests, in accordance with provisions of Section 01 4000 - Quality Requirements.
- B. Test and evaluate mortar in accordance with ASTM C780 procedures.
- C. Test and evaluate grout in accordance with ASTM C1019 procedures.
- D. Prism Tests: Test masonry and mortar panels for compressive strength in accordance with ASTM C1314, and for flexural bond strength in accordance with ASTM C1072 or ASTM E518/E518M; perform tests and evaluate results as specified in individual masonry sections.

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 Units (CMU).
- B. Clay facing brick.
- C. Common brick.
- D. Reinforcement and anchorage.
- E. Cavity-wall insulation.
- F. Expanded Polystyrene Inserts.
- G. Flashings.
- H. CMU and Bond Beams.
- I. Accessories.
- J. Water Repellant.
- K. Graffiti Protection.

1.3 RELATED REQUIREMENTS

- A. Section 04 0100 - Maintenance of Masonry.
- B. Section 05 5000 - Metal Fabrications: Loose steel lintels.
- C. Section 07 1900 - Water Repellents. Water repellents of masonry surfaces.
- D. Section 07 2500 - Weather Barriers.
- E. Section 07 6200 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.
- F. Section 07 8400 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
- G. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.
- H. Section 08 9100 - Louvers for louvers set in masonry

1.4 MATERIAL EVALUATION/QUALITY ASSURANCE

- A. Preconstruction Testing: Contractor shall employ and pay qualified independent Testing Agency to perform preconstruction testing indicated and other inspecting and testing services required for source and field quality control.
 - 1. Clay Unit Masonry Tests: For each different clay masonry unit indicated, test units in accordance with ASTM C 67.
 - 2. Concrete Masonry Unit Tests: For each different concrete masonry unit indicated, test units for strength, absorption, and moisture content in accordance with ASTM C 140.
 - 3. Prism Tests: For each type of wall construction indicated, test masonry prisms in accordance with ASTM C 1314.
 - a. Contractor shall fabricate prisms under supervision and direction of Testing Agency Representative.

4. Test mortar composition and properties in accordance with ASTM C 270 if Property Specification is used.
 5. Evaluate mortar proportions in accordance with ASTM C 270 if Proportion Specification is used.
 6. Test mortar properties for approved mix in accordance with ASTM C780 (Compressive Strength Method) to determine a base line for field mortar tests.
 7. Test grout compressive strength in accordance with ASTM C 1019 to demonstrate compliance with ASTM C476, Property Specification.
 8. Test self-consolidating grout compressive strength in accordance with ASTM C1019. Test slump flow and visual stability index in accordance with ASTM C1611/C1611M.
- B. Testing Agency Qualifications: Independent Testing Agency shall demonstrate to YPS Office of Facilities Management and Fuller and D'Angelo, P.C.'s satisfaction that it has experience and capability to satisfactorily perform testing indicated without delaying progress of work.
- C. Preinstallation Conference: Perform conference at project site to comply with requirements of Division 1 section "Project Meetings."

1.5 REFERENCE STANDARDS

- A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2018
- B. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- D. ASTM A580/A580M - Standard Specification for Stainless Steel Wire; 2016.
- E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018, with Editorial Revision (2018).
- F. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2016.
- G. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- H. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2017.
- I. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2018.
- J. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.
- K. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.
- L. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2017a.
- M. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- N. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- O. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- P. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- Q. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- R. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.

1.6 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting two (2) weeks before starting work of this section; require attendance by all relevant installers.

1.7 SUBMITTALS

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

- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, grout, mortar, anchors, and all masonry accessories.
 - 1. Material Data: Submit to Fuller and D'Angelo, P.C. certificates for the following signed by manufacturer and Contractor certifying each material complies with requirements.
 - a. Masonry Units.
 - b. Each different cement product required for mortar and grout, including name of manufacturer, brand, and type.
 - c. Integral water repellent used in mortar.
 - d. Each material and grade indicated for reinforcing bars.
 - e. Each type and size of joint reinforcement.
 - f. Each type and size of anchors, ties, and metal accessories.
- C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
- D. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.
- E. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- F. Test Reports: Concrete masonry manufacturer's test reports for: units with integral water repellent admixture.
 - 1. Mortar: Property (Proportion) requirements of ASTM C 270.
 - 2. Grout complying with ASTM C 476. Include description of type and proportions of grout ingredients.
 - 3. Masonry units: ASTM C67 and ASTM C140.
 - 4. Field Mortar Base Line Compressive Test: ASTM C780.
 - 5. Efflorescence tests for Brick: ASTM C67.
 - 6. Durability tests for surface-coated brick: ASTM C67.

1.8 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum five years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- D. Grouting and Reinforcing: All masonry and grouting and reinforcing work shall be performed by masonry craft-workers who have successfully completed the International Masonry Institute (1-800-IMI-0988) training course for Grouting and Reinforced Masonry Construction, or equal.
- E. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.
 - 1. Provide manufacturer's certification for fire ratings.
 - 2. Equivalent thickness as determined by ASTM C 140.
 - a. Aggregate: Limestone.
 - a) One hour rated:
 - (a) 6" CMU: 55% solid.
 - (b) 8" CMU: 53% solid.
 - (c) 10" CMU: 51.7 solid.
 - b) Two hour rated:

- (a) 6" CMU: 75% solid.
- (b) 8" CMU: 53% solid.
- (c) 10" CMU: 51.7% solid

- F. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required

1.9 MOCK-UP

- A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar, accessories, structural backup, flashings (with lap joint, corner, and end dam), wall insulation, and insert insulation in mock-up.
- B. Locate where directed.
- C. Mock-up may not remain as part of the Work.
- D. Build mockup of typical wall area as directed by YPS Office of Facilities Management and Fuller and D'Angelo, P.C..
- E. Build mockups for the following types of masonry in sizes approximately 8 feet long by 6 feet high by full thickness, including face and backup wythes and accessories. Include a sealant-filled joint at least 16 inches long in each mockup.
 - 1. Typical exterior wall.
 - 2. Typical exterior wall with through-wall flashing installed for a 24-inch length in corner of mockup approximately 16-inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
 - 3. Typical steel stud framing or masonry backup.
 - 4. Show cavity insulation, joint reinforcing, drainage board, weather barrier, mortar net, and weeps..
- F. Clean exposed faces of mockups with masonry cleaner as indicated.
- G. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
- H. Notify YPS Office of Facilities Management and Fuller and D'Angelo, P.C. seven days in advance of dates and times when mockups will be constructed.
- I. Protect accepted mockups from the elements with weather-resistant membrane.
- J. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- K. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - 1. Approval of mockups is also for other material and construction qualities specifically approved by YPS Office of Facilities Management and Fuller and D'Angelo, P.C. in writing.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by YPS Office of Facilities Management and Fuller and D'Angelo, P.C. in writing.
 - 3. **No brick work shall commence until mock-up is completely approved.**
- L. Demolish and remove mockups when directed Owner.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

1. Protect concrete masonry units from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- E. Deliver pre blended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store pre blended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- F. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil
- G. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

1.11 WORKMANSHIP

- A. Contractor shall be responsible for correction of work not conforming to specified requirements. Correct deficient work as directed by Architect.
- B. Remove work found to be defective. Replace with new acceptable work

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Masonry General
 1. Unit Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 "Specifications for Masonry Structures" except where exceeded by the requirements of the contract documents.
 2. Fire Performance Characteristics: Where indicated, provide materials and construction identical to those of assemblies whose fire resistance has been determined in accordance with ASTM E 119 by a testing and inspecting organization, by equivalent concrete masonry thickness, or by another means as acceptable to authorities having jurisdiction.
 3. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color or uniform blend within ranges accepted for these characteristics from one manufacturer for each different product required for each continuous surface or visually related surfaces.
 4. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- B. Concrete Block: Comply with referenced standards and as follows:
 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
 - a. Manufactured to specified dimensions of 3/8 inch less than nominal widths by nominal heights by nominal lengths indicated in drawings. If not shown in drawings, use length to produce coursing with little or no cutting.
 2. Special Shapes: Provide non-standard blocks configured for corners, control joint edges, "U" block, pre-fab bullnose for exposed corners (no grinding), and other detailed conditions.
 3. Load-Bearing Units: ASTM C90, normal weight (light weight not acceptable)

- a. Hollow block, as indicated.
 - b. Exposed Faces: Manufacturer's standard color and texture.
 - c. Strength: Minimum 2,500 @ 28 days.
 - d. Substitutions: 01 6000 - Product Requirements.
4. Non-Loadbearing Units: ASTM C129.
- a. Hollow block.
 - b. Normal weight.
 - c. Strength: Minimum 2,500 @ 28 days.

2.2 BRICK UNITS

- A. Manufacturers:
- B. Face Brick: ASTM C216, Type FBS, Grade SW.
 1. Match existing
 2. Nominal size: As indicated on drawings.
 3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
 4. Compressive strength: 12,000 psi, average, measured in accordance with ASTM C67.
 5. Initial Rate of Absorption: Less than 15.33% when tested per ASTM C 67.
 6. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresce."

2.3 MORTAR AND GROUT MATERIALS

- A. Mortar and Grout: As specified in Section 04 0511.
- B. Water: Clean and potable.

2.4 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 1. Hohmann & Barnard, Inc: www.h-b.com/sle.
 2. Substitutions: 01 6000 - Product Requirements.
- B. Recycled Content: Provide minimum 90 percent postconsumer recycled content. For stainless steel products, provide minimum 60 percent postconsumer recycled content.
- C. All reinforcement and anchors for masonry, located in exterior walls, shall be stainless steel.
- D. All reinforcement and anchors located in interior walls shall be galvanized steel.
- E. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; hot dipped galvanized steel.
- F. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- G. 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.
 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure. Flush weld all keys
 4. Hohmann & Barnard - #120.
- H. Adjustable Cavity Wall Joint Reinforcement with Masonry Backup: ASTM A951/A951M.
 1. Type: Ladder, with adjustable ties spaced at 16 in on center, .
 2. Material: Stainless steel complying with ASTM A580/A580M Type 304 and fabricated with moisture drip for cavity wall with masonry backup.

3. Size: 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire, width of components as required to provide not less than 5/8 inch of mortar coverage from each masonry face. Flush weld all keys.
4. Seismic Feature: Provide lip, hook, or clip on extended leg of wall ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch diameter.
5. Insulation Clips: Provide clips at tabs or ties designed to secure insulation against outer face of inner wythe of masonry.
6. Truss #270-ML with DW-10 Seismicclip Hohmann & Barnard.

2.5 EMBEDDED FLASHING MATERIALS

- A. Combination Asphaltic Flashing Materials - Copper:
 1. Copper/Asphalt Flashing: 7 oz/sq ft copper sheet coated with elastic asphalt compound on both sides.
 2. Drip Plate: Stainless Steel FTSA
 3. Termination Bar: Stainless Steel
 - a. Manufacturers:
 - a) Hohmann & Barnard, Inc; C-Coat: www.h-b.com.

2.6 ACCESSORIES

- A. Preformed Control Joints: Neoprene material. Provide with corner and tee accessories, fused joints (as required).
 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com.
- B. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
 1. #NS Hohmann & Barnard, Inc or equal for use between bottom of lintel and top of masonry wall under steel.
 2. #BS Hohmann & Barnard, Inc or equal under bearing plates.
- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
 - a. Manufacturers:
 - a) Mortar Net Solutions; -: www.mortarnet.com.
 - b. "Mortar net" with insect barrier.
 - a) Thickness: 1-1/2".
 - b) Substitutions: See Section 01 2500 - Substitution Procedures.
- D. Weeps:
 1. Type: Molded PVC grilles, insect resistant.
 2. Color(s): As selected by Fuller and D'Angelo, P.C. from manufacturer's full range.
 - a. Manufacturers:
 - a) Hohmann & Barnard, Inc; Sadell Morar Trap: www.h-b.com/sle.
- E. Cavity Vents:
 1. Type: Molded PVC grilles, insect resistant.
 2. Manufacturers:
 - a. Hohmann & Barnard, Inc; Quadro Vent: www.h-b.com/sle.
 - a) Location brick cavity walls.
 - b. Heckmann Building Products, Inc.
 - a) Locations: brick cavity walls.

- F. Cavity Wall Insulation
1. Extruded-Polystyrene Board Insulation: Rigid, cellular, polystyrene thermal insulation with closed cells and integral high-density skin; formed by the expansion of polystyrene base resin with a carbon-black filler in an extrusion process to comply with the following characteristics:
 - a. Aged thermal resistance (R-value) for 1-inch thickness of 5.0, deg F x h x sq. ft./Btu at 75 deg F at 5 years.
 - b. Compressive strength: 25 as per ASTM D-1621
 - c. Flexural Strength: 75 as per ASTM C-203
 - d. Water Absorption: 0.10 as per ASTM C-272.
 - e. Water Vapor Permeance: 0.6 as per ASTM E-96.
 - f. Water affinity: Hydrophobic.
 - g. Water Capillarity: None. Prism-Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM C 1314, and as follows:
 - a) Prepare 1 set of prisms for testing at 7 days and 1 set for testing at 28 days.
 - h. Dimensional Stability: 2.0 as per ASTM D-2126.
 - i. Linear Coefficient of thermal expansion: 2.7×10^5
 - j. Flame Spread: 5 as per ASTM E-84.
 - k. Smoke Developed: 45-175 as per ASTM E-84.
 - l. Oxygen Index: 24 Min. as per ASTM D-2863
 2. Products: Owens Corning "High Performance Foamular 250": 2" x 16" x 96" R-10 for masonry backup application.
 3. Substitutions: 01 6000 - Product Requirements.
- G. Cavity Insulation Joint Sealing Tape: Rubber asphalt membrane. 40 mil thick, consisting of 36 mil self adhering rubberized asphalt membrane laminated to a 4 mil high density polyethylene film and removable release sheet.
1. Minimum width: 4".
 - a. Primer: As recommended by the manufacturer for application over extruded polystyrene insulation
- H. Expanded Polystyrene Inserts: For installation into the cores of concrete masonry units.
1. All units will comply with ASTM D-2126: Dimensional Stability.
 2. All units will comply with ASTM DC-355: Water Vapor Transmission.
 3. All units will comply with ASTM C-518: Thermal Resistance.
 4. All units will comply with ASTM E-84: Flame Spread
- I. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication.
1. Provide units with either two loops or four loops as needed for number of bars indicated.
 - a. Hohmann & Barnard, Inc. #RB Rebar Positioner
 - b. Hohmann & Barnard, Inc. #RB-Twin Rebar Positioner
- J. Mortar Grout Screen: 1/4" square screen high strength non-corrosive polypropylene polymers.
1. MSG Hohmann & Barnard, Inc.
- K. Epoxy Adhesive: Fiber Glass 1101
1. Use for dowels inserted in existing masonry or concrete.

2.7 MASONRY CLEANERS

- A. Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use

product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Products: :
 - a. Cleaners for Red and light-colored Brick Not Subject to Metallic Staining with Mortar Not Subject to Bleaching:
 - a) ProSoCo, Inc. Sure Klean No. 600 Detergent
 - b. Cleaners for Red and Dark-Colored Brick Not Subject to Metallic Staining:
 - a) ProSoCo., Inc Sure Klean No. 101 Lime Solvent.
 - c. Substitutions: 01 6000 - Product Requirements

2.8 GRAFFITI PROTECTION

- A. Graffiti Protection: ProSoCo Sure Klean Blok-Guard & Graffiti Control II
 1. Application: Graffiti protection all wall surfaces.

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.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.
- D. Notify Construction Manager if construction is not acceptable.
- E. Do not proceed with construction until unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. 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. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work or as required by TMS 402/602.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work or as required by TMS 402/602.
 1. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602 IMIAC and the following:
 - a. When the ambient temperature is within the limits indicated, use the following procedures:
 - a) 40 to 32 deg F (4 to 0 deg C): Heat mixing water or sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C).
 - b) 32 to 25 deg F (0 to -4 deg C): Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry.
 - c) 25 to 20 deg F (-4 to -7 deg C): Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F (4 deg C) if grouting. Use heat on both sides of walls under construction.
 - d) 20 deg F (-7 deg C) and Below: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to

produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F (4 deg C). Provide enclosures and use heat on both sides of walls under construction to maintain temperatures above 32 deg F (0 deg C) within the enclosures.

- e) Cold-Weather Protection: When the mean daily temperature is within the limits indicated, provide the following protection:
 - (a) 40 to 25 deg F (4 to -4 deg C): Cover masonry with a weather-resistant membrane for 48 hours after construction.
 - (b) 25 to 20 deg F (-4 to -7 deg C): Cover masonry with insulating blankets or provide enclosure and heat for 48 hours after construction to prevent freezing. Install wind breaks when wind velocity exceeds 15 mi./h (25 km/h).
 - (c) 20 deg F (-7 deg C) and Below: Provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for 48 hours after construction.
 - f) Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
2. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
- a. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.
 - b. Verify moisture content in brick. If dry wet bricks prior to installation.
 - a) Comply with the requirements of IMIAC.

3.4 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
- 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Where one wythe of multi wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
 - 3. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
 - 4. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - a. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
 - b. Protect sills, ledges, and projections from mortar droppings.
 - c. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - d. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
 - 5. **Under no circumstances shall masonry installation cease or be delayed due to the weather conditions. Installation shall continue using procedures listed above.**

3.5 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: Running to match existing.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.
- D. Brick Units:
 - 1. Bond: As indicated for different locations.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.6 PLACING AND BONDING

- A. General: Comply with referenced unit masonry standard and other requirements indicated applicable to each type of installation included in project.
 - 1. Masonry units shall be laid true, level, plumb and in uniform coursing in accordance with drawings. Corners and angles shall be square unless otherwise indicated in drawings.
 - 2. Lay only dry concrete masonry units. Do not wet concrete masonry units unless approved.
 - 3. Adjust masonry units into final position while mortar is soft and plastic. If units are displaced after mortar has stiffened, remove mortar, clean joints and units, and relay units with fresh mortar.
 - 4. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual thickness of masonry units using units of nominal thickness indicated.
 - 5. Use full-sized units without cutting where possible. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction.
 - 6. Use concrete brick as miscellaneous infill at pockets and elsewhere as needed.
- B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- D. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets.
- E. Layup walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.
- F. Bond Pattern for Exposed Masonry: Lay exposed masonry as follows unless indicated otherwise in drawings:
 - 1. Running Bond.
 - 2. Do not use units with less than nominal 4-inch horizontal face dimensions.
 - 3. Avoid use of less-than-half-sized units at corners, jambs, and where possible at other locations.
 - 4. Where indicated in drawings, match coursing, bonding, color, and texture of new masonry with existing masonry if not Running bond.
- G. Lay concealed masonry with units in wythe in running bond or bonded by lapping not less than 4 inches.
 - 1. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch- horizontal face dimensions at corners or jambs.
- H. At exterior frames, insert extruded polystyrene board insulation around perimeter of frame in thickness indicated but not less than 3/4 inch to act as thermal break between frame and masonry.

- I. Build chases and recesses as shown or required to accommodate items specified in this and other sections of specifications. Provide not less than 8 inches of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.
- J. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to opening.
- K. Nonbearing Interior Partitions: Build full height of story to underside of solid floor or roof structure above and as follows.
 - 1. Install compressible filler in joint between top of partition and underside of structure above. Brace top of wall as shown in drawings.
- L. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.
 - 1. Construct formwork to conform to shape, line, and dimensions shown. Make sufficiently tight to prevent mortar and grout leakage. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- M. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- N. Lay hollow masonry units with face shell bedding on head and bed joints.
- O. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- P. Remove excess mortar and mortar smears as work progresses.
- Q. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- R. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- S. Cut mortar joints flush where wall tile is scheduled, resilient base is scheduled, cavity insulation vapor barrier adhesive is applied, or bitumen dampproofing is applied.
- T. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- U. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.
- V. Stopping and Resuming Work: In each course, rack back one-half unit length for one-half running bond or one-third unit length for one-third running bond. Do not tooth. Clean exposed surfaces of set masonry. Wet clay masonry units lightly if required. Remove loose masonry units and mortar prior to laying fresh masonry.

3.7 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally directly above through-wall flashing, above shelf angles and lintels, and at bottom of walls.
- B. Install cavity vents in veneer and cavity walls at 24 inches on center horizontally below shelf angles and lintels and near top of walls.

3.8 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.
- D. Install mortar diverter at every floor level. For wall cavities that exceed 11' in height, place an additional continuous trapezoidal strip on wall reinforcing anchors/ties at every 9' to 11' of wall height.

- E. Flashing should extend at least 6" above the top of mortar diverter, as should any other materials used to fill space between mortar diverter and inside cavity surface.
- F. No more than 1/4" should be left between mortar diverter and cavity's inside surface (flashing or filler).
- G. Installing Cavity-Wall Insulation:
 - 1. For attachment to metal framing backup anchor thru insulation and sheathing into the metal stud using masonry anchors specified. Butt joints tightly both ways. Install tongue and groove panels with tongue in the up position.
 - a. Seal all joints between insulation board units in cavity with joint sealing tape, to form a tight seal at all joints, including areas around masonry anchors and other openings. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
 - 2. For attachment to masonry backup place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

3.9 INSTALLATION OF REINFORCING STEEL

- A. Place reinforcement as detailed in drawings. Secure against displacement prior to grouting. Horizontal bars may rest on cross web of hollow units.
- B. Tolerances for placement of reinforcing steel in walls and flexural members shall be as follows:
 - 1. Plus/minus 1/2 inch for depth equal to 8 inches or less.
 - 2. Plus/minus 1 inch for depth equal to 24 inches or less but greater than 8 inches.
 - 3. Plus/minus 1 1/2 inches for d equal to 24 inches or less.
 - 4. Plus/minus 2 inches for longitudinal location of reinforcement.
- C. Clearance between reinforcing steel and surface of masonry shall not be less than 1/4 inch for fine grout and 1/2 inch for coarse grout.
- D. Lap reinforcing bars as shown in drawings.
- E. Positioners: Provide positioners to maintain position of vertical reinforcing bars at each lap splice or at maximum spacing of 10 feet, whichever is less. Where these positioners are within 1/2 inch of surface of masonry, galvanize according to ASTM Standard A 153.
- F. Provide continuous bond beams reinforced with two No. 5 bars at floors, roof, and tops of parapets unless otherwise noted. Provide corner bars same size as continuous reinforcing in wall corners and intersections, lapped 2 feet with continuous reinforcing.
- G. Provide minimum vertical reinforcing of one No. 5 bar in window and door jambs, at ends of walls, corners, and each side of vertical control joints. Locate bar maximum 16 inches from end of CMU.

3.10 HORIZONTAL JOINT REINFORCEMENT

- A. General:
 - 1. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
 - 2. Place continuous joint reinforcement in first and second joint below top of walls.
 - 3. Lap joint reinforcement ends minimum 6 inches.
 - 4. 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 16 inches horizontally and 16 inches vertically.
 - 5. Masonry Veneer:

- a. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 36 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
 - b. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center and 36" o.c. vertically..
6. Cavity Wall Masonry:
- a. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 16 inches vertically.
7. Multiple Wythe Masonry:
- a. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
 - b. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 16 inches vertically.

3.11 ANCHORED MASONRY VENEER TO LIGHT-GAUGE BACKUP WALLS

- A. Anchor single-wythe masonry veneer to metal studs with masonry veneer anchors to comply with the following requirements:
1. Fasten each anchor section through sheathing and insulation to metal studs as indicated.
 2. Install Self-Sealing Tape behind anchor sections.
 3. Embed tie section in masonry joints. Provide not less than 2-inch air space between back of masonry veneer wythe and face of sheathing or insulation.
 4. Locate anchor section relative to course in which tie section is embedded to allow maximum vertical differential movement of tie up and down.
 5. Space anchors as indicated but not more than 16 inches on-center vertically and horizontally. Install additional anchors within 1 foot of openings and at intervals around perimeter not exceeding 8 inches.
- B. If masonry veneer is concrete-masonry, provide single-wythe joint reinforcing at 16 inches vertically, staggered with ties.

3.12 BONDING CAVITY WALLS/MULTI WYTHER MASONRY

- A. Bond wythes together using one of the following methods:
1. Individual Two-Piece Wire Ties: Use continuous horizontal joint reinforcing with individual ties installed in horizontal joints spaced not to exceed 16 inches on-center horizontally and 16 inches on-center vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 8 inches on-center around perimeter of openings. Provide two-piece adjustable ties where wythes do not align.
 2. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
 - b. Where bed joints do not align, use tab-type horizontal joint reinforcing with adjustable one-piece double-pintle wire ties.
 - a) Where one wythe is of clay masonry and the other of concrete-masonry, use adjustable-type (two-piece-type) ties.

3.13 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
1. Provide open space not less than 1 inch wide between masonry and structural member unless otherwise indicated. Keep open space free of mortar or other rigid materials.

2. Anchor masonry to structural members with adjustable anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated but not more than 16 inches on center vertically and horizontally.

3.14 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 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, 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 plastic, laminated, and EPDM flashings to within 1/4 inch of exterior face of masonry.
- C. Lap end joints of flashings at least 4 inches and seal watertight with mastic or elastic sealant.
- D. Install flashing a minimum of 6" above cavity mortar drainage system.

3.15 LINTELS

- A. Install precast concrete lintels or concrete masonry "U" block unit over openings.
- B. Provide masonry lintels where shown and wherever openings of more than 1 foot for brick-sized units and 2 feet for block-sized units are shown without structural steel or other supporting lintels. Provide precast or formed-in-place masonry lintels. Cure precast lintels before handling and installing. Temporarily support formed-in-place lintels.
- C. Maintain minimum 8 inch bearing on each side of opening.

3.16 GROUTED COMPONENTS

- A. General:
 1. Use grout to fill masonry. Do not use mortar.
 2. Reinforcement must be in place prior to grouting.
 3. Install vertical grout dams at maximum horizontal spacing of 30 feet to control horizontal flow of grout. For walls partially grouted, use expanded metal lath mesh or other material that will not interfere with bond to restrict grout into only those cells that are to be grouted.
 4. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
 5. Grout to 1½ inches below top of masonry units for each lift to form and interlock with subsequent masonry and grouting. Where bond beams occur, stop grout pour minimum 1½ inch below top of masonry. At top of masonry, fill grout space flush with tops of units and consolidate.
 6. Solidly grout cells and spaces containing reinforcing steel for partially grouted walls. For solid grouted walls, grout all cells.
 7. Consolidate grout using mechanical vibrator, and re-consolidate using mechanical vibrator after excess water is absorbed into masonry units.
 - a. Do not consolidate or re-consolidate self-consolidating grout.
- B. Reinforce bond beams with 2, No. 5 bars, 1 inch from bottom web.
- C. Lap splices minimum 24 bar diameters or as shown on structural drawings..
- D. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- E. Place and consolidate grout fill without displacing reinforcing.
- F. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.
- G. Low Lift Grouting:

1. Construct masonry wall up to 5 feet 4 inches (vertically) at a time. Minimum height of grout lift creating a cold joint shall equal splice length of reinforcing indicated in drawings.
2. Install vertical and horizontal reinforcing steel, anchors, and embedded items as masonry work progresses.
3. Grout walls in 5 foot 4 inch maximum lifts, consolidating and consolidating each lift. Stop grout 1½ inch below top of top course.
 - a. Do not consolidate or re-consolidate self-consolidating grout.

H. High Lift Grouting

1. Construct masonry wall up to 24 feet maximum without grouting.
2. Provide positioners to secure vertical reinforcement in correct location.
3. If grouting is to be stopped for more than one hour during a pour, stop grout 1½ inch below top of uppermost grouted unit (top of pour). Where additional masonry is to be laid above a given pour, stop grout 1½ inch below top of top course.

3.17 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joints as indicated on drawings; if not indicated, 3/8 inch wide and 1/2" deep.
- D. Size control joint in accordance with Section 07 9200 - Joint Sealants for sealant performance.
- E. Form expansion joint as detailed on drawings.

3.18 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames, glazed frames, window frames, anchor bolts, and plates and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

3.19 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation from Alignment of Columns: 1/4 inch.
- C. Maximum Variation From Unit to Adjacent Unit: as per ASTM.
- D. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- E. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- F. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- G. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- H. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- I. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.20 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.21 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. Simultaneously remove only limited sections of existing masonry; support and protect masonry remaining next to and above the removal areas.
- C. Install new cap flashings and wall flashing extensions, properly lapped under and connected to the existing wall flashings, as indicated on the drawings and specified elsewhere, before installing new bricks.
- D. Wet bricks which have initial rates of absorption (suction) greater 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.
- E. Install new brick to replace removed brick. Fit replacement bricks to match the original bond and course pattern. Use a motor driven diamond blade wet saw to cut bricks with clean, sharp unchipped edges.
- F. Lay replacement brick with completely filled bed, head and collar joints. Butter the ends with sufficient mortar to fill the head joints and shove the bricks into place.
- G. Install new bricks with mortar joints to match the width of the adjoining brick joints. Tool the new joints to match existing joints in surrounding brickwork.

3.22 FIRE RATED WALL MARKING AND IDENTIFICATION

- A. For all masonry walls or partitions indicated to be fire rated, or smoke rated, where there is an accessible concealed floor, ceiling or attic space adjacent to said wall. Contractor shall permanently mark with signs or stenciling within the concealed space, in accordance with IBC 703.7 in concealed spaces.
 - 1. Identifications shall be located within 15 feet of the end of each wall or partition and at intervals not exceeding 30 feet measured horizontally along the wall or partition.
 - 2. Identifications shall include lettering not less than 3 inches in height with a minimum 3/8 inch stroke width in a contrasting color incorporating the wording “ FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS”.

3.23 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Inspecting installation of anchors, joint reinforcing, cavity insulation, cavity mortar net, weep holes etc.
 - 1. Weep holes shall be tested by placing water (by bucket or hose) into cavity.

3.24 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.
- E. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- F. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
- G. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- H. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel un cleaned for comparison purposes. Obtain YPS Office of Facilities Management's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and non masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.25 PROTECTION

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

3.26 MASONRY WASTE DISPOSAL

- A. Excess Masonry Waste: Remove excess, clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property

END OF SECTION

**SECTION 04 7200
CAST STONE 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. Architectural cast stone.
- B. Units required are:
 - 1. Exterior sills.

1.3 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Mortar for setting cast stone and installation of cast stone in conjunction with masonry.
- B. Section 07 6200 - Sheet Metal Flashing and Trim.
- C. Section 07 9200 - Joint Sealants: Sealing joints indicated to be left open for sealant.

1.4 REFERENCE STANDARDS

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A 185/A 185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018, with Editorial Revision (2018).
- E. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).
- F. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- G. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2018.
- H. Cast Stone Institute® Technical Manual Cast Stone Institute® Technical Manual.

1.5 DEFINITIONS

- A. Cast Stone – A refined architectural concrete building unit manufactured to simulate natural cut stone, used in unit masonry applications.
 - 1. Dry Cast Concrete Products – manufactured from zero slump concrete.
 - a. Vibrant Dry Tamp (VDT) casting method: Vibratory ramming of earth moist, zero-slump concrete against a rigid mold until it is densely compacted.
 - b. Machine casting method: manufactured from earth moist, zero-slump concrete compacted by machinery using vibration and pressure against a mold until it becomes densely consolidated.
 - 2. Wet Cast Concrete Products - manufactured from measurable slump concrete.
 - a. Wet casting method: manufactured from measurable slump concrete and vibrated into a mold until it becomes densely consolidated.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Test results of 7,000 psi cast stone components made previously by the manufacturer or design mix prepared for this project conforming to paragraph 2.2 Strength requirements and 2.3 Materials of cast stone components made previously by the manufacturer.
 - 1. Include one copy of ASTM C1364 for YPS Office of Facilities Management and Fuller and D'Angelo, P.C.'s use.
- C. Product Data water repellent.
- D. Shop Drawings: Include plans, elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- E. Mortar Color Selection Samples.
- F. Verification Samples: Pieces of actual cast stone components not less than 12 inches square, illustrating range of color and texture to be anticipated in components furnished for the project.
- G. Source Quality Control Test Reports.
- H. Warranty: Cast Stone Institute member limited warranty
- I. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Current producer member of the Cast Stone Institute or the Architectural Precast Association.
 - 2. Manufacturer's production facility currently holds a Plant Certification from the Cast Stone Institute or the Architectural Precast Association.
 - 3. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Standards: Comply with the requirements of the Cast Stone Institute® Technical Manual and the project specifications. Where a conflict may occur, the contract documents shall prevail.
- D. Testing Agency Qualifications: An independent testing agency, qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
 - 1. Three (3) field cut cube specimens from each of these samples shall have an average minimum compressive strength of not less than 85% with no single specimen testing less than 75% of design strength as allowed by ACI 318.
 - 2. Three (3) field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6%.
 - 3. Field specimens shall be tested in accordance with ASTM C 1194 and C 1195
- E. Source Limitations for Cast Stone: Obtain cast stone units through one source from a single manufacturer

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Package units and protect them from staining or damage during shipping and storage.
- B. Provide an itemized list of product to support the bill of lading.
- C. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- D. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- E. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.

- F. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- G. Store mortar materials where contamination can be avoided.
- H. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports
- I. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

1.9 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a ten (10) year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Architectural Cast Stone:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following
 - a. Sun Precast Co., Inc., 4051 Ridge Rd, Beaver Springs, PA 17812. (570) 658-8000 .
 - b. Architectural Cast Stone, Inc; 1953 N. Ohio Street, Wichita, KS 67214; 316-262-5543
 - c. Custom Cast Stone, Inc.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.2 ARCHITECTURAL CAST STONE

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural limestone, complying with ASTM C1364.
 - 1. Compressive Strength: 6,500-psi minimum at 28 days
 - 2. Maximum Water-Cement Ratio at Point of Placement: 0.40
 - 3. Absorption - ASTM C 1195: 6% maximum by the cold water method, or 10% maximum by the boiling method for products at 28 days
 - 4. Air Content - ASTM C173 or C 231, for wet cast product shall be 4-8% for units exposed to freeze-thaw environments. Air entrainment is not required for VDT products
 - 5. Thaw Resistance: Demonstrated by field experience. The CPWL shall be less than 5% after 300 cycles of freezing and thawing.
 - 6. Linear Shrinkage - ASTM C 426: Shrinkage shall not exceed 0.065%.
 - 7. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet.
 - 8. All surfaces intended to be exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/32 in. (0.8 mm) and the density of such voids shall be less than 3 occurrences per any 1 in. 2 (25 mm²) and not obvious under direct daylight illumination at a 5 ft (1.5m) distance.
 - 9. Units shall exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a 10 ft (3m) distance.
 - 10. Color: Match existing.
 - 11. Remove cement film from exposed surfaces before packaging for shipment.
- B. Shapes: Provide shapes indicated on drawings.
 - 1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
 - 2. 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.
- C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.
- 1. Pieces More than 24 inches in Any Dimension: Provide full length two-way reinforcement of cross-sectional area not less than 0.25 percent of unit cross-sectional area.
 - 2. Pieces More than 12 inches Wide: Provide full length two-way reinforcement of cross-sectional area not less than 0.25 percent of unit cross-sectional area.

2.3 MATERIALS

- A. Portland Cement: ASTM C150/C150M.
 - 1. For Units: Type I, white or gray as required to match existing.
- B. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.
- C. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.
- D. Pigments: ASTM C979, inorganic iron oxides; do not use carbon black.
- E. Admixtures: ASTM C 494/C 494M for water reducing, retarding, accelerating and high range admixtures.
- F. Air-Entraining Admixture: ASTM C 260, certified by the manufacturer to be compatible with other admixtures used.
 - 1. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 5 to 7 percent
- G. ASTM C 618 mineral admixtures of dark and variable colors shall not be used in surfaces intended to be exposed to view.
- H. Water: Potable.
- I. Reinforcing Bars: ASTM A615/A615M deformed bars, epoxy coated.
- J. Suggested Cast Stone Anchors:
 - 1. All anchors shall be sized and detailed for the appropriate specific conditions.
 - 2. Anchor Pin: Type 304 Stainless Steel type and size as required
 - a. #433 by Hohmann & Barnard.
- K. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; Use products approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.
- L. Refer to Section 07 6200 - Sheet Metal Flashing and Trim for metal flashings.
- M. Section 04 0511 - Mortar and Masonry Grout

2.4 SOURCE QUALITY CONTROL

- A. Test compressive strength and absorption of specimens selected at random from plant production.
 - 1. Test in accordance with ASTM C1194 Compressive Strength and ASTM C 1195- Absorption.
 - 2. Select specimens at rate of 3 per 500 cubic feet, with a minimum of 3 per production week.
 - 3. Submit reports of tests by independent testing agency, showing compliance with requirements.

2.5 FABRICATION

- A. Provide cast stone units complying with ASTM C 1364.
- B. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666, Procedure A, as modified by ASTM C 1364.

- C. Reinforce units as indicated and as required by ASTM C 1364. Use epoxy-coated reinforcement when covered with less than 1-1/2 inches of material or when specified.
 - 1. Reinforce units as required for safe handling and structural stress.
- D. Fabricate units with sharp arris and details accurately reproduced with indicated texture on all exposed surfaces, unless otherwise indicated.
 - 1. Slope exposed horizontal surfaces at least 1:12, unless otherwise indicated.
 - 2. Provide drips on projecting elements.
- E. Fabricate all corner coping stones in 90 degree section
- F. Cure and finish units as follows:
 - 1. Cure units in totally enclosed curing room under dense fog and water spray at 95 percent relative humidity for 24 hours.
 - 2. Colors and Textures: Match existing units.

2.6 ACCESSORIES

- A. High Impact resilient setting shims.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine construction to receive cast stone components. Notify YPS Office of Facilities Management and Fuller and D'Angelo, P.C. if construction is not acceptable.
- B. Do not begin installation until unacceptable conditions have been corrected.

3.2 INSTALLATION

- A. Install cast stone components in conjunction with masonry, complying with requirements of Section 04 2000 - Unit Masonry.
- B. Mechanically anchor cast stone units indicated; set remainder in mortar.
- C. Setting:
 - 1. Drench cast stone components with clear, running water immediately before installation.
 - 2. Set units in a full bed of mortar unless otherwise indicated.
 - 3. Fill vertical joints with mortar.
 - 4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
 - 5. Set dowels with epoxy grout.
 - 6. Build concealed flashing into mortar joints as units are set.

3.3 TOLERANCES

- A. Manufacturing Tolerances:
 - 1. Cross section dimensions shall not deviate by more than $\pm 1/8$ in. (3mm) from approved dimensions.
- B. Installation Tolerances:
 - 1. Variation from Plumb: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
 - 2. Variation from Level: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet, or 3/8 inch maximum.
 - 3. Variation in Joint Width: Not more than 1/8 inch in 36 inches or 1/4 of nominal joint width, whichever is less.

3.4 FIELD QUALITY CONTROL

- A. Inspect finish installation in accordance to Cast Stone Institution Technical Bulletin 36.

- B. Notify YPS Office of Facilities Management in advance of times when lift devices and/or 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.

3.5 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.
- D. Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet.
 - 1. Repair with matching touchup material provided by the manufacturer and in accordance with manufacturer's instructions.
 - 2. Repair methods and results subject to Fuller and D'Angelo, P.C. 's approval.
- E. Clean completed exposed cast stone after mortar is thoroughly set and cured.
 - 1. Wet surfaces with water before applying cleaner.
 - 2. Apply cleaner to cast stone in accordance with manufacturer's instructions.
 - 3. Remove cleaner promptly by rinsing thoroughly with clear water.
 - 4. Do not use acidic cleaners.

3.6 PROTECTION

- A. Protect completed work from damage.
- B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.
- C. Protect from splashing by mortar and other damage.

END OF SECTION

**SECTION 05 3100
STEEL DECKING**

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. Cellular acoustical roof deck.
- B. Roof deck.
- C. Composite floor deck.

1.3 RELATED REQUIREMENTS

- A. Section 01 4533 - Code-Required Special Inspections and Procedures.
- B. Section 03 3000 - Cast-in-Place Concrete: Concrete slab over metal deck.

1.4 REFERENCE STANDARDS

- A. AISI "Specification for the Design of Cold Formed Steel Structural Members."
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2018.
- 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. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- F. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- G. FM DS 1-28 - Wind Design; 2016.
- H. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; Factory Mutual System; 2016.
- I. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2017.
- J. ICC-ES AC43 - Acceptance Criteria for Steel Deck Roof and Floor Systems; 2016.
- K. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.
- L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- M. UL (FRD) - Fire Resistance Directory; Current Edition.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide deck profile characteristics, dimensions, structural properties, shear connectors, and finishes.
- C. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, accessories, and anchorage details showing locations and size of welds or mechanical fasteners if used.
- D. Include the following as required:
 - 1. Each condition requiring closure panels.
 - 2. Location and attachment of accessories.

3. Supplementary framing furnished and required.
 4. Special conditions; opening locations.
 5. Side-lap fastening.
 6. Material thickness.
 7. Deck finish.
 8. Cross-section of panel with dimensions.
- E. Calculations: Submit calculations for powder-actuated fasteners indicating required diaphragm capacity has been provided in accordance with the Performance Requirements section of this Specification and the Drawings.
- F. Certificates: Certify that products furnished meet or exceed specified requirements.
- G. Submit manufacturer's installation instructions.
- H. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.6 QUALITY ASSURANCE

- A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in New York State.
- B. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
- C. Installer Qualifications: Company specializing in performing the work of this Section with minimum five (5) years of experience.
- D. Provide Certification of satisfactorily passing AWS qualification tests within previous 12 months to perform type of welding in work.
- E. Underwriters' Label: Provide metal floor deck units listed in Underwriters' Laboratories "Fire Resistance Directory," with each deck unit bearing the UL label and marking for specific system detailed.
- F. FM Listing: Provide steel roof deck units that have been evaluated by Factory Mutual System and are listed in "Factory Mutual Approval Guide" for Class 1, fire-rated construction.
- G. Field advisor shall prepare a written report summarizing information listed above. Submit report to Owner's Representative, Architect, and Construction Manager.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.
- C. Protect from weather, and keep free of dirt and debris.
- D. Ventilate to avoid condensation.
- E. Handle material carefully so it is not bent or marred.
- F. Replace damaged materials at no cost to Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Steel Deck:
1. Canam Steel Corporation: www.canam-steeljoists.ws.
 2. Nucor-Vulcraft Group: www.vulcraft.com/#sle.
 3. Substitutions: See Section 01 2500 Substitution Procedures.

2.2 STEEL DECK

- A. General:
1. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.

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2. Materials shall be new and free from rust.
 3. Galvanized and Painted (Shop-primed) Steel Deck: ASTM A 653, with galvanized coating. Designation G 60, extra smooth, with no oil preservatives. Cleaned and phosphatized, with one coat of shop primer. Areas of metal deck to be galvanized and shop primed are indicated in the drawings. Minimum 40,000 psi yield strength.
 4. Calculate to structural working stress design and structural properties specified.
 5. Maximum Vertical Deflection of Floor Deck: 1/360 of span.
 6. Maximum Vertical Deflection of Roof Deck: 1/240 of span.
- B. Cellular acoustical Roof Deck: Non-composite type, steel sheet with plain vertical flute faces perforated with 1/8 inch diameter holes staggered 3/8 inch on center:
1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
 3. Structural Properties:
 - a. Section modulus: 40,000 pai.
 - b. Span Design: Multiple.
 4. Minimum Base Metal Thickness: 18 Gage.
 5. Nominal Height: 3 inch.
 6. Type: BA
 7. Formed Sheet Width: 24 inch.
 8. Side Joints: Lapped, mechanically fastened.
 9. End Joints: Lapped, mechanically fastened.
 10. Fire Resistance Classification: Comply with UL (FRD) Assembly Number ____.
 11. Flute insulation: Fiberglass acoustical insulation.
- C. Roof Deck: Non-composite type, fluted steel sheet:
1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
 2. Structural Properties:
 - a. Section Modulus: 40,000 psi.
 - b. Span Design: Multiple.
 3. Minimum Base Metal Thickness: 18 Gage.
 4. Type: B and N.
 5. Nominal Height: 2" for Type B and 3" for Type N inch.
 6. Profile: Fluted; SDI NR.
 7. Formed Sheet Width: 36 inch.
 8. Side Joints: Lapped, mechanically fastened.
 9. End Joints: Lapped, mechanically fastened.
- D. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
 3. Span Design: Single.
 4. Minimum Base Metal Thickness: 18 Gage.
 5. Nominal Height: 2 inch.
 6. Type: B
 7. Profile: Fluted; SDI NR.

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8. Formed Sheet Width: 36 inch.
9. Side Joints: Lapped, welded.
10. End Joints: Lapped, welded.
11. Provide deck units with integral embossing or raised pattern to furnish mechanical bond with concrete slabs. Open-beam deck units shall have fluted section with interlocking side laps.

2.3 ACCESSORY MATERIALS

- A. Welding Materials: AWS D1.1/D1.1M.
- B. Fasteners: Galvanized hardened steel, self tapping.
- C. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
 1. Design Requirements for Sidelap Connections: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM)SDI design method for roof deck and floor deck applications and ICC-ES AC43.
 2. Fasteners for Steel Roof Decks Protected with Waterproofing Membrane: ASTM B633, SC1, Type III zinc electroplate.
- D. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- F. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.
- G. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit deck.

2.4 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage, 0.0299 inch thick sheet steel; of profile and size as indicated; finished same as deck.

2.5 FABRICATION

- A. General: Form deck units in lengths to span three or more supports.
 1. Provide flush or 2-inch nested end laps for roof deck, except at joists provide 4-inch nested end laps.
 2. Provide flush end laps for floor deck.
 3. Use Lapped, mechanically fastened.
 4. Prior to shipping decking to job site, manufacturer shall wire-brush, grind, clean, and paint scarred areas (weld marks on cellular deck, scratches, rust spots, etc.) on top and bottom surfaces of decking units.
 - a. Touch up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.
- B. Metal Cell Closures: Fabricate metal closure strips for cell raceways and openings between decking and other construction. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On masonry surfaces provide minimum 4 inch bearing.
- C. On steel supports provide minimum 1-1/2 inch bearing.

- D. Fasten deck to steel support members at ends and intermediate supports at 12 inches on center maximum, parallel with the deck flute and at each transverse flute using methods specified.
 - 1. Welding: Use fusion welds through weld washers.
 - 2. Place and secure special deep fluted sections for integral concrete bridging.
- E. Clinch lock seam side laps.
- F. At mechanically fastened male/female side laps fasten at 24 inches on center maximum.
- G. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.
- H. At welded male/female side laps weld at 18 inches on center maximum.
- I. Weld deck in accordance with AWS D1.3/D1.3M.
- J. At deck openings from 6 inches to 18 inches in size, provide 2 by 2 by 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
- K. At deck openings greater than 18 inches in size, provide steel angle reinforcement. as specified in Section 05 1200.
- L. Provide pour stops, girder fillers and floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.
- M. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
- N. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.
- O. Place metal cant strips in position and fusion weld.
- P. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- C. Remove and replace work that does not comply with specified requirements.
- D. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements

3.4 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

3.5 TOLERANCES

- A. Maximum variation in deck unit alignment shall be 1/4 inch in 40 feet.

END OF SECTION

**SECTION 05 4000
COLD-FORMED METAL FRAMING**

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. Soffit, acoustical tile and miscellaneous framing.
- B. Manufacturer's accessories.

1.3 RELATED REQUIREMENTS

- A. Section 05 3100 - Steel Decking.
- B. Section 04 2000 - Unit Masonry for masonry anchors and cavity insulation.
- C. Section 05 5000 - Metal Fabrications for masonry shelf angles and connections
- D. Section 07 9200 - Joint Sealants.
- E. Section 09 2116 - Gypsum Board Assemblies: Lightweight, non-load bearing metal stud framing.
- F. Section 09 2400 - Cement Plastering.
- G. Section 09 5100 - Acoustical Ceilings: Ceiling suspension system.

1.4 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
- B. AISI 200 North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)
- C. AISI S211 "North American Standard for Cold-Formed Steel Framing - Wall Stud Design".
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- F. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members; 2018.
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- H. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.6 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.

1.7 MATERIAL EVALUATION/QUALITY CONTROL

- A. Submit testing service qualifications demonstrating experience with similar types of projects.

1.8 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations .
- C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- D. Shop Drawings: Indicate component details, framed openings, anchorage, and type and location of fasteners, and accessories or items required of related work.
 - 1. Indicate stud layout.
 - 2. Describe method for securing studs to tracks and for bolted framing connections.
 - 3. Calculations for loadings and stresses of specially fabricated framing, signed and sealed by a professional structural engineer.
- E. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention .
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Welder's Certifications.

1.9 QUALITY ASSURANCE

- A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in New York State 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
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.10 MOCK-UP

- A. Provide mock-up of framing, including components specified elsewhere, such as soffits.
- B. Mock-Up Size: 2 by 1 feet, including corner condition.
- C. Location: As directed.
- D. Mock-up may remain as part of the Work.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.
- C. Handle material carefully so it is not bent or marred.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Framing:
 - 1. Marino; ____: www.marinoware.com.
 - 2. The Steel Network, Inc: www.SteelNetwork.com.
 - 3. Substitutions: 01 6000 - Product Requirements
- B. Framing Connectors and Accessories:

1. Same manufacturer as metal framing.

2.2 FRAMING SYSTEM

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Requirements: Provide completed framing system having the following characteristics:
 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-12.
 2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
 3. Design Loads: In accordance with applicable codes.
 4. Live load deflection meeting the following, unless otherwise indicated:
 - a. Exterior Walls: Maximum horizontal deflection under wind load of 1/360 of span.
 5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
 6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
 7. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, panel failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
 8. Design exterior non-load-bearing curtain-wall framing to "C" accommodate horizontal deflection without regard for contribution of sheathing materials

2.3 FRAMING MATERIALS

- A. Studs and Track: ASTM C955; studs formed to channel, "C" shape with punched web; U-shaped track in matching nominal width and compatible height.
 1. Gage: 0.0566 inch. (16 gauge) unless shown otherwise.
 2. Stud Depth: 3-5/8 inch unless shown otherwise..
 3. Galvanized in accordance with ASTM A653/A653M, G60/Z180 coating.
 - a. Provide minimum G90 coating for exposed exterior environments.
 4. Provide components fabricated from ASTM A1008/A1008M, Designation SS (structural steel).
- B. Framing Connectors: Factory-made, formed steel sheet.
 1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gage, 0.1345 inch, and factory punched holes and slots.
 2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
 3. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.
- C. Vertical Deflection Clips: Manufacturer's standard clips, capable of accommodating required out-of-plan loading and upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- D. Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and section properties as indicated on drawings.

2.4 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.

2.5 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.6 FABRICATION

- A. General: Prefabricate framing components into assemblies before erection wherever possible. Fabricate panels plumb, square, true to line, and braced against racking with joints welded. Perform lifting of prefabricated units to prevent damage or distortion.
- B. Fastenings: Attach components by welding, bolting, or screw fasteners as standard with manufacturer unless noted otherwise in drawings.
- C. Wire-tying of framing components shall not be permitted.
- D. Cut framing components squarely or on an angle required to fit tightly with proper bearing against abutting members. Maintain members firmly in position until permanently fastened.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that building framing components are ready to receive work.
- B. Verify field measurements and adjust installation as required.

3.2 PREPARATION

- A. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction

3.3 INSTALLATION OF STUDS

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using welding or fastener method.
 - 1. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - 2. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads
- C. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install intermediate studs above and below openings to align with wall stud spacing.
- E. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- F. Touch-up field welds and damaged galvanized surfaces with primer.

3.4 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing agency to perform field quality-control testing.
- B. Field and shop welds will be subject to inspection and testing.
- C. Testing agency will report test results promptly and in writing to Contractor and YPS Office of Facilities Management and Fuller and D'Angelo, P.C.
- D. Remove and replace Work that does not comply with specified requirements.

- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements

3.5 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure cold-formed metal framing is without damage or deterioration at time of Substantial Completion

3.6 TOLERANCES

- A. Framing and prefabricated assemblies:
- B. Length of end bearing members: + 1/16 inch.
 - 1. Vertical alignment of studs: + 1/8 inch in 10 feet.
 - 2. Horizontal alignment of walls: + 1/8 inch in 10 feet; 1/4-inch maximum deviation from theoretical line.
 - 3. Framing spacing: + 1/8 inch from design spacing; 1/2-inch maximum cumulative error.
 - 4. Maximum variation in plane and true position between prefabricated assemblies should not exceed 1/4 inch.

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 and aluminum items.
- B. Downspout boots.
- C. Steel framing for canopy.
- D. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- E. Loose lintel where required for work under this section.
- F. Elevator machine hoist beam.
- G. Support angles for elevator door sills.
- H. Loose bearing plates.
- I. Elevator pit ladder
- J. Floor Hatch
- K. Sump Pit Covers
- L. Wall heater.

1.3 RELATED REQUIREMENTS

- A. Section 01 4000 - Quality Requirements for testing requirements and procedures.
- B. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- C. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- D. Section 05 3100 - Steel Decking: Bearing angles for metal deck bearing, including anchorage.
- E. Section 07 7123 - Manufactured Gutters and Downspouts.
- F. Section 07 7200 - Roof Accessories for roof access ladder and security cover.
- G. Division 7 for roofing and sheet metal flashings for roof penetrations and installations associated with steel support roof framing.
- H. Section 09 9113 - Exterior Painting: Paint finish.
- I. Section 09 9123 - Painting: Paint finish.
- J. Division 26 Electrical.

1.4 REFERENCE STANDARDS

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2016).
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- G. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014 (Editorial 2017).
- H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- I. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.
- J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- L. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2017.
- M. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- N. SSPC-SP 2 - Hand Tool Cleaning; 1982, with Editorial Revision (2004).

1.5 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- B. 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. Floor hatch.
 - 3. Elevator pit ladder.
 - 4. Metal downspout boots.
 - 5. Pit covers and frames.
 - 6. Wall heater
 - 7. 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. 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.
- B. Coordinate with HAVC Contractor's equipment prefabricated curbs, portals, and conduit.
- C. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Plates: ASTM A283/A283M.
- C. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 MATERIALS - ALUMINUM

- A. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H34 temper.
- B. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.

2.3 MATERIALS - STAINLESS STEEL

- A. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 316L.
- B. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L.
- C. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 316L.
- D. Bars and Shapes: ASTM A 276, Type 316L

2.4 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 es 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. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.5 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.
- 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

2.6 FABRICATED ITEMS

- A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; mill finish.
 - 1. Comply with ANSI A14.3, unless otherwise indicated.
 - a. For elevator pit ladders, comply with ASME A17.1.
 - b. Side Rails: 3/8 x 2 inches members spaced at 20 inches.
 - c. Rungs: 3/4 inch diameter solid round bar spaced 12 inches on center.
 - d. Space rungs 7 inches from wall surface.
 - e. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung by a proprietary process.
- B. Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking and masonry; galvanized finish.
- C. Lintels: As detailed; Prime paint interior galvanized for exterior finish.

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.
- D. Pit Frame and Grating: Provide aluminum grating sump pit cover and frame for elevator pit.
1. Coordinate with elevator and plumbing drawings.
 - a. Bar Size: 1"H x 3/16" thick.
 - b. Overall Size: 24" x 24".
 - c. Spacing Between Bars: 1".
 - d. Cross Bar Spacing: 4".
 - e. Finish: Mill.
 2. Product:
 - a. McNichols "#67013153"; Voice:855.981.1794; www.mcnichols.com
- E. Elevator Hoistway Beams: Beam sections; prime paint finish.
- F. Floor Hatch
1. Single leaf access door shall be provided as follows:
 - a. Cover: 1/4" aluminum with a 1" fillable pan to receive terrazzo tile to withstand a live load of 150 lb/sq. ft with a maximum allowable deflection of 1/150th span.
 - b. Frame: 1/4" extruded aluminum channel with built-in neoprene cushion and with 1" extruded anchor flange.
 - c. Lifting Mechanism: Compression spring operators enclosed in telescopic tubes to provide smooth, easy, and controlled cover operation throughout the entire arc of opening and to act as a check in retarding downward motion of the cover when closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe fastened to a formed 1/4" gusset support plate.
 - d. Handle: Removable exterior turn/lift handle with spring loaded ball detent. The latch release shall be protected by a flush, gasketed, removable screw plug.
 - e. Hinges: Continuous heavy duty Type 316 stainless steel accessible only when the cover is in the open position.
 - f. Hold-open arm with red vinyl handle.
 - g. Gas strut mechanism with powder coat finish
 - h. Finish: Aluminum shall be mill finish. Hardware shall be zinc plated and chromate sealed.
 2. Installation shall be in accordance with the manufacturer's instructions. Manufacturer shall guarantee against defects in material or workmanship for a period of five years.
 3. Acceptable Manufacturers:
 - a. Bilco Company, Type TER 26" +/- x 38" +/- (custom size to match existing opening)..

2.7 DOWNSPOUT BOOTS

- A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
1. Configuration: Straight.
 2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
 3. Material: Cast Aluminum ASTM B-26 Alloy 319.
 4. Finish: Manufacturer's standard factory applied powder coat finish.
 5. Color: To be selected by Owner's representative from manufacturer's standard range.
 6. Manufacturers:

- a. Model B25A, as manufactured by BarryCraft Construction Casting Company, 800-524-1809.
- b. Substitutions: 01 6000 - Product Requirements .

2.8 WALL HEATER

- A. Architectural Heavy Duty Wall Heater.
- B. Dimensions:
 1. Grille: 19-5/16"H x 15-3/4"W.
 2. Back Box: 18-1/4"H x 14-3/8"W.
 3. Temperature Range: 40°-90°F.
 4. Manual reset thermal overheat protector.
 5. Built-in tamper-resistant thermostat.
 6. Automatic fan delay.
 7. Maintenance power on/off switch.
 8. CFM: 100.
 9. 14 Gauge security front cover.
 10. All controls are concealed behind the front cover.
 11. 120V, 1800 W, 15 Amps, 1 phase, 6142 BTU/hr.
 12. Color: Northern White
 13. Warranty: Five (5) years element warranty.
- C. Product:
 1. "AWH3180 Series" QMark 800-642-4328.

2.9 MISCELLANEOUS MATERIALS

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

2.10 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.

2.11 FINISHES - STEEL

- A. Prime paint steel items.
 1. Prime paint all steel items except:
 - a. Galvanize items to be embedded in concrete, items to be embedded in masonry, and items specified for powder coat finish.
 - b. Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. 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.
 2. Refer to Section Section 09 9123 Interior Painting and Section 09 9113 Exterior Painting for preparation, prime coats and finish coats for all exterior exposed ferrous metal.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.12 FINISHES - ALUMINUM

- A. Superior-Performance Organic Finish: AA-C12C40R1x (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 AAMA 2605 and with coating and resin manufacturer's written instructions.
 - 1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat thermocured system consisting of specially formulated inhibitive primer fluoropolymer color coat, and clear fluoropolymer top coat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
 - 2. Color: As selected by Fuller and D'Angelo, P.C. from manufacturer's standard colors.
- B. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.13 FABRICATION TOLERANCES

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

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. Supply 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 per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

**SECTION 06 1000
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 SUMMARY

- A. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules and notes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Roof related wood nailers, blocking, shims, and plywood.
 - 2. Light gauge metal roof related framing.
- B. Related Requirements
 - 1. Masonry Maintenance - Section 04 0100
 - 2. EPDM Roofing - Section 07 5323
 - 3. Sheet Metal Flashing & Specialties - Section 07 6200
 - 4. Roof Accessories - Section 07 7200

1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a full time supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 - c. Submit the supervisor's resume upon request.
 - 2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within a fifty mile radius of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
 - b. Submit the reference list upon request.
- B. Material Quality: Obtain each type of material from a single source to ensure consistent quality, color, pattern, and texture.
- C. Pre-Construction Conference: Attend the pre-construction meeting and discuss how and when carpentry work will be performed and coordinated with other work, and how the building will be kept watertight as work occurs.

1.4 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work on site:
 - 1. A pre-work site and building inspection report with photos, to document conditions before work starts on site.
 - 2. Manufacturer's technical literature for all materials.

3. Test reports and certifications substantiating compliance with specification requirements if requested by the Architect.
 4. 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 and fit on adjoining work.
- B. Simultaneously provide all technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
1. Submittals shall be prepared and made by the firm that will perform the actual work.
 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program is not established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building.
- D. Payment requisitions will not be processed until all submittals are received and approved.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store materials dry at all times. Cover with tarps and protect against exposure to weather and contact with damp or wet surfaces.
- B. Do not overload the structure when storing material on the roof.
- C. Protect roof surfaces where material and equipment is placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.6 GUARANTEE

- A. Provide a written Contractor's Guarantee which guaranties that all work will remain free of material and workmanship defects and in a watertight condition for a five year period beginning upon Final Completion:
 1. Defects include but are not limited to the following: leakage, delamination, lifting, loosening, splitting, cracking, joint separation and movement.
 2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as guaranteed at his own expense:
 3. Guarantee coverage shall include removing and replacing items installed as part of the original work, if removal is needed to make repairs.
- B. Provide one Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- C. The Guarantee shall take effect no more than 30 days before the satisfactory completion of all punch list work.
- D. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Performance Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Wood, including shims, nailers, blocking, furring and similar members, in the sizes indicated, worked into the shapes shown, and as follows:
 1. Lumber: Douglas Fir dimension lumber, free of large knots and other imperfections.
 2. Plywood: Exterior grade APA rated Type CDX underlayment plywood.
 3. Beveled Siding: Utility grade cedar, redwood, or synthetic siding, 1/2 inch by 6 inches and 3/4 inch by 10 inches wide, tapered to 1/8 inch thick.

- B. Metal, including light gauge metal channel and stud sections factory formed of minimum 24 gauge cold rolled galvanized steel.

2.2 FASTENERS

- A. Hot dipped galvanized steel, stainless steel, or steel covered with a proprietary rust inhibiting coating.
 - 1. Do not use un-coated steel nails. Remove and replace carpentry components installed with un-coated steel nails.
- B. Use screws wherever possible, minimum size diameter #10. If nails are used they shall be annular ring shank type.
 - 1. Do not use dry wall screws to secure wood blocking assemblies. Remove and replace carpentry components installed with drywall screws.

2.3 CARPENTRY ACCESSORIES

- A. Gypsum board & related accessories: 5/8 inch thick Type X Firecode gypsum board, galvanized drywall screws, asbestos free factory pre-mixed joint compound, joint tape, and galvanized steel J, L and corner beads.

PART 3 EXECUTION

3.1 INSTALLATION – GENERAL

- A. Coordinate carpentry work with the installation of the roofing system, insulation, flashings, and other similar items.
- B. Shim and set carpentry work plumb and true, except provide slope at the top surfaces of horizontal members as indicated.
- C. Stagger joints in built up assemblies at least 2 feet to obtain maximum strength. Provide the shapes needed and adjust wood blocking to suit the existing conditions and achieve full bearing and secure attachment. Discard defective material, and pieces which are too small, and fabricate the work with a minimum of joints and an optimum joint arrangement.
- D. Securely attach carpentry work to resist a force of 275 pounds per lineal foot in any direction. Countersink all fasteners flush unless otherwise shown.
- E. Space fasteners to achieve adequate holding power, and generally 12 inches apart. :
 - 1. Space nails in wood blocking 8 inches apart.
 - 2. Install two rows of fasteners on blocking wider than 5 inches.
- F. Fit carpentry work neatly scribed and cut to fit within 1/8 inch of adjoining materials. Position furring, nailers, blocking, shims and similar supports for the proper attachment of subsequent work.
- G. Fasten wood and metal blocking assemblies to metal decks with #12 screws.
- H. Fasten wood and metal blocking assemblies to concrete decks and masonry walls with 1/4 inch diameter Spike or Drive fasteners. Pre-drill the holes.

3.2 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Inspect the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work on site.
- B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leaks and damage that weren't documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.

- D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- E. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site presents a neat, orderly and workmanlike appearance. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- F. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

END OF SECTION

SECTION 07 1310
UNDERSLAB AND BLINDSIDE WATERPROOFING BARRIER MEMBRANE

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 SCOPE

- A. The work of this section includes, but is not limited to, the following:
 - 1. Installation of underslab waterproofing and blindside vertical sheet membrane at elevator pit as indicated in the drawings.
 - 2. Accessory Products.

1.3 RELATED SECTIONS

- A. Section 03 3000 - Cast-in-Place Concrete.
- B. 31 2316 - Excavation.

1.4 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM D412 Tests for Rubber Properties in Tension
 - 2. ASTM D570 Test Method for Water Absorption of Plastics
 - 3. ASTM D 903 (98) Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
 - 4. ASTM D 1000 Standard Test Methods for Pressure-Sensitive, Adhesive-Coated Tapes used for Electrical and Electronic Applications.
 - 5. ASTM D 1970 (01) Standard Specification for Self Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 - 6. ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
 - 7. ASTM D 4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - 8. ASTM D4533 Test Method for Trapezoid Tearing Strength of Geotextiles
 - 9. ASTM D 5084 Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
 - 10. ASTM D 5385-93(06) Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes.
 - 11. ASTM D6574 (00) Test Method for Determining the (In Plane) Hydraulic Transmissivity of a Geosynthetic by Radial Flow.
 - 12.
 - 13. ASTM D1434 Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting
 - 14. ASTM E 96 (Method B) Standard Test Methods for Water Vapor Transmission of Materials.
 - 15. ASTM E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
 - 16. ASTM E4696(b) Tests for Water Vapor Transmission of Materials in Sheet Form
 - 17. ASTM E154 Test for Puncture Resistance
 - 18. ASTM F2130 Resistance to Penetration by Pesticides

YONKERS PUBLIC SCHOOLS
CAPITAL IMPROVEMENT REHABILITATION PHASE 3
CHARLES E. GORTON HIGH SCHOOL YPS #10909
UNDERSLAB AND BLINDSIDE WATERPROOFING BARRIER MEMBRANE

- B. General Services Administration, Public Building Service: GSA-PBS-07115 Guide Specification for Elastomeric Waterproofing.
- C. Texas A & M Method - Resistance to penetration by termites.
- D. Radon Reduction Technology Laboratory:
 - 1. Resistance to Permeance by Radioactive Radon Gas
 - 2. Resistance to Diffusion by Radioactive Radon Gas
- E. Qualifies under LEED:
 - 1. IAQ Credit 5 - Indoor Chemical and Pollutant Source Control (below grade toxin barrier / reduced pesticide usage).
 - 2. SS 3 - Brownfield redevelopment (can be used for pesticide contaminated sites)
 - 3. Can be considered for ID 1 - Innovation in design.

1.5 SYSTEM DESCRIPTION

- A. Underslab Waterproofing: Sheet membrane with a 20 mil thick high strength polyethylene geomembranes topped with a 55 mil thick layer of proprietary waterproofing sealant integrated into a high strength nonwoven geotextile fabric.
- B. Blindside Waterproofing: 73-mil rubberized asphalt membrane consisting of a strong sheet membrane with a facing of 4-mil, high-density, cross-laminated, polyethylene backing laminated to a thick layer of proprietary stress absorbing / waterproofing formulation, with a nonwoven geotextile fabric.

1.6 SUBMITTALS

- A. General: Submit in accordance with Section 01 3000 - Administrative Requirements.
- B. Product Data: Submit manufacturer's product data, installation instructions, use limitations and recommendations. Include certification of data indicating VOC (Volatile Organic Compound) content of all components of waterproofing system.
- C. Samples: Submit representative samples of the following for approval:
 - 1. Sheet Membrane
 - 2. Fabric Tape and Accessories.
 - 3. Prefabricated Drainage Composite
- D. Subcontractor's approval by Manufacturer: Submit document stating manufacturer's acceptance of subcontractor.
- E. Warranty: Submit a sample of manufacturer's warranty identifying the terms and conditions stated in 1.09.
- F. Substitutions: 01 6000 - Product Requirements.
 - 1. Manufacturer shall demonstrated in documented field trials over a minimum 5 year period the ability to reduce cracking and to maintain a seal even if the slab above it has cracked.
- G. Sustainable Design Submittals:
 - 1. Submit invoices and documentation from manufacturer of the amounts of materials and content for products specified.
 - 2. Submit invoices and documentation showing manufacturing locations and origins of materials for products manufactured and sourced within 500 miles of project site.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Sheet Membrane Waterproofing Barrier System must be manufactured by a company with a minimum of 10 years experience in the production and sales of membrane waterproofing materials.
- B. Applicator Qualifications: A firm having at least 3 years experience in applying these types of specified materials and specifically accepted in writing by the membrane system manufacturer.

YONKERS PUBLIC SCHOOLS
CAPITAL IMPROVEMENT REHABILITATION PHASE 3
CHARLES E. GORTON HIGH SCHOOL YPS #10909
UNDERSLAB AND BLINDSIDE WATERPROOFING BARRIER MEMBRANE

- C. Materials: For each type of material required to complete the work of this section, provide primary materials which are the products of a single manufacturer.
- D. Pre-Application Conference: A pre-application conference shall be held to establish procedures and to review conditions, installation procedures and coordination with other related work. Meeting agenda shall include review of special details and flashing.
 - 1. Attendance Required: YPS Office of Facilities Management, Fuller and D'Angelo, P.C., Contractor, and Manufacturer's Representative
- E. Manufacturer's Representative: Arrange to have trained representative of the manufacturer on site periodically to review installation procedures.

1.8 DELIVERY, STORAGE, HANDLING

- A. Deliver to site in manufacturer's original, unopened containers with original labels attached and bearing the following information:
 - 1. Name of material.
 - 2. Manufacturer's batch codes including date of manufacture.
 - 3. Materials Safety Data Sheets.
- B. Membrane and accessories should be unloaded and stored carefully. Cartons and containers must be protected from weather, sparks, flames, excessive heat, cold and lack of ventilation. Do not stack membrane higher than 5 feet vertically, nor double stack cartons. Cartons should be stored on pallets and covered to protect from water damage. Any damaged material must be removed from the site and disposed of in accordance with applicable regulations.
- C. Store materials in a clean, dry area in accordance with manufacturer's instructions.
- D. Store adhesives at temperatures of 40oF (4oC) and above to facilitate handling.
- E. Store membrane cartons on pallets.
- F. Do not store at temperatures above 90oF (32oC) for extended periods.
- G. Keep away from sparks and flames.
- H. Completely cover when stored outside. Protect from rain.
- I. Protect materials during handling and application to prevent damage or contamination.
 - 1. Avoid use of products which contain tars, solvents, pitches, polysulfide polymers, or PVC materials that may come into contact with waterproofing membrane system.

1.9 PROJECT CONDITIONS

- A. Work should be performed only when existing and forecasted weather conditions are within the limits established by the membrane manufacturer. Membrane should only be installed when temperature is 40°F (4.44°C) and rising. Consult manufacturer for information concerning cooler temperatures.
- B. Proceed with installation only when substrate construction and preparation work is complete. Ensure that subsoil is approved by architect or geotechnical firm.
- C. Warn personnel against breathing of vapors and contact with skin and eyes; wear appropriate protective clothing and respiratory equipment.
- D. Keep flammable products away from spark or flame. Post "No Smoking" signs. Do not allow spark producing equipment to be used during application and until all vapors have dissipated.
- E. Maintain work area in a neat and workmanlike condition. Remove empty cartons and rubbish from the site daily.

1.10 WARRANTY

- A. Provide a written 5 year material and systems warranty from the manufacturer upon completion and acceptance of the installation.

FULLER AND D'ANGELO, P.C.
ARCHITECTS AND PLANNERS

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Polyguard Products, Inc., Ennis, Texas 75120-0755, phone: 800-541-4994.
 - 1. Polyguard Underseal Underslab™ Waterproofing Barrier System.
 - 2. Polyguard Underseal® Blindside Waterproofing Membrane.

2.2 PRODUCTS

- A. Polyguard Underseal® Blindside Waterproofing Membrane:

PHYSICAL PROPERTIES

Property	Test Method	Typical Value
Color		Black/White
Membrane Thickness	ASTM D 1000	85 Mils
Tensile Strength	ASTM D 4632	80.0 Lb.
Tensile Strength, Film	ASTM D 412	4,250 Psi
Hydraulic Transmissivity Of A Geosynthetic Using A Constant Head	ASTM D 4716	No Measurable Flow
In Plane Hydraulic Transmissivity of A Geosynthetic By Radial Flow	ASTM D 6574	No Water Flow
Breaking Strength Of 1-Inch Width Sample Polyethylene Film Layer	ASTM D 882	5700 Psi
Elongation – Ultimate Failure Of Rubberized Asphalt Compound	ASTM D 412	> 460%
Permeance To Water Vapor Transmission, Maximum	ASTM E 96 Method B	0.01 Perms
Crack Cycling	ASTM C 836 Tested @-15°F	No Effect
Peel Adhesion To Concrete	ASTM D 903	31.3 lbs./in
Lap Peel Adhesion	ASTM D 1876	8.7 lb./in.
Low Temperature Flexibility 180° Bend Over 1” Mandrel At -20°F. (-29°C)	ASTM D 1970	No Effect
Puncture Resistance, Minimum	ASTM E 154	220 Lbs.
Resistance To Hydrostatic Head, Minimum	ASTM D 5385	231 Ft.
Resistance To Fungi In Soil	Gsa-Pbs 07115-16 Weeks	No Effect
Resistance To Permeance By Methane Gas	ASTM D 1434	3.48 X 10-7 Ft ³ /(Ft ² •Hr • Psi(Ft ² /Hr/ Psi) Tested Using 99.99% Purity
Resistance To Radioactive Radon Gas	Radon Reduction Technology Laboratory % Reduction In Radon Gas Diffusion	97.10
Water Absorption, Maximum	ASTM D 570	0.1%

- B. Accessory Products
 - 1. Fabric Tape:
 - a. Polyguard Underseal Fabric Tape.
 - 2. Surface Primer :Polyguard 650 LT Liquid Adhesive
 - 3. Sealant:
 - a. Polyguard® Detail Sealant PW™

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4. US Inside Corner Boot.
5. Inside Corner Boots.
6. Outside Corner Boots.
7. Pit Top Corner Boots.
8. Verticle Tape.
9. Drainage Mats:
 - a. Polyguard® Polyflow® 15 Drainage Mat: Two-part, prefabricated geo-composite drain consisting of a formed polystyrene core covered on one side with polypropylene filter fabric.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Before starting any waterproofing work, the applicator shall thoroughly inspect all surfaces for any conditions detrimental to the proper completion of the work. Should any deficiencies exist, the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. shall be made aware of such in writing immediately. Do not proceed with application until all unsatisfactory conditions are corrected.

3.2 SURFACE PREPARATION:

- A. Underslab Waterproofing:
 1. Refer to manufacturer's product literature for surface preparation requirements.
 2. Remove surface debris, including rocks, trash, concrete chunks, roots, and sticks.
 3. Soil Condition:
 - a. Level, tamp or roll aggregate base.
 4. Provide a dry surface prior to application; Do not place the membrane in standing water.
 5. Remove standing water prior to concrete being poured on Underslab Membrane
- B. Blindside Waterproofing:
 1. Protect adjacent surfaces not designated to receive waterproofing.
 - a. Clean surfaces to receive waterproofing in accordance with manufacturer's instructions.
 - b. Do not apply waterproofing to surfaces unacceptable to manufacturer.
 - c. Concrete surfaces must be clean, smooth, and free of standing water.
 - d. Patch all holes and voids and smooth out any surface misalignments.

3.3 INSTALLATION:

- A. Installation shall be in accordance with manufacturer's instructions and ASTM E 1634.
- B. Membrane Installation - Horizontal Surfaces:
 1. Unroll waterproofing barrier membrane with longest dimension parallel with direction of pour.
 2. Place the Underslab Membrane with the polyethylene backing toward the sub base with the fabric facing up to receive the concrete.
 3. Place Membrane with the longest dimension parallel to the direction of concrete pour
 4. Lap membrane over footings, slab perimeter, grade beams and seal to surfaces.
 5. Overlap side seams using the 4" edge trim seal. Clean polyethylene backing of waterproofing barrier membrane prior to application on the 4" edge seal as recommended by manufacturer.
 6. End laps should be overlapped a minimum of 4" and apply with liquid adhesive as recommended by manufacturer. Roll to assure full adhesion.
 7. After application of end lap use liquid adhesive to prime seam and apply a 12" piece of fabric tape centered over seam to seal extend out 6" past side laps – roll with laminate roller.
 8. Steel reinforcements will be applied directly over the waterproofing barrier membrane. Insure that reinforcement (rebar) chairs are compatible with the system. Steel chairs and bolster be plastic dipped or have plastic caps.

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9. Precaution should be taken to protect the waterproofing barrier membrane during placement of reinforcing or concrete. Visually inspect waterproofing barrier membrane prior to pouring of concrete for any punctures or damage to membrane which needs to be repaired. Patch any damaged areas by applying the liquid adhesive to fabric side of waterproofing barrier membrane and apply a patch of fabric tape.
10. Prior to slab pour all standing water must be removed from the membrane.

C. Vertical Installation:

1. Drainage Board Installation:
 - a. Drainage board should be applied vertically. Apply drainage board with fabric to lagging, caisson, shotcrete, slurry seal or steel piling walls. Bring drainage board over the top of the surface to be waterproofed and securely tack the drainage board to the top. On lagging walls cut holes in the drainboard where the lag bolts are extending out of the wood lagging into the drainage board.
 - b. Butt drainboard together at side and end seams.
2. Membrane Installation - Vertical Surfaces:
 - a. Waterproofing membrane should be applied vertically with the high-density backing to the fabric side of the drainage board.
 - b. Application up to 20 feet shall be done by applying pins with washers every 12 inches across the top lagging thru the membrane and drainage board and allowing the membrane to hang down the wall.
 - c. Side laps are furnished with edge trim of 4". Apply pins with washers every 24" to secure membrane to wall. Remove any debris and dust on the polyethylene backing, clean in manufacturer for recommendations, prior to applying to the edge trim.
3. All end laps must be installed in shingle fashion with all lower endlaps installed polyethylene side to the fabric side of the top lift in order to shed water properly.
4. Overlap endlap pieces a minimum of 4" and prime fabric side of seams with Polyguard® 650 LT Liquid Adhesive at a rate of 150-200 sq. ft. per gallon and apply a 12" strip of Polyguard® Detail Tape centered over seam extending out 6" past seam on both sides. Roll fabric with a laminate roller to ensure adhesion.
5. If annular space of pipe, bolt or penetration of opening is 1/2" or less apply liquid adhesive to fabric side of membrane. Apply a 3/4" cant/fillet of approved liquid membrane or sealant provided by manufacturer around pipe penetration extending onto fabric side of waterproofing barrier membrane and pipe a minimum of 3".
6. Visually inspect membrane prior to pouring of concrete for any punctures/damage.
7. Repair damaged areas by applying liquid adhesive at a rate of 150-200 sq. ft. per gallon and apply patch at least 3 inches larger than damaged area in all directions.
8. Termination Bar
 - a. Secure at top of wall fastening every 7" O.C

3.4 FIELD QUALITY CONTROL

- A. YPS Office of Facilities Management will provide testing services in accordance with Section 01 4000 - Quality Requirements. Contractor shall provide temporary construction and materials for testing.
- B. On completion of horizontal membrane installation, dam installation area in preparation for flood testing.
- C. Flood to minimum depth of 1 inch with clean water. After 48 hours, inspect for leaks.
- D. If leaking is found, remove water, repair leaking areas with new waterproofing materials as directed by YPS Office of Facilities Management and Manufacturer's representative and repeat flood test. Repair damage to building.
- E. Manufacturer's representative shall inspect and submit written report indicating approval or corrections to be performed.

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- F. When area is proven watertight, drain water and remove dam.

3.5 PROTECTION

- A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION

**SECTION 07 2500
WEATHER BARRIERS**

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. Fluid-applied, vapor permeable weather barrier membrane Water-Resistive Barrier:
- B. Air Barriers: Materials that form a system to stop passage of air through exterior walls and joints around frames of openings in exterior walls.

1.3 RELATED REQUIREMENTS

- A. Section 04 0100 - Maintenance of Masonry.
- B. Section 04 2000 - Unit Masonry.
- C. Section 07 5300 - Elastomeric Membrane Roofing: Vapor retarder installed as part of roofing system.
- D. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.
- E. Section 07 9200 - Joint Sealants: Sealing building expansion joints.
- F. Section 09 2116 - Gypsum Board Assemblies: Water-resistive barrier under exterior cladding.
- G. Section 09 2662 - Gypsum Sheathing

1.4 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
 - 1. Water Vapor Permeance: For purposes of conversion, $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm}$.
- D. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture resistant, to the degree specified, intended to be installed to shed water without sealed seams.

1.5 REFERENCE STANDARDS

- A. AMMA 2400: Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction.
- B. ASTM D5590 - Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay; 2000, with Editorial Revision (2012).
- C. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences Across the Specimen.
- D. ASTM E 330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

- E. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylight, Doors and Curtain Walls by Uniform Static Air Pressure Differences.
- F. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
- G. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- H. ASTM E 2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- I. CGSB 37-GP-56M: Membrane, Modified, Bituminous, Prefabricated, and Reinforced.

1.6 QUALITY ASSURANCES

- A. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.
- B. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
- C. Qualifications
 - 1. Submit document stating the applicator of the primary air/vapor barrier membranes specified in this section is qualified by the manufacturer as suitable for the execution of the Work.
 - 2. Installer shall have experience with installation of weather barrier assemblies under similar conditions.
 - 3. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
 - a. Maintain one copy of manufacturer's written instructions on site.
 - 4. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.
 - 5. Provide products which comply with all federal, state and local regulations controlling use of volatile organic compounds (VOCs).

1.7 PRE-INSTALLATION MEETING

- A. Refer to Section 01 3000 - Administrative Requirements.
- B. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include YPS Office of Facilities Management, Installer, and Weather Barrier Manufacturer's Designated Representative.
- C. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection

1.8 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics, performance criteria, and limitations.
- C. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch
- D. Shop Drawings: Provide drawings of special joint conditions.
- E. Manufacturer's Installation Instructions: Indicate preparation.
- F. Warranty Documentation for Installation of Building Rainscreen Assembly: Submit installer warranty and ensure that forms have been completed in Yonkers Public Schools's name and registered with installer.
- G. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier system installation

1.9 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.10 MOCK-UP

- A. Install water-resistive barrier materials in mock-up specified in Section 01 4000.
- B. Provide mock up of air/vapor barrier materials under provisions of approved Shop Drawings, Product Data and Samples.
- C. Where directed by YPS Office of Facilities Management and Weather Barrier Manufacturer's Designated Representative construct typical exterior wall panel.
- D. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty
- E. Install mock-up using approved weather barrier assembly including flashing and tape and related accessories per manufacturer's current printed instructions and recommendations.
 - 1. Mock-up size: 10' X 10'.
 - 2. Mock-up Substrate: Match wall assembly construction, including window opening.
 - 3. Mock-up may remain as part of the work.

1.11 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

1.12 DELIVERY, STORAGE AND HANDLING

- A. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Wasted Management and Disposal
 - 1. Separate and recycle waste materials in accordance with Section 01 7419 - Construction Waste Management and Disposal.
- C. Contractor to verify compliance for Volatile Organic Compounds (VOC) limitations of products to comply with all federal, state and local regulations controlling use of volatile organic compounds (VOCs).
- D. Store weather barrier materials as recommended by weather barrier manufacturer.

1.13 SCHEDULING

- A. Review requirements for sequencing of installation of weather barrier assembly with installation of doors, louvers, and flashings to provide a weather-tight barrier assembly.

1.14 WARRANTY

- A. Special weather-barrier manufacturer's warranty for weather barrier assembly for a period of ten (10) from date of final weather barrier installation.
 - 1. Approval by weather barrier manufacturer for warranty is required prior to assembly installation.

PART 2 PRODUCTS

2.1 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

- A. Primary liquid air/vapor barrier membrane **for temperatures above 40 degrees F** shall be a one component elastomeric membrane, trowel or spray applied, compatibility with substrates, transition membranes and insulation. Membrane shall have the following physical properties:
 - 1. Meets the air leakage requirements of the Massachusetts Commercial Energy Code (780 CMR, Ch. 13) Energy Conservation Requirements for the Building Envelope,
 - 2. Air permeability: 0.00012 CFM/ft² @ 1.6 lbs/ft² to ASTM E 2178 and ASTM E 283 and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft² for 1 hour and gust wind load pressure of 62.8 lbs/ft² for 10 seconds when tested at 1.6 lbs/ft² to ASTM E 331,

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3. Rating 0 -No fungal growth as tested to ASTM D 5339,
4. Water vapor permeance: 0.08 perms to ASTM E 96,
5. VOC Content: No appreciable VOC (less than 100g/L),
6. Elastic Recovery: 90% to CAN/CGSB 37.58M86,
7. Meets CAN/CGSB-51-33 Type I Water Vapor Permeance requirements.
8. Basis of Design: Air-Bloc 32MR manufactured by Henry Company, (800) 598-7663, www.Henry.com.

2.2 SEALANTS

- A. Polyurethane Sealant: as specified in Section 07 9200 - Joint Sealants.
- B. Primers, Cleaners, and Other Sealant Materials: As recommended by sealant manufacturer, appropriate to application, and compatible with adjacent materials.

2.3 ADHESIVES

- A. Provide adhesive recommended by weather barrier manufacturer.

2.4 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
- B. Joint Treatment.
 1. Joint Compound: Fluid-applied, vapor permeable, elastomeric flashing material; trowel applied as recommended by the manufacturer.
- C. Fasteners: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap or manufacturer approved 1-1/4" or 2" metal gasketed washer.
- D. Sealants: Refer to Section 07 9200 - Joint Sealants approved by the weather barrier manufacturer

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.
- B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane. Strike masonry joints flush
- C. Verify that surfaces and conditions are ready to accept the work of this section.

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive air barrier system in accordance with manufacturer's instructions.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Corners: Apply fluid-applied joint compound, 25 mil thick, to outside and inside corners. Joint compound shall extend 2 inches from corner for full height of corner
- C. Water-Resistive Barriers: Install continuous barrier over surfaces indicated, with sheets lapped to shed water but with seams not sealed.
- D. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- E. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

- F. Primary Air/Vapor Barrier:
 - 1. Apply by spray or flat trowel a complete and continuous unbroken film of liquid air/vapor and rain barrier membrane.
 - a. For temperatures above 40 degrees F and rising, apply one component water based elastomeric emulsion air/vapor barrier membrane at a rate of 20 sq.ft/gallon to a uniform wet film thickness of 75 mils for smooth surfaces depending upon surface texture and porosity. For rough surfaces, apply elastomeric emulsion air/vapor barrier membrane at a rate of 14 sq.ft/gallon to a uniform wet film thickness of 110 mils depending upon surface texture and porosity.
 - 2. Spray-apply or trowel around all projections and penetrations ensuring a complete and continuous air barrier membrane. Lap liquid applied membrane 1 inch over self-adhering membranes to seal leading edge.
 - 3. Allow air barrier membrane to dry as per manufacturers recommendations prior to placement of insulating materials
- G. Coatings:
 - 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
 - 2. Use flashing to seal to adjacent construction and to bridge joints.
- H. Allow Fluid-Applied Flashing, Joint Compound and Sealant to cure for minimum 24 hours before coating with Fluid-applied Weather Barrier.
- I. Fluid Applied Weather Barrier: Install fluid-applied weather barrier prior to installation of windows, doors and louvers.
 - 1. Mask and protect any adjacent finished surfaces from fluid- applied weather barrier material.
 - 2. Install fluid-applied weather barrier over exterior face of required exterior wall substrates in accordance the manufacturer recommendations and instructions.
 - 3. Install fluid-applied weather barrier by power-rolling method to achieve 25 mils, providing a consistent and uniform thickness.
 - 4. Repair any voids, holidays, or non-uniform installations or damages by other trades to proper mil thickness prior to installation of final cladding assemblies.
- J. Install fluid-applied weather barrier over exterior face of required exterior wall substrates in accordance with weather barrier manufacturer recommendations and instructions

3.4 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Coordination of ABAA Tests and Inspections:
 - 1. Provide testing and inspection required by ABAA QAP.
 - 2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
 - 3. Cooperate with ABAA testing agency.
 - 4. Allow access to air barrier work areas and staging.
 - 5. Do not cover air barrier work until tested, inspected, and accepted.
- C. Notify manufacturer's designated representative to obtain required periodic observations of weather barrier assembly installation
- D. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- E. Take digital photographs of each portion of the installation prior to covering up.

3.5 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

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- B. Do not leave paper- or felt-based barriers exposed to weather for longer than one week.
- C. Protect installed weather barrier from damage.

END OF SECTION

**SECTION 07 4770
ALUMINUM SOFFIT PANELS**

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 extent of aluminum soffit shown on the drawings.
- B. Manufactured metal aluminum panels for exterior soffits, with accessory components
- C. All metal trim, fasteners and sealants

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 05 3100 - Steel Decking.
- B. Section 07 9200 - Joint Sealants.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 3000 - Administrative Requirements.
 - 1. Product Data: Manufacturer's standard printed product data and installation instructions for specified products.
 - 2. Special details.
 - 3. Selection Samples: Submit color chips of manufacturer's full range of colors for Architect's selection.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten (10) years of documented experience.
- B. Installer Qualifications: Company specializing in installing products of the type specified in this section with minimum five (5) years of documented experience.
- C. Regulatory Requirements: Provide products that comply with the following:
 - 1. Refer to Section 01 4100 - Regulatory Requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in original packaging.
 - 1. Store products in original packaging, on flat surface under cover, stacked no more than 12 boxes high.

1.7 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, including defects in water tightness and integrity of seals for metal wall panels.
- C. Finish warranty: Manufacturer's standard form in which manufacturer agrees to repair finish or replace standing seam metal roof panels that show evidence of deterioration of factory-applied finish within specified warranty period.
 - 1. Exposed Panels Finish - deterioration includes the following:
 - a. Color fading more than 5 hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

- c. Cracking, checking, peeling or failure of a paint to adhere to a bare metal.
- d. Warranty Period: 20 Years from the date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: PAC-800 as manufactured by: Petersen Aluminum Corporation, 1005 Tonne Road, Elk Grove Village, IL 60007

2.2 ALUMINUM SOFFIT PANELS

- A. Aluminum Soffit Panels:
 - 1. Style: 12 " o.c. Soffit Flush Panels non vented.
 - a. Thickness: Nominal 0.040; aluminum alloy 3105-H14:
 - b. Interlocking edges and elongated nailing hems.

2.3 FINISHES

- A. Fluoropolymer Coil Coating System: Manufacturer's standard multi-coat aluminum coil coating system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss as scheduled.
 - 1. Color: As selected by the Architect, from standard and premium colors.
 - 2. Manufacturers:
 - a. Kynar 500 by Arkema.
 - 3. Substitutions: 01 6000 - Product Requirements .

2.4 ACCESSORIES

- A. Accessories: Flashings and Trim Aluminum of same thickness, finish, and color as soffit.
 - 1. Provide hat channel and furring channel clip.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrate conditions before beginning installation of soffit products; verify dimensions and acceptability of substrate.
 - 1. Do not proceed with installation until unacceptable conditions have been corrected.

3.2 INSTALLATION

- A. Install metal panels, fasteners, trim and related sealants in accordance with approved shop drawings and as may be required for a weather-tight installation. Conform to standards set forth in SMACNA architectural sheet metal manuals and approved shop drawings for this project.
- B. Remove all strippable coating and provide a dry-wipe down cleaning of the panels as they are erected.
- C. Install panel system so it is watertight, without waves, warps, buckles or distortions, and allow for thermal movement considerations.
- D. Abrasive devices shall not be used to cut on or near soffit panel system.
- E. Fasten panels to structural supports; aligned, level, and plumb.
- F. Use concealed fasteners unless otherwise approved by Fuller and D'Angelo, P.C.
- G. Secure units to supports.
- H. Place fasteners as indicated in manufacturer's standards.
- I. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.3 ADJUSTING AND CLEANING

- A. Clean dirt from surface of installed products, using mild soap and water.

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1. After completing installation, remove from project site excess materials and debris resulting from installation.

END OF SECTION

**SECTION 07 5323
EPDM ROOFING**

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. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules, and keynotes, as specified, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Inspect the underside of the roof deck before starting work, and periodically each day as work occurs, to determine if there are conduits, pipes, ceiling hangers or fixtures next to the deck or fastened to the deck that could be affected as the work occurs.
 - a. Perform all work so any conduits, pipes, ceiling hangers or fixtures are not disturbed.
 - b. Replace and reset any conduits, pipes, ceiling hangers or fixtures that are affected by the work.
 - 2. Remove and dispose of existing roofing, insulation, the vapor barrier, underlayment, wood blocking, and flashing.
 - a. Clean all residual material from the surface of the decks.
 - b. The work may include removing asbestos containing roofing materials. Refer to the asbestos abatement specification for additional information and asbestos removal requirements.
 - 3. Install a new fully adhered unreinforced 60 mil thick EPDM roofing system, including a vapor barrier, insulation, cover board, flashing, stripping and related accessories.
 - 4. Provide miscellaneous mechanical, electrical, hoisting and other work needed, and remove, adjust, modify, reset and reconnect all roof-mounted and roof-penetrating equipment.
 - 5. Install new flashings at the roof drains, and all roof-mounted and roof-penetrating equipment.
 - 6. Disconnect and remove abandoned mechanical equipment and curbs, and infill the roof deck.
 - 7. Repair deterioration less than 1/2 inch deep in the surface of the existing concrete deck as Base Bid work.
 - 8. Replace deteriorated portions of existing deck in accordance with the Unit Prices.
 - 9. Protect roof surfaces where material and equipment is placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.
- B. Related Requirements
 - 1. Masonry Maintenance - Section 04 0100
 - 2. Carpentry - Section 06 1000
 - 3. Sheet Metal Flashing & Specialties - Section 07 6200
 - 4. Roof Accessories - Section 07 7200

1.3 CODE APPROVAL REQUIREMENTS

- A. Install roofing and insulation system components to meet the following minimum requirements:
 - 1. New York State Uniform Fire Prevention and Building Code, which includes by reference the New York State Energy Conservation Code.
 - 2. Underwriters Laboratories Inc. Class A External Fire Rating for roof assemblies tested in accordance with ASTM E 108 or UL 790.

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3. Underwriters Laboratories Inc. Standard 1256 for roof assemblies with foam insulation.
 4. Minimum wind uplift pressure calculated using ASCE 7 and a safety factor of 2:
 - a. Field Zone – 60 psf
 - b. Perimeter Zones - 100 psf
 - c. Corner Zone - 150 psf
- B. Provide written certification from the roof material Manufacturer, before beginning work, to confirm the roofing system meets these requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a full time supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 - c. Submit the supervisor's resume upon request.
 2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design within a fifty mile radius of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
 - b. Submit the reference list upon request.
 3. The Installer shall be acceptable to or licensed by the Manufacturer of the primary roofing materials, and provide written certification from the Manufacturer to confirm this prior to award if requested.
- B. Material Quality: Obtain each type of material from a single source to ensure consistent quality, color, pattern, and texture.

1.5 PRE-CONSTRUCTION CONFERENCE

- A. Meet at the project site between one and two weeks prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:
1. How the building will be kept watertight as old roofing is removed and the work progresses.
 2. How new roofing will be coordinated with the installation of the vapor barrier, thermal barrier, insulation, cover board, flashings and other items to provide a watertight installation.
 3. Generally accepted industry practice and the Manufacturer's instructions for handling and installing his products.
 4. The condition of the substrate (deck), curbs, penetrations and other preparatory work needed.
 5. Incomplete submittals; note that progress payments will be not processed until all submittals are received and approved.
 6. The construction schedule, weather forecast, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
 7. A schedule for Manufacturer and Architect inspections.

1.6 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work on site:
1. A pre-work site and building inspection report with photos to document conditions before work starts.
 2. Written certification from the Manufacturer which states that the Installer is acceptable or licensed to install the specified roofing; if not previously provided.

3. Manufacturer's technical literature for all materials.
 4. Samples of the Contractor's Guarantee and Manufacturer's warranty forms.
 5. Test reports and certifications substantiating compliance with specification requirements if requested by the Architect.
- B. Simultaneously provide all technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
1. Submittals shall be prepared and made by the firm that will perform the actual work.
 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program is not established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders.
- D. Payment requisitions will not be processed until all submittals are received and approved.

1.7 JOB CONDITIONS (CAUTIONS & WARNINGS)

- A. Do not use oil or solvent based roof cement with EPDM roofing. Do not allow waste products, (petroleum grease or oil, solvents, vegetable or mineral oil, animal fat) or direct steam venting to come in contact with any roofing, insulation or flashing product. Do not expose EPDM roofing and accessories to a temperature in excess of 175 degrees Fahrenheit.
- B. Splice cleaner, primer, cements and bonding adhesives are flammable. Do not breathe vapors or use near fire or flame or in a confined or unventilated area. Dispense only from a UL listed safety can or the Manufacturer's original container.
- C. Remove empty adhesive, cleaner and solvent containers and contaminated rags from the roof and legally dispose of them daily.
- D. Do not apply primer, cleaners or adhesives next to ventilation system louvers or windows. Temporarily cover the louvers and windows with 6 mil fire retardant polyethylene and prevent odors from entering the building. Remove temporary covers at the end of each days work.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver material to the site in the Manufacturer's original and unopened packaging, with intact and legible labels which identify the products and Manufacturers,
- B. Cover all stored materials, except rolls of EPDM and sealed cans of adhesives, with watertight tarpaulins installed immediately upon delivery.
- C. Immediately remove insulation which gets wet from the job site.
- D. Store and install all material within the Manufacturer's recommended temperature range.
- E. Do not overload the structure when storing materials on the roof.
- F. Protect roof surfaces where material and equipment is placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.9 GUARANTEE AND WARRANTY

- A. Provide a written Manufacturer's Full System Warranty which warrants that the roofing system, including the insulation, cover board, EPDM roofing and flashings, will remain in a watertight condition for a twenty year period beginning upon Final Completion.
 1. Guarantee coverage shall remain in effect for gust wind speeds up to 72 miles per hour, measured at ground level at the site.
 2. Guarantee coverage shall have no dollar value limit.

- B. Provide a written Contractor's Guarantee which guaranties that all work will remain free of material and workmanship defects and in a watertight condition for a five year period beginning upon Final Completion:
 - 1. Defects include but are not limited to the following: leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, joint separation, movement and undue expansion or shrinkage.
 - 2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as guaranteed at his own expense:
 - 3. Guarantee coverage shall include removing and replacing materials installed as part of the original work, if removal is needed to affect guaranteed repairs.
 - 4. Guarantee coverage shall remain in effect for gust wind speeds up to 72 miles per hour, measured at ground level at the site.
 - 5. Guarantee coverage shall have no dollar value limit.
- C. Provide one Contractor's Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- D. The Manufacturer's Warranty and Contractors Guarantee shall take effect no more than 30 days before the completion of all punch list work.
- E. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Performance Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.
- F. Guarantee and Warranty coverage may be cancelled, for the affected portion of the roof, if the work is damaged by winds in excess of 72 mph, by hail, lightning, insects or animals, by failure of the structural substrate, by exposure to harmful chemicals, by other trades on the roof, or by vandalism, or if the Owner fails to maintain the roof in accordance with, or makes roof alterations contrary to, the Manufacturer's printed recommendations.
 - 1. Guarantee and Warranty coverage shall be reinstated, for the remainder of the original period; if the Owner restores the roof to the condition it was in prior to the damage occurring.

1.10 SUBSTITUTIONS

- A. The following factors will be considered when evaluating a possible alternative to the roofing system specified:
 - 1. The wording and intent of the warranty to be issued.
 - 2. The financial status, numbers of years in business, and stability of the entity that will issue the warranty.
 - 3. A reference list of at least five completed similar projects of comparable size, with a successful functional history of at least five years, within an approximate fifty mile radius of the Project.
 - 4. Technical aspects of the system, especially relating to durability, serviceability and performance.
 - 5. The Manufacturer's ability and history providing technical support, on-site inspections and in progress assistance.
 - 6. The availability and experience of local authorized applicators to install and maintain the proposed alternate system.
 - 7. The Manufacturer's willingness and history responding to warranty claims previously made by the Owner, Architect or Consultant's involved in this project.

PART 2 PRODUCTS

2.1 GENERAL

- A. EPDM roof system components are specified as products of Firestone Building Products Company to establish a standard of quality. Equal products and systems from Carlisle SynTec and Johns Manville will be accepted.
- B. Primary products required for this project include:

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1. Vapor barrier
2. Roof insulation
3. Cover board
4. EPDM roofing
5. Primers and adhesives
6. Sealants
7. EPDM flashing
8. Fasteners

2.2 EPDM

A. Unreinforced 60 mils thick, fire retardant, EPDM (Ethylene Propylene Diene Monomer) sheet membrane conforming to the following minimum physical properties.

1. PROPERTY SPECIFICATION	TEST METHOD		
2. —	Gray/Black		
3. Tensile Strength		ASTM D-412	1305 psi min.
4. Elongation		ASTM D-412	300% min
5. Tear Strength		ASTM D-624	150 lb/in min
6. Ozone Resistance cracks, 7 days/100		ASTM D-1149	No
7. pphm/100°F/50% strain			
8. Heat Aging 200%		ASTM D-573	1200 psi min@
9. elongation/4 wks/240°F			
10. Brittleness Temperature	ASTM D-746	-49°F	
11. Water Vapor Permanence		ASTM E-96	2.0 perm max
12. Thickness	ASTM D-412	60 mils plus/minus 6 mils	
13. Fire Retardant Class A			UL

B. Cleaners, adhesives, sealants, caulking and fasteners furnished by the EPDM system Manufacturer, that comply with low VOC regulations in effect at the time of application.

1. Stripping: 90 mil thick 5 inch and 9 inch wide self adhering flashing, consisting of 45 mils of semi-cured EPDM factory laminated to 45 mils of cured seaming tape.
2. Bonding Adhesive: High strength contact adhesive.
3. Splice Adhesive: High strength synthetic polymer based contact cement formulated specifically to splice EPDM sheets.
4. Lap Sealant: EPDM rubber based gun grade sealant.
5. Water Block Seal: One component low viscosity butyl rubber sealant.
6. Pre-Molded Pipe Flashing: Pressure sensitive prefabricated flashings with pre-applied adhesive.
7. Pourable Sealer: Two component, solvent free polyurethane based sealant.
8. Reinforced Perimeter Fastening Strips: .030 inch thick reinforced cured EPDM.
9. Seam Tape Primer: Synthetic rubber polymer based primer designed to clean and prime seam tape splice areas prior to installing the tape.
10. Seam Splice Tape: Nominal 30 mil thick cured polymer self adhesive tape with release paper carrier, 6 inches wide.
11. Plates and Bars: Galvanized and corrosion resistant specialty products.
12. Fasteners: #14 Fluorocarbon polymer coated heavy duty screws.

C. Primer & Vapor Barrier:

1. ASTM asphalt primer
 2. SBS torch on modified bitumen roofing, minimum thickness 160 mils
- D. Gypsum Cover Board: 1/4 and 1/2 inch thick fire resistant gypsum board decking with inorganic glass mat facers and a water resistant core, formulated in 48 x 48 inch square edge boards, UL Class A, meeting ASTM C-1177, manufactured under the trade name Dens-Deck Prime.
- E. Insulation: Flat and tapered rigid cellular polyisocyanurate boards with fibrous felt/fiberglass mat facers, minimum compressive strength 20 psi, meeting ASTM C1289-01, Type II, Class1, Grade 2, as manufactured by Firestone under the trade name of "ISO 95+ Isocyanurate Insulation". Minimum thickness as shown on the roof plan.
1. Tapered insulation sloping 1/8 inch per foot.
 2. Crickets sloping 1/4 inch per foot.
- F. Tapered edge strips – high density isocyanurate or wood fiberboard strips installed at the drain sumps, and insulation transition points.
- G. Insulation adhesive: Two component low rise polyurethane foam adhesive, installed with a mixing extruding Pace Cart dispenser, or with a pleural heated foam rig, Firestone I.S.O. Adhesive.
1. Use insulation adhesive suitable for application at the intended application temperatures.
 2. Do not use twin cartridge "caulking gun" adhesive except on very small isolated sections of roof.
- H. Concrete Grout: Fast setting Portland cement based polymer modified repair mortar as manufactured by The Quikrete Companies, under the trade name Quick-Setting Cement, or equal.

PART 3 EXECUTION

3.1 GENERAL

- A. Install the new roofing system in a watertight, workmanlike manner, meeting the guarantee requirements specified herein; in accordance with the drawings and in conformance with the Manufacturer's requirements, except as enhanced by the drawings and specifications.
- B. Perform work next to roof mounted mechanical equipment, so the work coincides with equipment shutdown periods and does not affect building occupants. Temporarily cover and protect equipment openings, and windows next to the work area, with 6 mil fire retardant polyethylene, so dirt, dust and odors do not enter the equipment or building. Remove covers as soon as the work is complete and at the end of each workday.
- C. Clean substrate surfaces of all laitance, dirt, oil, grease or other foreign matter.
- D. Remove debris daily and as it is generated. Do not stock-pile debris on the roof. Do not leave any debris on the roof at the end of the day. Do not overload the roof structure when moving debris.
- E. Install roof system components on dry surfaces only. Do not install any components when the weather and outside temperatures are not suitable in accordance with the Manufacturer's recommendations.
- F. Complete all work including the equipment flashings, in sequence as quickly as possible so the smallest area possible is under construction at any one time. Complete the entire area of work begun each day, the same day, and make all exposed edges watertight at the end of each day's work.
- G. Protect roof surfaces where material and equipment is placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

3.2 SUBSTRATE INSPECTION

- A. Remove existing roofing, insulation, flashings, underlayment material, and the vapor barrier as indicated, and carefully check the existing deck. To be an acceptable surface for the new roofing system, it is to be well secured to the underlying structure and not rotted or otherwise deteriorated.
- B. Immediately notify the Architect and Owner by telephone and in writing if defects in the substrate are discovered.

- C. Maintain the building watertight in the interim, but do not install new roof system components until defects have been corrected.

3.3 DECK REPAIR

- A. Concrete deck repairs:
 - 1. Perform repairs to the surface of concrete deck areas, 1/2 inch or less in depth, with quick setting non-shrink grout under the Base Bid.
 - 2. Deterioration greater than 1/2 inch deep shall be brought to the Architects attention for his review and direction.

3.4 VAPOR BARRIER CONCRETE DECKS

- A. Install primer and a vapor barrier on the concrete deck.
 - 1. Apply the primer with a roller and allow it to dry.
 - 2. Starting at the low point, torch apply and fully adhere modified bitumen vapor barrier sheets to the primed substrate. Lap sheets at least 4 inches at the ply overlaps and at least 6 inches at the end laps.
 - 3. Carefully install the vapor barrier sheets to achieve only the minimum required bleed out.
 - 4. Extend vapor barrier up vertical surfaces at the roof perimeter, and up and around all penetrations and curbs, and seal the vapor barrier to provide continuity of the building air/vapor envelope.

3.5 INSULATION AND COVER BOARD

- A. Install tapered insulation neatly cut at all miters and transitions. Do not lace corner boards.
- B. Install insulation with joints offset between rows and layers a minimum of 12 inches. Cut insulation to fit neatly at penetrations and joints. Fill any gap which is greater than 1/4 inch.
- C. Fasten all layers of insulation only to the top flute of steel decks, with screws and discs which penetrate through the deck a minimum of 3/4 inch and a maximum of 1-1/2 inches.
 - 1. Install 16 fasteners per 4 by 8 foot insulation board in the field of the roof.
 - 2. Install 28 fasteners per 4 by 8 foot insulation board in 8 foot wide perimeter zones.
 - 3. Install 32 fasteners per 4 by 8 foot insulation board in 8 foot square corner zones.
 - 4. Carefully choose the length and position of each screw to ensure the screws do not protrude through the underside of the deck where visible inside the school, and to ensure the screws do not damage conduits mounted on the underside of the deck.
- D. On concrete deck areas install all layers of insulation using low rise polyurethane foam adhesive applied in accordance with the Manufacturer's recommendations and to achieve the specified minimum uplift resistance. Offset joints in the insulation between rows and layers a minimum of 12 inches. Cut insulation to fit neatly at penetrations and joints. Fill any gap which is greater than 1/4 inch.
 - 1. Install 1/2 inch diameter adhesive beads 12 inches on center in the field of the roof.
 - 2. Install 1/2 inch diameter adhesive beads 6 inches on center in 8 foot wide perimeter zones.
 - 3. Install 1/2 inch diameter adhesive beads 4 inches on center in 8 foot square corner zones.
 - 4. Place 5 gallon pails half full of gravel or concrete on the insulation and gypsum cover boards to hold them firmly in position for at least 15 minutes while the low rise foam adhesive sets. Position the pails no more than 24 inches apart in all directions.
- E. Install gypsum cover board using low rise polyurethane foam adhesive applied in accordance with the Manufacturer's recommendations and to achieve the specified minimum uplift resistance, over the insulation with joints offset between rows and layers a minimum of 12 inches. Cut gypsum cover board to fit neatly at penetrations and joints. Fill any gap which is greater than 1/4 inch.
 - 1. Install 1/2 inch diameter adhesive beads 12 inches on center in the field of the roof.
 - 2. Install 1/2 inch diameter adhesive beads 6 inches on center in 8 foot wide perimeter zones.
 - 3. Install 1/2 inch diameter adhesive beads 4 inches on center in 8 foot square corner zones.

4. Place 5 gallon pails half full of gravel or concrete on the insulation and gypsum cover boards to hold them firmly in position for at least 15 minutes while the low rise foam adhesive sets. Position the pails no more than 24 inches apart in all directions.

3.6 EPDM

- A. Place EPDM roofing on the substrate without stretching it, and allow it to relax approximately one hour – before starting to adhere it to the substrate and form the seams.
- B. Place adjoining sheets in the same manner lapping the edges to shed water.
- C. Fully adhere EPDM to the substrate with bonding adhesive.
 1. Open each can of adhesive and stir it with an electric paddle mixer for at least 5 minutes before applying the adhesive. Re-stir adhesive that isn't used within two hours of initial mixing.
 2. Do not punch holes in cans of adhesive and use them in a "Better Spreader" without first opening the cans to mix them.
 3. Replace used roller covers each day; discard covers after each days use.
 4. Allow bonding adhesive to dry to the touch before joining the EPDM to the substrate.
 5. Roll the EPDM onto the dried bonding adhesive and immediately rub it vigorously with a soft bristle broom to ensure complete adhesion.
 6. EPDM installed over improperly applied adhesive or with adhesive that wasn't stirred, and roofing installed with blisters, ridges, mole runs and similar deficiencies shall be removed and replaced at the Contractor's expense. Removal shall include the insulation and cover board assembly.

3.7 SPLICING

- A. Form EPDM roof splices with 6 inch wide field applied seam tape, or with 3 inch wide factory applied seam tape.
 1. Fold the top sheet back and clean mating surfaces using clean rags with splice wash.
 2. Scrub a smooth coat of QuickPrime onto mating surfaces, with long strokes, and to obtain complete coverage, using approximately 1 gallon per 225 square feet. Do not allow the QuickPrime to glop, streak or puddle; allow it to dry to the touch before installing the seam tape.
 3. Seam tape shall be positioned so 1/8 inch minimum and 1/2 inch maximum will be exposed at the seam edge when the seam is complete.
 - a. Install 5 inch uncured EPDM stripping over any seam where the tape is exposed less than 1/8 inch or more than 1/2 inch.
 4. Roll and allow the top sheet to fall freely into place without stretching or wrinkling it.
 5. Pull splice tape release paper from within the seam and neatly mate the seam using hand pressure to rub the membrane together.
 6. Immediately roll the splice with a 2 inch wide roller, using positive pressure, toward the outer edge of splice.
- B. Install uncured EPDM target patches with rounded corners, over all T-Seam intersections.

3.8 PERIMETER FASTENING

- A. Secure the EPDM at the perimeter of each roof level, and at eaves, penetrations, expansion joints and slope changes greater than 1 inch in 12 inches. Utilize surface applied discs or adhere the EPDM to continuous reinforced EPDM fastening strips. Secure the discs and EPDM fastening strips 12 inches on center.

3.9 FLASHINGS

- A. Utilized cured EPDM for all flashings; utilize self-curing EPDM at corners and angle changes only where required by the Manufacturer.
 1. Form flashing splices, and the splice between the flashing and main roof sheet with 6 inch seam tape.
 2. Adhere the flashing to vertical surfaces with bonding adhesive.

3. Fasten the top edge of all flashings, positioning the fasteners 12 inches on center, to be covered by a cap flashing.
- B. Install premolded pipe flashings wherever possible. Where premolded pipe flashings cannot be installed, use field wrapped flashings. Install sealant pockets as a last resort.
- C. Remove existing pipe flashings and Kennedy type couplings and extend the vent pipes to finish a minimum of 18 inches above the roof surface.
 1. Extend the pipes using the same type of pipe material as the original vent pipe.
 2. Use threaded or no-hub couplings, positioned within the insulation layer to extend the pipes.

3.10 MISCELLANEOUS

- A. Provide any miscellaneous roofing, flashing, caulking, and metal work needed to leave the work complete and entirely watertight, neatly and carefully executed in a thorough and workmanlike manner.
- B. Use mechanics skilled and licensed in the trades to perform mechanical and electrical work. Provide new material, couplings, transition pieces, blocking, fasteners and the like needed to complete the work.

3.11 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Conduct an inspection of the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work.
- B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leaks and damage that weren't documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- E. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site presents a neat, orderly and workmanlike appearance. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- F. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

3.12 ROOF INSPECTIONS BY MANUFACTURER

- A. Arrange for the roofing Manufacturer, or his authorized representative, to make a minimum of three inspections in accordance with the following schedule and submit a written report of each inspection to the Architect.
 1. First inspection during the first day of new roof installation.
 2. Second inspection when all roofing and flashings are installed.
 3. Final inspection at the completion of all work.
- B. Provide 48 hours advance written notice to the Architect, so he may have a representative attend the inspections.
- C. Submit the inspection reports within one week following each inspection.
 1. Payment requisitions will not be reviewed nor approved until the inspection reports are received.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING & SPECIALTIES

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. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules and keynotes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Sheet metal work that is compatible with the roofing system specified, including cap flashings, and miscellaneous flashings.
- B. Related Requirements
 - 1. Masonry Maintenance - Section 04 0100
 - 2. Carpentry - Section 06 1000
 - 3. EPDM Roofing - Section 07 5323
 - 4. Roof Accessories - Section 07 7200

1.3 CODE APPROVAL REQUIREMENTS

- A. Fabricate and install roof perimeter flashings that comply with the NY State Uniform Fire Prevention and Building Code and with ANSI/SPRI ES-1 "Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems" requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a full time supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 - c. Submit the supervisor's resume upon request.
 - 2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within a fifty mile radius of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
 - b. Submit the reference list upon request.
- B. Material Quality:
 - 1. Obtain each product from a single Manufacturer which has manufactured the same product in the United States of America for not less than 5 continuous years.
 - 2. Obtain copper and pre-finished sheet metal items from the same mill run to maintain consistent color hue and surface finish.
- C. Pre-Construction Conference: Meet at the project site between one and two weeks prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:

1. How the building will be kept watertight as work progresses.
2. How sheet metal work will be coordinated with the installation of the vapor barrier, insulation, cover board, roofing, flashings, roof accessories and other items to provide a watertight installation.
3. Generally accepted industry practice and the Manufacturer's instructions for handling and installing his products.
4. The condition of the substrate, curbs, penetrations and other preparatory work needed.
5. Incomplete submittals; note that progress payments will not be processed until all submittals are received and approved.
6. The construction schedule, weather forecast, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
7. A schedule for Manufacturer and Architect inspections.

1.5 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work on site:
 1. A pre-work site and building inspection report with photos to document conditions before work starts.
 2. Manufacturer's technical literature for all materials.
 3. Test reports and certifications substantiating compliance with specification requirements if requested by the Architect.
 4. Shop drawings, or 2 foot long samples, for each sheet metal item, to show how it relates and fits on adjoining masonry and wood blocking assemblies, and with the roof, stripping, and flashings.
 5. 6 inch square pieces of each type of sheet metal to show surface finish, texture and color.
 6. A sample of the Contractor's guarantee form.
- B. Simultaneously provide all technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
 1. Submittals shall be prepared and made by the firm that will perform the actual work.
 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program is not established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders.
- D. Payment requisitions will not be processed until all submittals are received and approved.

1.6 JOB MOCK-UPS

- A. After the submittals are approved, prepare in actual job locations, mock-ups of cap flashings, and all other items of sheet metal and related work, for inspection and approval by the Architect.
- B. Construct each mock-up of two full lengths of metal, fastened, connected and stripped-in to the related roofing system, to show the following:
 1. Type, gauge, color, cross-sectional dimensions and shape, and joint and mitering techniques.
 2. Related masonry work, wood blocking, and the attachment techniques and fasteners for all wood and metal components.
 3. Other sheet metal related materials and their installation techniques to fully define the detailing of each mock-up.
- C. Mock-ups shall be constructed to establish the minimum standard of materials and workmanship, and to assure that completed work which matches the mock-ups will be fully functional and serve the purpose for it has been designed.
- D. Approved mock-ups may be left in place and incorporated into the permanent installation. Rejected mock-ups shall be removed and replaced until an acceptable mock-up is approved.

- E. Do not purchase or fabricate sheet metal items until mock-up installation, inspection and approval are completed and approval is documented in writing.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver material to the site in the Manufacturer's original and unopened packaging, with intact and legible labels which identify the products and Manufacturers,
- B. Cover all stored materials with watertight tarpaulins installed immediately upon delivery.
- C. Do not overload the structure when storing materials on the roof.
- D. Protect roof surfaces where material and equipment is placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.8 GUARANTEE

- A. Provide a written Contractor's Guarantee which guarantees that all work will remain free of material and workmanship defects and in a watertight condition for a five year period beginning upon Final Completion:
 - 1. Defects include but are not limited to the following: peeling paint, leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, and undue expansion.
 - 2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as warranted at his own expense.
 - 3. Guarantee coverage shall include removing and replacing materials installed as part of the original work, if removal is needed to affect guaranteed repairs.
 - 4. Guarantee coverage shall have no dollar limit.
- B. Provide one Contractor's Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- C. The Guarantee coverage shall take affect no more than 30 days before the completion of all punch list work.
- D. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Copper sheet: ASTM B370, 99.0 % pure copper, thickness 16 ounces per square foot. Use copper for all metal items not otherwise indicated
- B. Solder: 50-50 tin and lead for plain copper, supplied in one pound bars with the alloy mixture stamped into the bar by the Manufacturer.
 - 1. Flux: Water-Soluble Liquid Flux, Kester #3345 for iron soldering of brass and copper.
- C. Aluminum cap flashings and miscellaneous trim: #3105-H14 alloy aluminum, minimum thickness .040 inches unless otherwise indicated, factory finished with a Fluoropolymer Kynar 500 finish, color as selected by the Architect, from the full range of custom and standard colors.
- D. Fasteners: fabricated of stainless steel, or material that matches the sheet metal being fastened.
- E. Sealant: High performance, solvent free, formulated and moisture curing silyl-terminated polyether sealant, ASTM C-920, Type S, Grade NS, Class 25, NovaLink construction sealant by ChemLink, color as selected.

PART 3 EXECUTION

3.1 GENERAL

- A. Accurately reproduce the details and design shown, and form profiles, bends and intersections, sharp, true and even. Fabricate sheet metal in the shop whenever possible, and form joints, laps, splices and connections to shed water and condensation in the direction of flow.
- B. Provide any miscellaneous flashing and sheet metal work not shown on the drawings but otherwise needed to leave the project complete and entirely watertight, neatly and carefully executed in a thorough and workmanlike manner.

3.2 INSPECTION

- A. Examine surfaces to receive work of this section and report any defects to the Owner. Commencement of work will be construed as complete acceptance of surfaces.

3.3 INSTALLATION

- A. Fabricate and install copper work in accordance with the current edition of "Copper and Common Sense" as published by the Revere Copper and Brass Company, unless otherwise indicated.
 - 1. Form all joints, except loose locked sealant filled expansion joints, to overlap 2 inches.
 - 2. Secure the joints with rivets spaced 1 inch on center positioned about 1/2 inch from the top edge of the joint, then sweat solder the joint.
 - 3. Use solder only to fill and seal the joint, not for mechanical strength. Form soldered joints continuous, strong and free from defects, with well heated soldering irons. Do not use open flame torches for soldering.
 - 4. Clean soldered joints daily, immediately after soldering, by washing them with soap and water applied with a soft bristle brush, then rinsing with clear water.
- B. Securely fasten and anchor all work, and make provisions for thermal expansion. Submit details of expansion joints for approval. Install fasteners through one edge of metal only, use a hook strip on the other edge.
- C. Use stainless steel pin Zamac type nail-in fasteners, or stainless steel screws and washers with neoprene inserts where fasteners will be exposed.

3.4 CAP FLASHINGS

- A. Install new copper cap flashings built into masonry walls properly joined to all related materials in a watertight manner.
 - 1. Solder all joints in the new cap flashing, except form 2 inch wide flat locked sealant filled expansion joints a maximum of 32 feet on center.
 - 2. Form the flashing to turn up 2 inches inside the wall and finish with a hem on the bottom exposed edge.
 - 3. Fasten the top edge of the cap flashing to the back up masonry 12 inches on center.
 - 4. Install new cap flashings where shown on the drawings, and at a height of 10 to 12 inches above the roof surface.
- B. Install new aluminum cap flashings on skylight and equipment curbs.
 - 1. Form the cap flashing to extend at least 2 inches under the equipment or skylight, 4 inches over the base flashing, and finish with a 1/2 inch hem on the bottom edge.
 - 2. Install a 1/2 inch thick by 2 inch wide continuous foam gasket between the cap flashing and mechanical equipment or skylight. Do not set the equipment or skylight in sealant.
 - 3. Secure the equipment or skylight to the curb with stainless steel screws spaced 12 inches on center.

3.5 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Conduct an inspection of the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work.

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- B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leaks and damage that weren't documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- E. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site presents a neat, orderly and workmanlike appearance. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- F. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

END OF SECTION

**SECTION 07 7123
MANUFACTURED GUTTERS AND DOWNSPOUTS**

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. Pre-finished aluminum gutters and downspouts.
- B. Spring gutter strainer.

1.3 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Downspout boots.
- B. Section 07 5300 - Elastomeric Membrane Roofing.
- C. Section 07 6200 - Sheet Metal Flashing and Trim.

1.4 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- C. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.5 DESIGN REQUIREMENTS

- A. Comply with applicable code for size and method of rain water discharge.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on prefabricated components.
- C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- D. Samples: Submit two samples, 12 inch long illustrating component design, finish, color, and configuration.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- B. Prevent contact with materials that could cause discoloration, staining, or damage.

1.8 PROJECT CONDITIONS

- A. Coordinate the work with downspout discharge pipe inlet.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Gutters and Downspouts:

1. Garrety Gutters, 128 West Vaughn St, Kingston, PA 18704; (800) 628-5849; garretymanufacturing@gmail.com
2. Substitutions: 01 6000 - Product Requirements.

2.2 MATERIALS

- A. Pre-Finished Aluminum Sheet: ASTM B209 (ASTM B209M);.050 inch thick.
 1. Finish: Plain, shop pre-coated with modified silicone coating.
 2. Color: As selected from manufacturer's standard colors.
- B. 6 inch wide seamless aluminum gutters, fabricated from custom colored metal stock.
 1. Furnish gutters with concealed aluminum fascia brackets, formed to hook onto the front edge of the gutter and get fastened through the back of the gutter with a stainless steel screw in each bracket.

2.3 COMPONENTS

- A. Gutters: Profile as indicated.
- B. Gutters:.050 inch thick, 7 inch wide seamless aluminum gutters, fabricated from custom colored metal stock.
 1. Furnish gutters with concealed aluminum fascia brackets, formed to hook onto the front edge of the gutter and get fastened through the back of the gutter with a stainless steel screw in each bracket.
- C. Downspouts:.050 inch thick 4 inches by 6 inches rectangular aluminum leaders factory finished with baked acrylic enamel, in a custom color. Fasten leaders with 1/16 inch thick 1 inch wide straps spaced 7 feet on center
- D. Anchors and Supports: Profiled to suit gutters and downspouts.
 1. Gutter Supports: Brackets.
 2. Downspout Supports: Straps.

2.4 ACCESSORIES

- A. Downspout Boots: Refer to Section 05 5000 Metal Fabrications.

2.5 FABRICATION

- A. Form gutters and downspouts of profiles and size indicated.
- B. Fabricate with required connection pieces.
- C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

2.6 FINISHES

- A. Superior-Performance Organic Finish: AA-C12C40R1x (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 AAMA 2605 and with coating and resin manufacturer's written instructions.
 1. Fluoropolymer Two-CoatSystem: Manufacturer's standard two-coat thermocured system consisting of specially formulated inhibitive primer fluoropolymer color coat, and clear fluoropolymer top coat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
 2. Color: As selected by Architect from manufacturer's standard colors.

2.7 SPRING GUTTER STRAINER

- A. 3" Spring Gutter Strainer sizes as required for downspouts.

- B. Stainless Steel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that surfaces are ready to receive work.

3.2 PREPARATION

- A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

3.3 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
- B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- C. Slope gutters 1/8 inch per foot .
- D. Connect downspouts to downspout boots at 24 inches above grade. Grout connection watertight.

END OF SECTION

**SECTION 07 7200
ROOF 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 SUMMARY

- A. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules and keynotes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Roof specialties that are compatible with the roofing systems specified, including:
 - a. Plastic skylights.
 - b. Louvered penthouse ventilators.
 - c. Drains, drain pipes and couplings.
 - d. Pipe insulation and fitting covers.
 - e. Steel roof access ladder and security cover
 - f. Roof walkway pads.
 - 2. Prepare, prime and paint all roof top equipment and miscellaneous rooftop items indicated.
- B. Related Requirements
 - 1. Masonry Maintenance - Section 04 0100
 - 2. Carpentry - Section 06 1000
 - 3. EPDM Roofing - Section 07 5323
 - 4. Sheet Metal Flashing & Specialties - Section 07 6200

1.3 CODE APPROVAL REQUIREMENTS

- A. Fabricate and install roof accessories that comply with the NY State Uniform Fire Prevention and Building Code.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a full time supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 - c. Submit the supervisor's resume upon request.
 - 2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within a fifty mile radius of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number, and the Contractor's Supervisor's name.
 - b. Submit the reference list upon request.

- B. Material Quality: Obtain each product from a single Manufacturer which has manufactured the same product in the United States of America for not less than 5 continuous years.
- C. Pre-Construction Conference: Meet at the project site between one and two weeks prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:
 - 1. How the building will be kept watertight as work progresses.
 - 2. How roof accessory work will be coordinated with the installation of the vapor barrier, thermal barrier, insulation, cover board, roofing, flashings, and other items to provide a watertight installation.
 - 3. Generally accepted industry practice and the Manufacturer's instructions for handling and installing his products.
 - 4. The condition of the substrate, curbs, penetrations and other preparatory work needed.
 - 5. Incomplete submittals; note that progress payments will not be processed until all submittals are received and approved.
 - 6. The construction schedule, forecast weather, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
 - 7. A schedule for Manufacturer and Architect inspections.

1.5 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work:
 - 1. A pre-work site and building inspection report with photos to document conditions before work starts.
 - 2. Manufacturer's installation instructions and technical data sheets for each item. Material sample submittals are not needed unless requested to show color and texture.
 - 3. Samples of the Contractor's and Manufacturer's guarantee/warranty forms.
 - 4. Test reports and certifications substantiating compliance with specification requirements if requested by the Architect.
- B. Simultaneously provide all technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
 - 1. Submittals shall be prepared and made by the firm that will perform the actual work.
 - 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program is not established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders.
- D. Payment requisitions will not be processed until all submittals are received and approved.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver material to the site in the Manufacturer's original and unopened packaging, with intact and legible labels which identify the products and Manufacturers,
- B. Cover all stored materials with watertight tarpaulins installed immediately upon delivery.
- C. Do not overload the structure when storing materials on the roof.
- D. Protect roof surfaces where material and equipment is placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.7 GUARANTEE

- A. Provide a written Contractor's Guarantee which guarantees that all work will remain free of material and workmanship defects and in a watertight condition for a five year period beginning upon Final Completion:

1. Defects include but are not limited to the following: peeling paint, leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, movement and undue expansion.
 2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as warranted at his own expense.
 3. Guarantee coverage shall include removing and replacing materials installed as part of the original work, if removal is needed to affect repairs.
 4. Guarantee coverage shall have no dollar limit.
- B. Provide one Contractor's Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- C. The Guarantee shall take affect no more than 30 days before the satisfactory completion of all punch list work.
- D. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Performance Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.
- E. Provide a Manufacturer's written warranty, which warrants the skylights will remain watertight for a minimum 5 year term beginning upon final completion.

PART 2 PRODUCTS

2.1 GENERAL

- A. Provide Manufacturer's standard units, modified as necessary to comply with the specified requirements. Fabricate each unit in a shop to the greatest extent possible, using the following components:
1. Aluminum Sheet: ASTM B 209 alloy 3003, tempered for forming and performance; mill finish, except as otherwise noted.
 2. Extruded Aluminum: Standard extrusions alloy 6063-T52; 0.078 inch minimum thicknesses for primary framing and curb member legs, 0.062 inch thickness for secondary framing and covers; mill finish, except as otherwise indicated.
 3. Insulation: Rigid fiber glass boards where encapsulated inside metal skirts, rigid isocyanurate where covered with roof flashings on the exterior of curbs.
 4. Wood Nailers: Dimension grade Douglas Fir, not less than 1-1/2 inches thick.
 5. Fasteners: Nonmagnetic stainless steel or hot dipped galvanized steel, to match the finish of the material being fastened.
 6. Gaskets: Tubular neoprene or polyvinyl chloride, or block sponge neoprene.
 7. Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

2.2 PLASTIC SKYLIGHTS

- A. Factory assembled dome and frame assemblies with welded corners manufactured by Kingspan / Bristolite or American Skylights are specified to establish a quality standard. Equal products are acceptable provided they comply with the following requirements:
1. Glazing sheet thickness required for a minimum of 30 pounds per square foot external and 30 pounds per square foot internal loading; and to comply with the minimum thickness and wind pressure requirements of AAMA/WDMA/CSA 101/I.S.2/A440 as set forth in paragraph 2405.5 of the NYS Uniform Fire Prevention and Building Code.
 2. Outer Dome: Dome shaped polycarbonate meeting the following tests:
 - a. Burn Rate ASTM D635 - Not over 2.5
 - b. Smoke Developed ASTM D2843
 - c. Smoke Density Not over 75%
 3. Inner Panel: Clear multiwall polycarbonate panel meeting the following tests:
 - a. Burn Rate ASTM D635 - Not over 2.5
 - b. Smoke Developed ASTM D2843
 - c. Smoke Density Not over 75%

4. Fall Protection: Fabricate the skylights so the dome and panel will not disengage from the frame upon impact of 755 foot pounds, and to comply with OSHA 1910.23 Fall Protection Guidelines.
5. Energy Performance Ratings:
 - a. Maximum U-factor 0.50
 - b. Solar Heat Gain Coefficient (SHGC) of 0.40
- B. Curb Construction: Provide units with integral internal gutters and weep holes to drain condensation; fabricated with formed and extruded thermally broken welded aluminum frames and retaining angles for installation on field constructed curb assemblies.

2.3 LOUVERED PENTHOUSE VENTILATORS

- A. Factory fabricated penthouse assemblies for mounting on field constructed curbs, incorporating .081 inch thick extruded aluminum louver blades, hidden mullions, 1-1/2 by 1-1/2 by 1/8 inch aluminum angle framing, 18-14 aluminum mesh insect screens, and .050 inch thick aluminum covers, manufactured by United Enertech: Model PEL-4, height sized to provide a net free louvered opening equal to the size of the deck opening.

2.4 DRAINS, DRAIN PIPES, AND COUPLINGS

- A. Conventional cast iron bottom and side outlet roof drains, installed with drain receivers, under deck clamps, cast iron strainers, cast iron clamping rings and factory installed stainless steel gravel screens Series 1011 as manufactured by Jay R. Smith Manufacturing Company.
- B. Match the drain outlet size and style to the building drain line, except if the drain line is a copper pipe, then furnish the drain body with a threaded outlet and use a male adapter to connect the drain body to the drain line.
- C. Drain pipe: cast iron pipe with no hub fittings, minimum 3 inch diameter, and larger to match the existing building drain lines.
- D. No-hub couplings: heavy duty rubber neoprene sleeve couplings with full length Type 304 stainless steel shields and at least 4 worm drive clamps, conforming to ASTM A564.

2.5 PIPE INSULATION AND FITTING COVERS

- A. Insulation: minimum 1 inch thick pre-molded 3.5 lb. heavy density fiberglass pipe insulation with UL rated non-combustible service jackets.
- B. .030 inch thick factory fabricated white PVC "Smoke Safe" fitting and drain bowl covers as manufactured by the Speedline Corporation, with a maximum Flame Spread Value of 25 and a maximum Smoke Developed Value of 50 in accordance with ASTM E8450.

2.6 STEEL ROOF ACCESS LADDER AND SECURITY COVER

- A. Fabricate ladder from 1-1/4 inch inside diameter steel pipe rails, spaced 22 inches apart, and 3/4 inch solid steel rebar rungs spaced 12 inches on center. Fit the rungs into drilled holes in the centerline of the rails, weld and grind the welds smooth. Extend the ladder rails and form goose-neck returns to finish 42 inches above the door saddle.
- B. Fabricate a security cover for the ladder from 1-1/2 inch x 1-1/2 inch by 1/4 inch angle and 1/4 inch thick by nominal 1 inch flat expanded mesh.

2.7 ROOF WALKWAY PADS

- A. 2 inches thick, 24 inches by 24 inches precast concrete pavers, natural buff color and finish, minimum 7500 psi compressive strength as manufactured by Hanover Architectural Products.
- B. 30 inches by 30 inches hard rubber black walkway pads manufactured by Firestone.

2.8 PAINT AND PRIMER

- A. Alkyd base rust inhibiting exterior primer and high gloss finish paint for ferrous metal surfaces as manufactured by Benjamin Moore or equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General: Field measure existing openings. Comply with manufacturer's instructions and recommendations. Coordinate with the installation of roof deck, other substrates to receive specialty units, vapor barriers, roof insulation, roofing and flashing to ensure that each element of the work performs and fits properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

3.2 PLASTIC SKYLIGHTS

- A. Skylights on field constructed curbs: Remove the existing skylight and curb assembly using care not to damage the roof deck or skylight well liner. Re-support ceiling and shaft components that are attached to the skylight curb or shaft liner. Construct or extend the existing curb to finish 10 inches above the roof surface. Install new base and cap flashings, and restore & finish the shaft liner to match the original construction. Install the new skylight on top of a 1/2 inch by 2 inch foam gasket.

3.3 LOUVERED PENTHOUSE VENTILATORS

- A. Construct a wood curb to extend 10 inches above the roof surface. Install new base and cap flashings, restore the curb liner to match the original construction, and install the penthouse assembly on top of a 1/2 inch by 2 inch foam gasket.

3.4 DRAINS, DRAIN PIPES AND COUPLINGS

- A. Remove and replace the existing drains where roof removal and replacement work is indicated:
 - 1. Remove the existing drains and flashings; use care not to break or disturb the drain pipes within the building.
 - 2. Modify the existing drain lines to properly connect to the new drain assemblies.
 - 3. Enlarge the hole in the deck and reinforce the deck to accommodate the new drain, and install the drain recessed below the roof surface to achieve maximum drainage.
 - 4. Support the drain with a stamped sump drain receiver, secure it with an under deck clamp and patch the deck around the new drain.
 - 5. Connect the new drain to the existing drain line to conform to all applicable codes, and insulate the underside of the drain body and drain line.
- B. Connect the fittings and sections of cast iron pipe using heavy duty no-hub couplings; solvent weld PVC fittings and pipe, and use threaded connections to join steel fittings and pipe.
- C. Install new drain pipes to slope 1/4 inch per foot, and support each section of pipe with a hanger, supported on a structural member or strut, on each side of every coupling. Do not rely on the couplings to support any weight. Do not hang the drain pipes from the roof deck.

3.5 PIPE INSULATION AND FITTING COVERS

- A. Install insulation on all horizontal drain piping, and on new vertical pipes installed to connect the new drains to the existing lines.
- B. Install insulation on the undersides of the new drains.
- C. Install white PVC fitting and drain bowl covers, and wrap the joints between fitting covers and pipe insulation jackets with 3 inch wide white PVC tape.

3.6 STEEL ROOF ACCESS LADDER AND SECURITY COVER

- A. Install ladder with security cover at the interior location shown. Support and secure each ladder at the top and bottom and at intermediate points spaced a maximum of 5 feet on center. Use bolted steel brackets, anchored with 1/2 inch diameter stainless steel epoxy set bolts. Space the ladders to provide 7 inches of toe clearance. Extend the rails 42 inches and goose-neck form them to provide additional support at the top of the ladder.

3.7 ROOF WALKWAY PADS

- A. Install hard rubber walkway pads to provide a path 2-1/2 feet wide where shown, and at all roof access points, i.e., doors, ladders and hatches, under concrete pavers used for conduit and pipe supports, and around all HVAC equipment.
 - 1. Adhere each pad with five self adhesive strips - do not install the pads using three strips of tape as supplied by the manufacturer.

3.8 PAINTING

- A. Scrape and wire brush roof top equipment, the vent pipes, and the ladder & security cover to remove loose and peeling paint and surface rust.
- B. Install one coat of primer and two finish coats of paint using a brush or roller. Wait 24 hours for each coat of paint to dry before applying the next coat.

3.9 MISCELLANEOUS

- A. Provide and install any sealants needed, where shown or required.
- B. Perform mechanical and electrical work using skilled and licensed tradesmen.
- C. Provide new material, couplings, transition pieces, blocking, fasteners and the similar accessories needed to complete the work.

3.10 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Inspect the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work.
- B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leaks and damage that weren't documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- E. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site presents a neat, orderly and workmanlike appearance. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- F. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

END OF SECTION

**SECTION 07 8400
FIRESTOPPING**

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

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.4 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

1.5 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.

1.6 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 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 floor or wall, whichever is greater.
- B. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor 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, WALL-TO-FLOOR, AND WALL-TO-WALL JOINTS

- A. Gypsum Board Walls:
 - 1. Wall to Wall Joints That Have Movement Capabilities (Dynamic):
 - a. 1 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.
 - 2. Top 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. Top 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.
 - 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 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. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Acoustical sealant.
- D. 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 1300 - Sheet Waterproofing: Sealing cracks and joints in waterproofing substrate surfaces using materials specified in this section.
- C. Section 07 2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.
- D. Section 07 8400 - Firestopping: Firestopping sealants.
- E. Section 07 9513 - Expansion Joint Cover Assemblies: Sealants forming part of expansion joint cover assemblies.
- F. Section 08 8001 - GLAZING: Glazing sealants and accessories.
- G. Section 09 2116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

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.

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 Plan: Submit at least two weeks prior to start of installation.
- G. Field Quality Control Plan: Submit at least two weeks prior to start of installation.
- H. 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.
- I. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

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. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
- D. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
1. Identification of testing agency.
 2. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
 - a. Test date.
 - b. Copy of test method documents.
 - c. Age of sealant upon date of testing.
 - d. Test results, modeled after the sample form in the test method document.
 - e. Indicate use of photographic record of test.
- E. Field Quality Control Plan:
1. Visual inspection of entire length of sealant joints.
 2. Field testing agency's qualifications.
 3. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.
- F. 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/#sle.
 3. Pecora Corporation; ____: www.pecora.com/#sle.
 4. Sika Corporation: www.usa-sika.com.
 5. Tremco Commercial Sealants & Waterproofing; ____: www.tremcosealants.com/#sle.
 6. 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/#sle.
 2. W.R. Meadows, Inc: www.wrmeadows.com/#sle.

2.2 JOINT SEALANT APPLICATIONS

- A. Scope:
 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints indicated below.
 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. Other joints indicated below.
 3. Do not seal the following types of joints.

- a. Intentional weepholes in masonry.
 - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - d. Joints where installation of sealant is specified in another section.
 - e. Joints between suspended panel ceilings/grid and walls.
- B. Vertical Exterior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
1. Type ___ - Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane "traffic-grade" sealant.
- C. Interior Vertical Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
1. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
- D. Exterior and Interior Horizontal Joints: Single component, self-leveling, premium-grade polyurethane sealant

2.3 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01 6116.

2.4 NONSAG JOINT SEALANTS

- A. Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
 3. Color: To be selected by Fuller and D'Angelo, P.C. from manufacturer's standard range.
 4. Cure Type: Single-component, neutral moisture curing
 5. Service Temperature Range: Minus 65 to 180 degrees F.
 6. Manufacturers:
 - a. Sika Corporation; Sikasil 728NS: www.usa-sika.com/#sle.
 - b. Substitutions: 01 2500 - Substitution Procedures
- B. 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/#sle.
 - d. Sanitary 1700; GE Silicones..
 4. Substitutions: 01 2500 - Substitution Procedures
- C. 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.
 4. Manufacturers:

- a. Pecora Corporation; Dynatrol I;: www.pecora.com.
 - b. Sika Corporation; Sikaflex-1a: www.usa-sika.com.
5. Applications: Use for:
- a. Control, expansion, and soft joints in masonry.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.
 - d. All exterior and interior vertical joints.
6. Substitutions: 01 2500 - Substitution Procedures
- D. Type Acoustical Sealant: - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-hardening, non-sagging; not intended for exterior use.
1. Color: To be selected by Fuller and D'Angelo, P.C. from manufacturer's standard range.
 2. Grade: ASTM C834; Grade - Minus 18 Degrees C.
 3. Manufacturers:
 - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant: www.pecora.com.
 4. Applications: Use for:
 - a. Use for all interior joints of where acoustical sealant indicated.
 5. Substitutions: 01 2500 - Substitution Procedures

2.5 SELF-LEVELING SEALANTS

- A. Self-Leveling Silicone Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
 2. Hardness Range: 0 to 15, Shore A, when tested in accordance with ASTM C661.
 3. Color: To be selected by Fuller and D'Angelo, P.C. from manufacturer's standard range.
 4. Service Temperature Range: Minus 40 to 180 degrees F.
 5. Manufacturers:
 - a. Sika Corporation; Sikaflex 1c SL: www.usa-sika.com/#sle.
 - b. Use for all horizontal exterior joints and Interior joints in wet areas..
 - c. Substitutions: 01 2500 - Substitution Procedures
- B. Type ___ - Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
1. Movement Capability: Plus and minus 25 percent, minimum.

2.6 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 7 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 07 9513
EXPANSION JOINT COVER ASSEMBLIES**

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. Expansion joint assemblies for floor and surfaces.

1.3 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2010.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction, anchorage locations, and _____.
- D. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

PART 2 PRODUCTS

2.1 MANUFACTURERS

2.2 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS

- A. Interior Floor Joints Subject to Thermal Movement:
 - 1. Products:
 - a. Construction Specialties, Inc; GFT-200: www.c-sgroup.com/#sle.
- B. Interior Wall/Ceiling Joints Subject to Thermal Movement:
 - 1. Manufacturers:
 - a. Construction Specialties, Inc; GFTW-200: www.c-sgroup.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.3 EXPANSION JOINT COVER ASSEMBLIES

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
 - 1. Joint Dimensions and Configurations: As indicated on drawings.
 - 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
 - 3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
 - 4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.

- B. Floor Joint Covers: Coordinate with indicated floor coverings.
 - 1. If floor covering is not indicated, obtain instructions from Fuller and D'Angelo, P.C. before proceeding.

2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
- B. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

3.2 PREPARATION

- A. Install anchoring devices in conformance to templates.

3.3 INSTALLATION

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.
- C. Rigidly anchor to substrate to prevent misalignment.

3.4 PROTECTION

- A. Do not permit traffic over unprotected floor joint surfaces.
- B. Provide strippable coating to protect finish surface.

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 0511 - Mortar and Masonry Grout: Masonry grout fill of hollow metal frames.
- B. Section 08 1613 - Fiberglass Doors and Aluminum Frames
- C. Section 08 7100 - Door Hardware.
- D. Section 08 8000 - Glazing: Glass for doors and borrowed lites.
- E. Section 09 9123 - Painting: Field painting.

1.4 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- C. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames; 2007 (R2011).
- 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. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- H. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.
- I. 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.
- J. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
- K. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- L. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- M. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- N. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.

- O. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- P. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2017.
- Q. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- R. UL (BMD) - Building Materials Directory; current edition.
- S. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.5 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, glazing, frame profiles, and any indicated finish requirements.
- D. Samples: Submit two samples of metal, 2 inch by 2 inch 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.
- G. Manufacturer's Qualification Statement.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five (5) years documented experience.
- 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.

1.7 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.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Curries, an Assa Abloy Group company; M Series: www.assaabloydss.com.
 - 2. Substitutions: Ceco- SU Series.

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. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
 7. 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.
 8. Galvanizing including all doors and frames: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.3 EMBOSSED WOOD GRAIN FINISH DOORS

- A. Full Flush Doors:
- B. Acceptable Product: Steelcraft "GrainTech "L" Series.
 1. Performance:
 - a. Physical performance: 5 million cycles per ANSI A250.4.
 - b. Sound attenuation (gasketed):
 - a) Honeycomb core, 35 STC.
 - c. Thermal performance (gasketed), ASTM C1363.
 - a) Polystyrene core, 0.48 U-factor.
 - d. Thermal performance (gasketed), ASTM C236.
 - a) Honeycomb core, 0.363 U-factor.
- C. Door Thickness: 1-3/4 inches.
- D. Gauge: 16 Gauge.
- E. Door faces reinforced and sound deadened as follows:
 1. Honeycomb Core:
 - a. Sanded for maximum adhesion.
 - b. Impregnated with phenolic resin.
 - c. Laminated to both face sheets with contact adhesive.
- F. Vertical edge seams: Provide doors with continuous vertical mechanical inter-locking joints at lock and hinge edges. Finish edges as follows:
 1. Visible Interlocked Edge: Continuous vertical mechanical interlocking joints with visible edge seams and continuous bead of structural epoxy in internal vertical connection
- G. Bevel hinge and lock door edges 1/8 inch (3 mm) in 2 inches (50 mm). Square edges on hinge and/or lock stiles are not acceptable.
- H. Reinforce top and bottom of doors with galvannealed 14 gage (1.7 mm), welded to both panels.
- I. Glazing Bead: Formed steel sheet or snap-in Designer trim.
- J. Fire Rating: Supply door units bearing Labels for fire ratings indicated in Door Schedule for the locations indicated.
- K. In addition to the requirements listed in Par 2.3 the following apply where wood grain finished are indicated:
 1. Fabricated from steel that has an embossed wood grain pattern extending the full height and width of the door. Provide a wood grain embodiment minimum .005" deep. Applied grain pattern or material is not acceptable.

- L. Anchors: Manufacturer's standard framing anchors, specified in manufacturer's printed installation instructions for project conditions.
- M. Door Bottom:
 - 1. Acceptable Product: Steelcraft Fas-Seal Door Bottom.
 - 2. Characteristics: Electrometric, continuous strip, screw-attached to recessed bottom door channel for concealed installation; double-sealing; acceptable for fire-rated doors up to 3 hour rating.
- N. Plaster Guards: Same material as door frame, minimum 24 gage (0.5 mm) minimum; provide for all strike boxes.
- O. Silencers: Resilient rubber, Inserted type, three per strike jamb for single openings and two per head for paired openings. Stick-on silencers shall not be permitted except on hollow metal framing systems.
 - 1. Provide silencers on all existing frames.
- P. Glazing: Specified in Section 08 8000 - Glazing
- Q. Finish: Complete factory finish.

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. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 - 1. Frame Metal Thickness: 12 gage, 0.093 inch, minimum.
 - 2. Frame Finish: Factory primed and field finished.

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. Door Window Frames: Door window frames with glazing securely fastened within door opening.
 - 1. Size: As indicated on drawings.
- B. Glazing Trim: As per manufacturer's standard for doors and glass thickness.
- C. Glazing: As specified in Section 08 8000 .
- D. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.
- E. Astragals and Edges for Double Doors: Pairs of door astragals, and door edge sealing and protection devices.
- F. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.
- G. 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.
- H. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.
- I. Frame Anchors: Minimum of six wall anchors and two base anchors.
 - 1. T anchors for masonry.
- J. 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. Coordinate frame anchor placement with wall construction.
- C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- D. Install door hardware as specified in Section 08 7100.
- E. Comply with glazing installation requirements of Section 08 8000.

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 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. Foam door seal.
- F. Accessories.

1.3 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry
- B. Section 05 5000 - Metal Fabrications for steel lintels.
- C. Section 08 1113 - Hollow Metal Doors and Frames
- D. Section 08 7100 - Door Hardware.
- E. 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/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- D. ASTM-B117 – Standard Practices for Operating Salt Spray (Fog) Apparatus.
- E. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- F. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- G. ASTM-C518 – Standard test Method for Steady-State Thermal Transmission Properties by Means of HeatA. Flow Meter Apparatus.
- H. ASTM D 638 - Tensile Properties of Plastics
- I. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010 (Reapproved 2018).
- J. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).
- K. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2014.
- L. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2016.
- M. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
- N. ASTM-D1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.

- O. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
- P. ASTM D 2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging
- Q. ASTM D 2583 - Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
- R. ASTM D 5420 – Impact Resistance of Flat Rigid Plastic Specimens by Means of a Falling Weight.
- S. ASTM D 6670 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products
- T. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- U. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (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 E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2007 (Reapproved 2016).
- Y. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- Z. ASTM F 476 - Security of Swinging Door Assemblies.
- AA. ASTM F 1642-04 - Standard Test Method for Glazing Systems Subject to Air blast Loading.
- AB. NWWDA T.M. 7-90 - Cycle Slam Test Method
- AC. NFRC 100 – Procedure for Determining Fenestration Products U-Factors.
- AD. NFRC 400 – Procedure for Determining Fenestration Products Air Leakage.
- AE. TAS 201 – Impact Test Procedures.
- AF. TAS 202 – Criteria for Testing Impact & Non-impact Resistant Building Envelope Components Using Uniform Static Air Pressure.
- AG. TAS 203 – Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.

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. YPS Office of Facilities Management and Fuller and D'Angelo, P.C. 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 inch by 10 inch 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 inch above grade, with minimum 1/4 inch space between doors.

1.10 FIELD CONDITIONS

- A. Maintain temperature and humidity at manufacturer's recommended levels during and after installation of doors.

1.11 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 Owner, 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. Limited lifetime
 - a. Covers failure of corner joinery, core deterioration, and delamination or bubbling of door skin and corrosion of all-fiberglass products while the door is in its specified application in its original installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fiberglass Composite 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.
 - 2. Substitutions: 01 6000 - Product Requirements

2.2 FIBERGLASS REINFORCED POLYESTER (FRP) DOORS:

- A. Model: SL-17 Pebble Grain FRP/ Aluminum Hybrid Door.
- B. 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: IBC 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) IBC 2603.4.1.7 foam plastic insulation, having a flame spread index less than 75 and a smoke developed index of not more than 450 shall be permitted as a door core when the face is metal minimum 0.032" aluminum or 0.016" steel.
 - d) Standard door assembly can be tested to show it meets these requirements without the use of thermal barrier. 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. Interior
 - a) 0.120" thick, pebble texture, through color with integral surface seal film FRP sheet.
 - 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.

2.3 ALUMINUM DOOR FRAMES

- A. General:
 - 1. Materials and Accessories
 - a. 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.
 - b. 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.
 - c. Expansion Anchor Devices: Lead shield or toothed steel, drilling expansion bolt anchors.
 - d. Bituminous Coating: Cold applied asphalt mastic complying with SSPC-PS 12, compounded for 30-mil thickness per coat.

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- e. 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.
 - f. Hardware:
 - a) Premachine and reinforce frame members for hardware in accordance with manufacturer's standards and door hardware schedule.
 - b) Factory install door hardware.
 - g. 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.
 - h. Applied Door Stops:
 - a) 0.625-inch high, with screws and weatherstripping.
 - i. Pressure gasketing for weathering seal.
 - j. Counter punch fastener holes in door stop to preserve full-metal thickness under fastener head.
 - k. Caulking: Caulk joints before assembling frame members.
 - l. Joints:
 - a) Secure joints with fasteners.
 - b) Provide hairline butt joint appearance.
 - m. Open-back framing is not acceptable.
- B. Thermally Broken Aluminum Framing.
- 1. Model.
 - a. SL-600TB.
 - b. Size; 2" x 4" and 4" x 6".
 - 2. Materials.
 - a. See par. 2.4
 - 3. Perimeter Frame Members.
 - a. Storefront frame with thermally broken pocket filler.
 - b. Factory fabricated.
 - c. Open-back framing is not acceptable.
 - d. Thermal Strut.
 - 4. Pultruded fiberglass only, no other materials will be accepted.
 - 5. Applied Door Stops.
 - 6. 5/8" x 1-1/4" or 5/8" x 1-3/4", 0.125" wall thickness, with screws and weather-stripping.
 - 7. Provide solid 1/2" aluminum bar behind door stop for closer shoe attachment.
 - a. Pressure gasketing for weathering seal.
 - 8. Counter-punch fastener holes in door stop to preserve full-metal thickness under fastener head.
 - a. Minimum 1/2" aluminum bar reinforcement under doorstop for required hardware attachments, aluminum to meet ASTM-B221.
 - b. Caulking.
 - c. Caulk joints before assembling frame members.
 - d. Frame Member to Member Connections.
 - e. Secure joints with fasteners.
 - f. Provide hairline butt joint appearance.
 - g. Shear block construction only, no screw spline allowed.
 - 9. Anchors:
 - a. Anchors appropriate for wall conditions to anchor framing to wall materials.

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- 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.

2.4 MATERIALS

- A. Aluminum Members.
 - 1. Aluminum extrusions made 6061 or 6063 aluminum alloys.
 - 2. Sheet and plate to conform to ASTM-B209.
 - 3. Alloy and temper to be selected by manufacturer for strength, corrosion resistance, and application of required finish, and control of color.
- B. Fiberglass.
 - 1. See Par. 2.2.
- C. Fasteners.
 - 1. All exposed fasteners will have a finish to match material being fastened.
 - 2. 410 stainless steel or other non-corrosive metal.
 - 3. Must be compatible with items being fastened.

2.5 PERFORMANCE

- A. 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.
 - 1. Thermal Transmission (Exterior Doors): U-value of not more than 0.09 (BTU/Hr. x sf x degrees F.) per AAMA 1503.1.
 - 2. 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.
- B. Face Sheet.
 - 1. 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 Resistance.
 - a) Excellent Rating.
 - (a) Acetic Acid, Concentrated.
 - (b) Acetic Acid, 5%.
 - (c) Bleach Solution.

- (d) Detergent Solution.
 - (e) Distilled Water.
 - (f) Ethyl Acetate.
 - (g) Formaldehyde.
 - (h) Heptane.
 - (i) Hydrochloric Acid, 10%.
 - (j) Hydrogen Peroxide, 3%.
 - (k) Isooctane.
 - (l) Lactic Acid, 10%.
- 1. USDA/FSIS Requirements.
 - a) FRP face sheet with surfaseal is a finished outer surface material that is rigid; durable; non-toxic; non-corrosive; moisture resistant; a light, solid color such as white; easily inspected; smooth or an easily cleaned texture.
 - b) FRP face sheet with surfaseal does not contain any known carcinogen, mutagen, or teratogen classified as hazardous substances; heavy metals or toxic substances; antimicrobials; pesticides or substances with pesticidal characteristics.
- C. Door Core.
- 1. Density, ASTM-D1622: ≤ 5.0 pcf.
 - 2. Compressive Properties, ASTM-D1621: Compressive Strength ≤ 60 psi, Compressive Modulus ≥ 1948 psi.
 - 3. Tensile and Tensile Adhesion Properties, ASTM-D1623: Tensile Adhesion, 3" x 3" FRP Facers ≥ 53 psi, Tensile Adhesion, 1" x 1" Foam ≥ 104 psi.
 - 4. Thermal and Humid Aging, ASTM-D2126: Volume Change at 158 °F, 100% humidity, 14 days $\leq 13\%$.
 - 5. Thermal Conductivity, ASTM-C518, Thermal Resistance ≥ 0.10 m²K/W.
- D. Door Panel.
- 1. Thermal Transmittance, AAMA 1503-98: U-Factor = 0.29 Btu/hr/ft²/°F, CRFp = 55.
 - 2. Indoor Air Quality, ASTM-D5116, ASTM-D6607: GreenGuard, GreenGuard Gold.
 - 3. Sound Transmission, ASTM-E90: STC = 26, OITC = 25.
- E. Door and Thermally Broken Aluminum Frame Assembly.
- 1. Thermal Transmittance, NFRC 100.
 - a. Opaque Swinging Door (< than 50% glass)
 - a) U-Factor = 0.31 Btu/hr/ft²/°F.
 - b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - a) U-Factor = 0.64 Btu/hr/ft²/°F.
 - 2. 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.

2.6 FINISH HARDWARE:

- A. Provide and factory install finish hardware for each door leaf as specified in Division 8 "Finish Hardware".
- B. SL-82 Class I Aluminum Recessed Pull Handles. Color selected by Architect.
- 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.

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. The details shown are based upon standard details by one or more manufacturers. It is intended that similar details by other manufacturers will be accepted, provided they comply with size requirements, and with minimum/maximum profile requirements as shown.
- D. 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.
- E. Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to assemble, cleaning, finishing, treatment and application for coatings. Remove burrs from cut edges, and ease edges and corners to a radius of approximately 1/64".
- F. Secure attachments and support at mechanical joints with hairline fit at contact surfaces.
- G. Welding of doors or frames is not acceptable..
- H. Conceal fasteners, wherever possible, except as otherwise noted.
- I. 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.
- J. 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.
- K. All shop fabrication to be completed in accordance with manufactures process work instructions.
- L. Quality control to be performed before leaving each department.

2.8 FINISHES

- A. Aluminum:
 - 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

- a. 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.
 - b. Color: As selected by Fuller and D'Angelo, P.C. from manufacturer's standard and premium colors.
- B. FRP Face Sheets
- 1. Through color.
 - a. Color: As selected by Fuller and D'Angelo, P.C. from manufacturer's standard and premium line of colors.

2.9 ACCESSORIES

- A. Snap Trim as required. Match door and frame finish.
- B. Glazing: As specified in Section 08 8000.
- C. Lite Kits:
 - 1. Provide and factory install a Special-Lite FL-Standard extruded aluminum.. Provide as per the drawings.
 - 2. Color: To match frame color.
 - 3. Size as indicated on drawings.
- D. Door Hardware: As specified in Section 08 7100.
- E. 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.

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.
- C. If substrate preparation is the responsibility of another installer, notify Fuller and D'Angelo, P.C. of unsatisfactory preparation before proceeding.

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. Install door hardware as specified in Section 08 7100.
- D. Set units plumb, level, and true-to-line, without warping or racking doors or frames, and with specified clearances; anchor securely in place.

- E. Anchor frames securely in place.
- F. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by architect.
- G. Install exterior doors to be weathertight in closed position.
- H. Remove and replace damaged components that cannot be successfully repaired as determined by architect.
- I. Set thresholds in continuous bed of sealant.
- J. In masonry walls, install frames prior to laying masonry; anchor frames into masonry mortar joints; fill jambs with grout as walls are laid up.
- K. Install perimeter sealant in accordance with requirements specified in Section 07 9200 - Joint Sealants.
 - 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.
- L. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.
- M. 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 5113
ALUMINUM WINDOWS**

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 extruded aluminum windows with operating sash.
- B. Factory glazing.
- C. Operating hardware.
- D. Foam sealant for filling perimeter window space.

1.3 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry.
- B. Section 05 5000 - Metal Fabrications: Steel lintels.
- C. Section 07 9200 - Joint Sealants: Sealing joints between window frames and adjacent construction.
- D. Section 08 8000 - Glazing.

1.4 DEFINITIONS

- A. Performance class designations according to AAMA/WDMA/CSA 101/I.S.2/A440-17:
 - 1. AW: Architectural.
- B. Performance grade number according to AAMA/WDMA/CSA 101/I.S.2/A440-17:
 - 1. Design pressure number in pounds force per square foot (pascals) used to determine the structural test pressure and water test pressure.
- C. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.
- D. Minimum Test Size: Smallest size permitted for performance class (gateway test size) or as specified elsewhere in this section, whichever is more stringent. Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class. Downsized test reports will not be considered acceptable.

1.5 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2017.
- B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- D. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- E. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002 (Reapproved 2010).

1.6 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size indicated below:
 - 1. Double-hung windows: 60" x 99".
- B. Structural Performance: Provide aluminum windows capable of withstanding the effects of the following loads, based on testing units of the minimum test size specified herein that pass AAMA/WDMA/CSA 101/I.S.2/A440-17, Uniform Load Structural and Uniform Load Deflection Tests:
 - 1. Uniform Load Structural Test: 150 psf (positive and negative).
 - 2. Uniform Load Deflection Test: 100 sf (positive and negative).
- C. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a minimum CRF:

1.7 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.
- C. Shop Drawings: Indicate opening dimensions, elevations of different types, mullion details, including reinforcement and stiffeners, weather-stripping details, thermal-break details, glazing details, framed opening tolerances, and installation requirements.
- D. Engineering Calculations: Submit calculations prepared and certified by a professional Engineer, registered and licensed for practice in the State of New York showing compliance with specifications, including type and location of all fasteners.
- E. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.
- F. Maintenance Data: For operable window sash, operating hardware and finishes to include in maintenance manuals.
- G. Warranty: Submit manufacturer warranty and special warranty and ensure that forms have been completed in Yonkers Public Schools's name and registered with manufacturer.
- H. Product Test Reports: Provide comprehensive test reports not more than four years old prepared by a qualified testing agency for each window type being used on the project. Test reports based on the use of downsized test units will not be accepted.

1.8 QUALITY ASSURANCE

- A. Design structural support components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of New York
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten (10) years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of type specified and with at least five (5) years of documented experience and approved by manufacturer for installation of units required for this Project.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of AAMA CW-10.
- B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.10 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F.

- B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.11 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, or air infiltration.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of metals or other materials beyond that which is normal.
 - e. Failure of insulating glass.
- C. Correct defective Work within a ten (10) year period after Date of Substantial Completion.
- D. Provide 10 year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- E. Balance System: Correct/Replace balances for failure or defective Work within a Class 6 ,ten (10) year period after Date of Substantial Completion.
- F. Painted Metal Finishes:
 - 1. Provide manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.
 - 2. Five (5) years from date of Substantial Completion for AAMA 2603 Baked Enamel Finishes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Architectural Window Manufacturing; 4700i: www.architecturalwindow.com.
- B. Other Acceptable - Aluminum Windows Manufacturers:
 - 1. Substitutions: See Section 01 6000 - Product Requirements.

2.2 WINDOW

- A. Window Type: Double Hung
- B. AAMA/WDMA Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440-17.
 - 1. Performance Class and Grade: AW-PG100.
- C. Condensation-Resistance Factor (CRF): Provide aluminum windows tested with insulating glass for thermal performance according to AAMA 1503, showing a minimum CRF of 50.
- D. Thermal Transmittance: Provide aluminum windows with whole-window U-factor and SHGC maximums indicated when simulated in accordance with NFRC 100 and NFRC 200 at a model size of 48" x 72" and glazed with 1" Argon filled sputter coat Low-E (#2) insulated glass using a warm edge spacer.
 - 1. U-Factor: 0.38 Btu/sq. ft. x h x deg F or less.
 - 2. SHGC: 0.28.
- E. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA/CSA 101/I.S.2/A440-17, Air Infiltration Test.
 - 1. Maximum Rate: 0.19 cfm/sq. ft. (5 cu. m/h x sq. m) of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa).
- F. Water Resistance: No water leakage as defined in AAMA/WDMA referenced test methods at a water test pressure equaling that indicated, when tested according to AAMA/WDMA 101/I.S.2/NAFS, Water Resistance Test.
 - 1. Test Pressure: 20 percent of positive design pressure, but not more than 12 lbf/sq. ft.

- G. Forced-Entry Resistance: Comply with Performance Grade 10 requirements when tested according to ASTM F 588.
- H. Life-Cycle Testing: Test according to AAMA 910 and comply with AAMA/WDMA/CSA 101/I.S.2/A440-17.
- I. Operating Force and Auxiliary (Durability) Tests: Comply with AAMA/WDMA/CSA 101/I.S.2/A440-17 for operating window types indicated

2.3 COMPONENTS

- A. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated
- B. Sills: Extruded aluminum; sloped for positive wash; fit under sash leg to 1/2 inch beyond wall face; one piece full width of opening. Jamb angles to terminate sill end.
- C. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action and for complete concealment when aluminum window is closed.
 - 1. Weather-Stripping Material: Manufacturer's standard system and materials complying with AAMA/WDMA/CSA 101/I.S.2/A440-17.
- D. Replaceable Weather Seals: Comply with AAMA 701/702.
- E. Fasteners: Non magnetic stainless steel or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.
 - 1. All fasteners must be concealed except where unavoidable for application of hardware.
 - 2. For application of hardware, where required, use non-magnetic stainless steel phillip flat head machine screws
- F. Glazing Materials: As specified in Section 08 8000 - Glazing.
- G. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.
- H. Sealant and Backing Materials: As specified in Section 07 9200 - Joint Sealants.

2.4 ACCESSORIES

- A. Window and Door Joint Seal: Polyurethane-based joint filler:
 - 1. UL Classified.
 - 2. Product: "Great Stuff" as manufactured by Dow Chemical.
 - a. "Gaps and Cracks: for joints less than 1".
 - b. "Big Gap Filler" for joint over 1".
 - 3. Use for all filling all spaces and joints around windows and doors located on exterior walls.

2.5 HARDWARE

- A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows and sized to accommodate sash or ventilator weight and dimensions. Do not use aluminum in frictional contact with other metals
- B. Locks and Latches: Designed to allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
- C. Double Hung Windows:
 - 1. Counterbalancing Mechanism: Comply with AAMA 902.

- a. Sash Balance: Concealed Class 6 Ultralift Extreme spring type capable of lifting 80 percent of sash weight of size and capacity to hold sash stationary at any open position.
2. Removable Lift-Out Sash: Design windows and provide with hardware to permit removal of sash from inside for cleaning. Units with tilt-in sash will not be acceptable.
3. Handle: Continuous, integral lift rail on bottom rail of lower sash and pull down rail on top rail of upper sash.
4. Upper Sash Lock: Pole-operated snap type white bronze lock on top rail of upper sash. Spring-loaded, snap-type aluminum lock on top rail of upper sash
5. Pole Socket: Provide a pole socket or groove on inside face of top rail of lower sash on windows with meeting rails more than 72 inches above floor.
6. Limit Device: Continuous extruded aluminum sash stop limit device with rubber bumper; for each lower operable sash located at jamb; two per sash
7. Spring loaded white bronze sill snap locks.
8. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches (1500 mm) above floor; 1 pole operator and pole hanger per room that has operable window hardware more than 72 inches (1800 mm) above floor.
9. Limit stops.

2.6 FABRICATION

- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.
- C. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed (products with exposed thermal barriers will not be acceptable), low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
 1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.
 2. No thermal short circuits shall occur between the exterior and interior.
 3. The thermal barrier shall be INSULBAR® or equal and shall consist of two glass reinforced polyamide nylon 6/6 struts mechanically crimped in raceways extruded in the exterior and interior extrusions.
 4. Poured and debridged urethane thermal barriers shall not be permitted.
- D. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.
- E. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- F. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.093-inch- thick extruded aluminum. Finish to match window units. Provide subframes capable of withstanding design loads of window units.
- G. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Section 08 8000 - Glazing and with AAMA/WDMA/CSA 101/I.S.2/A440-17.
- H. Glazing Stops: Provide snap-on glazing stops coordinated with 08 8000 - Glazing and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

2.7 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Exterior of Window:
 - 1. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.
 - a. Manufacturers:
 - a) PPG Metal Coatings; Duranar: www.ppgmetalcoatings.com.
- D. Interior of Window:
 - 1. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 - a. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603.
 - b. Color: To match exterior.
- E. (Note: Exterior color may be different from interior color.)
- F. Apply one coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.
 - 1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
 - 2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. Install windows in accordance with manufacturer's instructions.
- C. Install window assembly in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-17.
- D. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- E. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- F. Install sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- G. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior
- H. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

- I. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- J. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.
- K. Install operating hardware not pre-installed by manufacturer.
- L. 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.

3.3 TOLERANCES

- A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.

3.5 ADJUSTING

- A. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts

3.6 CLEANING

- A. Remove protective material from factory finished aluminum surfaces.
- B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.
- D. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.
- E. Protection of newly installed windows and/or final cleaning of glass and aluminum to remove any accumulations that may have occurred during the construction period is to be the responsibility of the General Contractor or Owner.
- F. Comply with manufacturer's written recommendations for final cleaning and maintenance

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.
 - 2. Electromechanical door hardware, power supplies, back-ups and surge protection.
- C. Related Sections:
 - 1. Section 08 1113 - Hollow Metal Doors and Frames.
 - 2. Section 08 81 30 - Aluminum Frames and Aluminum FRP Doors.
 - 3. 08 1613 - Fiberglass Doors and Aluminum Frames.
 - 4. Section 08 8000 - Glazing.
- 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. ASTM E1886 - Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Shutters Impacted by Missiles and Exposed to Cyclic Pressure Differentials.
 - 3. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure difference.
 - 4. ICC/IBC - International Building Code.
 - 5. NFPA 80 - Fire Doors and Windows.
NFPA 101 - Life Safety Code.
 - 6. 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 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 Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.4 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: Related Division 08 Sections (Steel, Aluminum and Wood) 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.

1.5 WARRANTY

- A. General Warranty: Reference School Facilities Management Contract Manual and Specifications. 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. Special Warranty Periods:
 - 1. Seven years for heavy duty cylindrical (bored) locks and latches.
 - 2. Five years for exit hardware.
 - 3. Ten years for manual door closers.
 - 4. Two years for electromechanical door hardware.

1.6 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- 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.
 - 1. 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:
 - a. 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.
 - 2. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.
 - a. Permanent cylinders, cores, and keys to be installed by Owner.
- B. 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 6000 - Product Requirements for Substitution Procedures. Approval of requests is at the discretion of the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. and their designated consultants.

2.2 HANGING DEVICES

- A. Continuous Hinges:
 - 1. For interior or exterior doors up to 450lbs, and 4'-0" wide.
 - a. To be constructed of extruded aluminum 6063-T6 alloy with thermoplastic polyester bearings.
 - b. Shall meet ANSI/BHMA A156.25.
 - c. Provide 12-24 x 1/2" steel self tapping screws and #12 x 1 1/2" Flathead Wood Screws, unless otherwise specified.
 - 2. Manufacturer: Markar (MA) 12HD , as specified in hardware sets.

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 straight- or clover-type cam.
 - 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.
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
 - 1. Interchangeable Cores: Large Format Interchangeable Core insert, removable by use of a special key; usable with other manufacturers' cylinders.
- E. Exterior Cylinders: ANSI/BHMA A156.5, Grade 1, certified patented cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.
 - 1. Acceptable Manufacturers:
 - a. Medeco (MC) - Keymark X4 Series.
- F. Keying System: Each type of lock and cylinders to be factory keyed. Conduct specified "Keying Conference" to define and document keying system instructions and requirements. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner. Incorporate decisions made in keying conference, and as follows:
 - 1. Master Key System: Cylinders are operated by a change key and a master key.
 - 2. Grand Master Key System: Cylinders are operated by a change key, a master key, and a grand master key.
 - 3. Great-Grand Master Key System: Cylinders are operated by a change key, a master key, a grand master key, and a great-grand master key.
 - 4. Existing System: Master key or grand master key locks to Owner's existing system.
 - 5. Keyed Alike: Key all cylinders to same change key.
- G. Key Quantity: Provide the following minimum number of keys:
 - 1. Top Master Key: One (1)
 - 2. Change Keys per Cylinder: Two (2)
 - 3. Master Keys (per Master Key Group): Two (2)

4. Grand Master Keys (per Grand Master Key Group): Two (2)
 5. Construction Control Keys (where required): Two (2)
 6. Permanent Control Keys (where required): Two (2)
- H. Construction Keying: Provide construction master keyed cylinders or temporary keyed construction cores where specified. Provide construction master keys in quantity as required by project Contractor. Replace construction cores with permanent cores. Furnish permanent cores for installation as directed under specified "Keying Conference".

2.4 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified cylindrical (bored) locksets furnished in the functions as specified in the Hardware Sets. Lock chassis fabricated of heavy gauge steel, zinc dichromate plated, with through-bolted application. 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. Locks are to be non-handed and fully field reversible.
1. Acceptable Manufacturers:
 - a. Corbin Russwin Hardware (RU) – CL3300 Series.
- B. Lock Trim Design: As specified in Hardware Sets.

2.5 CONVENTIONAL EXIT DEVICES

- A. 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. Mounting rails to be formed from smooth stainless steel, brass or bronze architectural materials no less than 0.072" thick, with push rails a minimum of 0.062" thickness. Painted or aluminum metal rails are not acceptable. Exit device latch to be investment cast stainless steel, pullman type, with deadlock feature. Provide flush end caps. Cylinder dogging at all exterior doors.
1. Acceptable Manufacturers:
 - a. Sargent: (SA) - 80 Series.
 - b. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
- B. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish. Provide keyed removable feature, stabilizers, and mounting brackets as specified in the Hardware Sets.
1. Acceptable Manufacturers:
 - a. Sargent (SA) - L980SxLAR
 - b. Corbin Russwin Hardware (RU) - 700/900 Series.
 - c. Yale Locks and Hardware (YA) - M200 Series.

2.6 DOOR CLOSERS

- A. 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 and metal covers standard. Install all closers to allow full 180 degree door swing.
1. Acceptable Manufacturers:
 - a. Corbin Russwin Hardware (RU) – DC6000 Series.
 - b. Norton Door Controls (NO) - 7500 Series.

2.7 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).
 - b. Trimco (TC).

2.8 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. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- C. Acceptable Manufacturers:
 1. Pemko Manufacturing (PE).
 2. Reese Enterprises, Inc. (RS).

2.9 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.

2.10 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.
- D. Antimicrobial Finishes: Where specified, finishes on locksets, latchsets, exit devices and push/pull trim to incorporate an FDA recognized. Silver Ion, antimicrobial coating (MicroShield™) listed for use on equipment as a suppressant to the growth and spread of a broad range of bacteria, algae, fungus, mold and mildew.

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 architect 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.
- B. Wood Doors: Comply with ANSI/DHI A115-W 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.
- 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 Division 7 Section "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 report 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.

3.8 DOOR HARDWARE SCHEDULE

- A. The hardware sets represent the design intent and direction of the owner and architect. 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. Manufacturer's Abbreviations:
 1. MK - McKinney

2. RU - Corbin Russwin
3. MC - Medeco
4. RO - Rockwood
5. PE - Pemko
6. MA - Markar
7. IVE - Ives
8. HS - HES
9. RI - Rixon

3.9 Hardware Schedule

3.10 SET 1.0

SGL EXT. PANIC

Hinge (cont)	HD12	628	MA
Exit Device (Rim,NL)	16-43 8804	630	SA
Mortise Cylinder Housing	1070-114- A02- 7-Pin	626	RU
Rim Cylinder Housing	3070-178- 7-Pin	626	RU
LFIC Core	X4 322301N		MC
Closer (surface)	DC6210 A5	689	RU
Kick Plate	K1050 10" x 2" LDW	US32D	RO
Threshold	See drawings		PE
Gasketing	2891ANB		PE
Sweep	18061CNB		PE
Elec. Strike	9600/9500 as reqd.	630	HS
Smartpac Bridge rectifyer	2005 M3		HS
1 ElectroLynx Adapter	2004 M		HS
1 Card Reader	By YPS Office of Facilities Management		
1 Power Supply	By YPS Office of Facilities Management		

3.11 Set: 2.0

EXT. DBL. DRS

Hinge (cont)	HD12	628	MA
Removable Mullion	910KM	RU	1
Exit Device (Rim,NL)	16-43 8804	630	SA
Exit Device (Rim, EO)	16-43 8800	630	SA
Mortise Cylinder Housing	1070-114- A02- 7-Pin	626	SA
Rim Cylinder Housing	3070-178- 7-Pin	626	SA
LFIC Core	X4 322301N		MC
Closer (surface)	DC6210 A5	689	RU
Kick Plate	K1050 10" x 2" LDW	US32D	RO
Threshold	See drawings.		PE
Gasketing	2891ANB		PE
Sweep	18061CNB		PE

YONKERS PUBLIC SCHOOLS
 CAPITAL IMPROVEMENT REHABILITATION PHASE 3
 CHARLES E. GORTON HIGH SCHOOL YPS #10909
 DOOR HARDWARE

Notes: 2 mortise cylinders for cylinder dogging. 1 mortise cylinder for mullion. 1 rim cylinder used at exterior. Pulls by door manufacturer.

SET 3.0

SGL VESTIBULE

Cont. Hinge	HD12	628	MA
Cylindrical Lock (intruder)	CL3352 PZD CT7D	626	RU
LFIC Core	8000 IC		RU
Closer (surface)	DC6200 A10/DC6210 A3	689	RU
Kick Plate	K1050 10" x 2" LDW	US32D	RO
Door Stop	400 (441H as needed)	US26D	RO
Magnetic Holder	900		RI

SET: 4.0

SGL ROOF ACCESS

Cont. Hinge	SL11/ SL40 HD	US26D	MK
Cylindrical Lock (Storeroom)	CL3357 PZD CT7D	626	RU
LFIC Core	8000 IC		RU
Closer (surface)	DC6200 A10/DC6210 A3	689	RU
Kick Plate	K1050 10" x 2" LDW	US32D	RO
Door Stop	400 (441H as needed)	US26D	RO

END OF SECTION

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. High Performance Architectural Insulating glass units.
- B. Insulated security glass.
- C. Insulated laminated glass
- D. Glazing compounds and accessories.

1.3 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealants for other than glazing purposes.
- B. Section 08 1113 - Hollow Metal Doors and Frames: Glazed lites installed in doors and borrowed lites.
- C. Section 08 1613 - Fiberglass Doors and Aluminum Frames: Glazed lites installed in doors and transoms.
- D. Section 08 5113 - Aluminum Windows: Glazing factory installed in windows.
- E. Section 08 5123 - Steel Windows: Glazing furnished and installed by window manufacturer.

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 C1036 - Standard Specification for Flat Glass; 2016.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- F. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.

- G. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.
- H. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2018c.
- I. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- J. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2017.
- K. ASTM E 2188 – Standard Test Method for Insulating Glass Unit Performance and Evaluation.
- L. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- M. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials.
- N. GANA (SM) - GANA Sealant Manual; 2008.
- O. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.
- P. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- Q. UL 9 - Standard for Fire Tests of Window Assemblies; Current Edition, Including All Revisions.
- R. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- S. UL 752 - Standard for Bullet-Resisting Equipment; Current Edition, Including All Revisions.
- T. 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 in size of glass units.
- E. Samples: Submit 6 inch 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. 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.
- I. 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. Sustainable Design Certification: Glass shall be Cradle to Cradle Certified™, minimum Silver Level, Cradle to Cradle Innovation Institute.
- B. Perform Work in accordance with GANA (SM) and GANA (LGRM) for glazing installation methods.
- C. 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
- D. 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
- E. 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.
- F. 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.
- G. Fabricator Qualifications: Manufactured Certified as acceptable to the manufacturer
- H. 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.
1. Manufacture shall provide field inspection of the installation.
- I. 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. Laminated Glass: Obtain laminated-glass units from one manufacturer using the same type of glass lites and interlayers for each type of unit indicated.
 4. Insulating Glass: Obtain insulating-glass units from one manufacturer using the same type of glass and other components for each type of unit indicated.
 5. Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.
- J. 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.
- K. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.8 MOCK-UPS

- A. See Section 01 4000 - Quality Requirements and individual sections for additional mock-up requirements.
- B. Provide mock-up of replacement units and units as specified in related sections.
- C. Locate where directed.
- D. Mock-ups may remain as part of the Work.

1.9 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.

1.10 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.

- C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.11 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.
- D. Coated-Glass Products: Manufacturer's standard form, made out to the glass fabricator, in which the coated glass manufacturer agrees to replace coated glass units that deteriorate during normal use within the specified warranty period. Deterioration of the coated glass is defined as peeling and/or cracking, or discoloration that is not attributed to glass breakage, seal failure, improper installation or cleaning and maintenance that is contrary to the manufacturer's written instructions.
 - 1. Warranty Period: five (5) from date of Substantial Completion
- E. Heat Soaked Tempered Glass: Provide a five (5) year manufacturer warranty to include coverage for spontaneous breakage of fully tempered glass caused by nickel sulfide (NiS) inclusions.

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. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
 - 1. In conjunction with vapor retarder and joint sealer materials described in other sections.
- 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. 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. Manufacturers:
- B. Space between lites filled with gas as required to maintain Thermal Transmittance Overall U-value.
- C. Total Thickness: 1 inch.
- D. Solar Heat Gain Coefficient (SHGC): 0.39, nominal.
- E. Insulated Security 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, minimum
 - 2. Inboard Lite: School Guard Glass SG4 IGU.
 - a. Tint: Clear.
 - b. Size : As shown on drawing.
 - c. Thickness: 5/16 inch, minimum
 - d. Standards:
 - a) ASTM C1036 - Standard Specification-Flat Glass
 - b) CPSC 6 CFR 1201.
 - c) Ratings: UL 972; 5-aa1 rated for 6 minutes.
 - d) BR Level 2 low spall.
 - e) UL 972
 - e. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch thick, minimum.
 - f. Total Thickness: 1".
 - g. Use for all exterior doors and transoms and as indicated on drawings.
 - h. Substitutions: Refer to 01 6000 - Product Requirements.
- F. Insulated 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: 1/8 inch minimum
 - 2. Inboard Lite: Fully tempered
 - a. Tint: Clear.
 - b. Thickness: 1/8 inch minimum
 - 3. Total Thickness: 1/2 inch.
 - 4. Use for reglazing existing windows.

5. Substitutions: Refer to 01 6000 - Product Requirements .
- G. 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.
 - a) Heavily patterned obscure glazing all toilet windows.
 - 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
 3. Total Thickness: 1 inch.
 4. Use for new windows.
 5. Substitutions: Refer to Section 01 2500 - Substitution Procedures.
- H. Fire Rated Safety Interior Vision Glazing
1. Conform to Underwriters Laboratories, Inc. Fire Tests of Door Assemblies and the following:
 2. Firelite Plus, clear ceramic laminated with 2 pieces of PREMIUM FireLite and a proprietary interlayer specialty high impact fire rated glazing material.
 - a. Thickness: 5/16"
 - b. U Value: 0.40
 - c. Weight: 3.8-lbs/sq. ft.
 - d. Sound Transmission Rating: 38 STC
 - e. Glazing materials shall be optically clear, colorless and free from usual distortion.
 - f. Each piece of fire-rated glazing material shall be labeled with a permanent logo including name of product, manufacturer, testing laboratory fire rating period and safety glazing standards.
 - g. Glazing material installed shall be certified and permanently labeled as meeting applicable requirements referenced in NFPA 80 and:
 - h. ANSI Z97.1
 - i. CPSC 16 CFR 1201, Category II 400 ft.lbs.
 - j. Glazing shall be installed in a rated framing system meeting ASTM E2010-01, NFPA 257, UL 9, UBC 7-4 or CAN4-S106 and ASTM E2074-00, NFPA 252, UL 10b, UBC 7-2 or CAN4-S104
 3. Use for all interior vision panels in fire rated doors
 4. Substitutions: Refer to 01 6000 - Product Requirements

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 of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch 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 1113 Hollow Metal Doors and Frames, Section 08 1416 Flush Wood Doors, Section 08 1613 Fiberglass Doors and Aluminum Frames, Section 08 4313 Aluminum Framed Storefronts, Section 08 4413 Glazed Aluminum Curtain Walls, 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 non-permanent 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 2116
GYPSUM BOARD ASSEMBLIES**

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. Metal Trim
- B. Gypsum wallboard.
- C. Joint treatment and accessories.
- D. Water-resistive barrier.

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 06 1000 - Carpentry: Wood blocking.
- C. Section 07 8400 - Firestopping: Top-of-wall assemblies and penetrations at fire rated walls.
- D. Section 07 9200 - Joint Sealants: Sealant.
- E. Section 09 5100 - Acoustical Ceilings.

1.4 REFERENCE STANDARDS

- A. ANSI A118.9>ANSI A108/A118/A136.1 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (Reaffirmed 2010).
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- C. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- E. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2014).
- F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2017.
- G. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2018b.
- H. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
- I. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- J. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- K. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
- L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.

- M. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2018c.
- N. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.
- O. 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 on metal framing, gypsum board, accessories, and joint finishing system.
- C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- D. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches in size, illustrating finish color and texture.
- E. Installer's Qualification Statement.

1.6 QUALITY ASSURANCE

- A. Perform in accordance with ASTM C 840.
- B. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 5 years of experience.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.2 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. Georgia-Pacific Gypsum: www.gpgypsum.com.
 - 2. National Gypsum Company: www.nationalgypsum.com/#sle.
 - 3. USG Corporation: www.usg.com.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. **Mold resistant board is required at all locations.**
 - 3. Thickness:
 - a. Soffits and Ceilings: 5/8 inch.

2.3 GYPSUM WALLBOARD ACCESSORIES

- A. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel, unless noted otherwise.
 - 1. Corner Beads: Low profile, for 90 degree outside corners.
 - 2. L-Trim with Tear-Away Strip: Sized to fit the thickness gypsum wallboard.
- B. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 1. Mold resistant and asbestos free.
 - 2. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
 - 3. Products:
 - a. Continental Building Products; ____: www.continental-bp.com/#sle.
 - b. Substitutions: 01 2500 - Substitution Procedures
 - 4. Joint Compound: Drying type, vinyl-based, ready-mixed.
 - a. Products:

- a) CertainTeed Corporation; Extreme All-Purpose Joint Compound:
www.certainteed.com/#sle.
- b) Substitutions: 01 2500 - Substitution Procedures

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.2 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.3 INSTALLATION OF TRIM AND ACCESSORIES

- A. Corner Beads: Install at external corners, using longest practical lengths.
- B. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.4 JOINT TREATMENT

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
 - 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
- B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
- C. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.5 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

**SECTION 09 2400
CEMENT PLASTERING**

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. Repair/replace/patch existing portland cement plaster for installation over metal lath and masonry.

1.3 RELATED REQUIREMENTS

- A. Section 09 9123 - Painting.

1.4 REFERENCE STANDARDS

- A. ASTM C847 - Standard Specification for Metal Lath; 2018.
- B. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- C. ASTM C206 - Standard Specification for Finishing Hydrated Lime; 2014.
- D. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters; 2015.
- E. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster; 2018a.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide data on plaster materials and trim accessories.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years documented experience.

1.7 MOCK-UP

- A. Construct mock-up of typical patching, two (2) feet long by two (2) feet wide, illustrating surface finish.
 - 1. Locate where directed.
 - 2. Mock-up may remain as part of this work.

1.8 FIELD CONDITIONS

- A. Interior Plaster Work: Maintain minimum ambient temperature of 50 degrees F during installation of plaster and until fully cured.

PART 2 PRODUCTS

2.1 CEMENT PLASTER APPLICATIONS

- A. Lath Plaster Base: Metal lath.
 - 1. Plaster Type: Factory prepared plaster mix.
 - 2. Number of Coats: Three.
 - 3. First Coat: Apply to a nominal thickness of 3/8 inch.
 - 4. Second Coat: Apply to a nominal thickness of 3/8 inch.
 - 5. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch.
 - 6. Finish Coat: Apply to a nominal thickness of 1/8 inch.
 - a. Texture: Match existing.

- B. Solid Plaster Base: Concrete masonry.
 - 1. Plaster Type: Factory prepared plaster mix.
 - 2. Number of Coats: Three.
 - 3. First Coat: Apply to a nominal thickness of 1/4 inch.
 - 4. Second Coat: Apply to a nominal thickness of 1/4 inch.
 - 5. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch.
 - 6. Finish Coat: Apply to a nominal thickness of 1/8 inch.

2.2 FACTORY PREPARED CEMENT PLASTER

2.3 ACCESSORIES

- A. Ribbed Metal Lath: ASTM C847, galvanized; 3/8 inch thick.
 - 1. Weight: 3.4 lb/sq yd.
- B. Beads, Screeds, Joint Accessories, and Other Trim: Depth governed by plaster thickness, maximum possible lengths.
 - 1. Material: Formed sheet steel with rust inhibitive primer, expanded metal flanges.
 - 2. Corner Beads: Radiused corners.
 - 3. Expansion Joints: Accordion profile with factory-installed protective tape, 2 inch wide flanges.
 - 4. Control Joints: Accordion profile with protective tape, 2 inch flanges.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify masonry joints are flush and surfaces are ready to receive work of this section, and that there are no existing bituminous or water repellent coatings on masonry surfaces.
- C. Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly in place.
- D. Verify mechanical and electrical equipment and services located within areas to receive this work have been properly tested and approved.

3.2 PREPARATION

- A. Dampen masonry surfaces to reduce excessive suction.
- B. Clean concrete surfaces of foreign matter using approved acid solutions, solvents, or detergents, and then rinse surfaces thoroughly with clean water.
- C. Roughen smooth concrete surfaces and apply bonding compound in accordance with manufacturer's written installation instructions.
- D. Apply dash bond coat of plaster to solid bases and moist cure for at least 24 hours before applying first coat of jobsite mixed plaster.

3.3 Mixing

- A. Mix only as much plaster as can be used prior to initial set.
- B. Mix materials dry, to uniform color and consistency, before adding water.
- C. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

3.4 APPLICATION

- A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
- B. Base Coats:
 - 1. Apply base coat(s) to fully embed lath to match existing.
 - 2. Follow guidelines in ASTM C926 and manufacturer's written installation instructions for moist curing base coats and application of subsequent coats.

- C. Leveling Coat:
 - 1. Apply leveling coat to match existing.
- D. Finish Coats:
 - 1. Cement Plaster:
 - a. Apply with sufficient material and pressure to ensure complete coverage of base to match existing.
 - b. Float to a consistent finish.

3.5 TOLERANCES

- A. Maximum Variation from True Flatness: 1/4 inch in 10 feet.

3.6 REPAIR

- A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

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. Removals.
- B. Preparation.
- C. Terrazzo floor tile
- D. Non-ceramic trim.

1.3 RELATED REQUIREMENTS

- A. Section 03 5400 - Cast Underlayment.

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 A118.1 - American National Standard Specifications for Dry-Set Cement Mortar; 2012 (Revised).
 - 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. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
 - 8. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).
- B. 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 in size illustrating pattern, color variations, and grout joint size variations.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

- 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 Tile: 10 square feet 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-UP

- 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 is 10' x 10'.
 - 2. Approved mock-up may remain as part of the 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 and below 100 degrees F during installation and curing of setting materials.

PART 2 PRODUCTS

2.1 TILE

- A. Terrazzo Tile, Type TZ-1:
 - 1. Composition: Portland cement, ASTM C150/C150M; aggregate complying with ASTM C33/C33M.
 - 2. Thickness: 5/8 inch.
 - 3. Surface Finish: Honed.
 - 4. Edges: Chamfered.
 - 5. Color(s): To be selected by Fuller and D'Angelo, P.C. from manufacturer's standard and premium range.
 - 6. Trim Units: Matching base with straight edge in sizes indicated.
 - 7. Products:
 - a. Tectura Designs, a division of Wausau Tile Inc; Terrazzo Tile: www.tecturadesigns.com.
 - b. Traditional Series.
 - c. Substitutions: 01 6000 - Product Requirements.

2.2 TRIM AND ACCESSORIES

- A. Non-Ceramic Trim: Refer to Section 09 6500 Resilient Flooring, style and dimensions as indicated on drawings, for setting using tile mortar or adhesive.

2.3 SETTING MATERIALS

- A. Manufacturers:
 - 1. Terrazzo: ANSI A118.4 mortar.
 - 2. Substitutions: 01 6000 - Product Requirements.

2.4 ADHESIVE MATERIALS

- A. Manufacturers:
 - 1. Mapei Corporation; Product MAPEI TYPE 1: www.mapei.com.
 - 2. Substitutions: 01 6000 - Product Requirements.

2.5 WATERPROOFING/CRACK ISOLATION FOR THIN-SET TILE INSTALLATIONS

- A. Acrylic based, roller applied waterproofing/crack isolation system
 - 1. Mapelastic HPG; Mapei Corporation

2.6 GROUTS

- A. Manufacturers:
 - 1. Mapei Corporation ; Product Mapei Ultracolor, Plus FA
 - 2. Substitutions: 01 6000 - Product Requirements.

PART 3 EXECUTION

3.1 PREPARATION

- A. Remove existing flooring.
- B. Protect surrounding work from damage.
- C. Vacuum clean surfaces and damp clean.
- D. Crack and Joint Repair: Concrete must be structurally sound, solid, dry, and free of laitance, dirt, debris, coatings, sealers, solvent base adhesives and any contaminant that may act as a bond breaker.
 - 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. Prohibit traffic until filler is fully cured.
- E. 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.

3.2 INSTALLATION - GENERAL

- A. Install tile 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. Install non-ceramic trim in accordance with manufacturer's instructions.
- F. Sound tile after setting. Replace hollow sounding units.
- G. Keep control and expansion joints free of mortar, grout, and adhesive. Refer to TCNA (HB) EJ 171 for location and frequency of joints.
- H. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints unless otherwise indicated.
- K. 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.

- L. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.3 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.

3.4 CLEANING

- A. Clean tile and grout surfaces.

3.5 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 as required and indicated on drawings.

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 05 3100 - Steel Decking: Placement of special anchors or inserts for suspension system.
- C. Section 07 9200 - Joint Sealants.
- D. Section 08 3100 - Access Doors and Panels: Access panels.
- E. Section 08 5113 - Aluminum Windows.
- F. 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 in size illustrating material and finish of acoustical units.
- E. 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 Owner's use in maintenance. Label and store where directed by the Owner including codes used on the Drawings. Do not deliver to the Project site until the Owner is prepared to receive and store maintenance materials.
 - 1. Tile: Furnish 5 percent of total acoustic unit area of extra tile to Owner.
 - 2. Panels: Furnish 5 percent of total acoustic unit area of extra panels to Owner.
 - 3. 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

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

- A. Acoustical Tile Type ACT-1 & ACT-2: Painted mineral fiber, ASTM E1264 Type III, Form: 1, Pattern EIC with the following characteristics:
 - 1. Size: 24 by 24 inches and 24 by 48 inches. See Finish Schedule.
 - 2. Thickness: 7/8 inches.
 - 3. Light Reflectance: 85 percent, determined in accordance with ASTM E1264.
 - 4. NRC Range: 0.75 determined in accordance with ASTM E1264.
 - 5. Articulation Class (AC): 170, determined in accordance with ASTM E1264.
 - 6. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 - 7. Sag/Humidity Resistance: Standard
 - 8. Fire Performance: Class A UL)

9. Edge: Beveled tegular.
 10. Surface Color: White.
 11. Suspension System: Exposed grid Type Prelude XL.
 12. Products:
 - a. Cirrus High NRC 551 & 556.
 - b. Substitutions: See Section 01 2500 - Substitution Procedures.
- B. Acoustical Panels, Type ACT-3: Mineral fiber with membrane-faced overlay, with the following characteristics:
1. Classification: ASTM E1264 Type IV.
 2. Size: 24 by 24 inches.
 3. Thickness: 1 inches.
 4. Composition: Water felted.
 5. Sag/Humidity Resistance: Standard
 6. Fire Performance: Class A UL)
 7. Panel Edge: Square.
 8. Color: White.
 9. Suspension System Type Prelude XL: Exposed grid.
 10. Products:
 - a. Armstrong World Industries, Inc; Calla Health Zone 2230,
www.armstrongceilings.com/#sle.

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-gage 0.08 inch 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. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
- C. 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.
- D. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- E. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- F. 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. 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.
- 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 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 Owner's use.

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. Removals.
- B. Crack repair.
- C. Moisture testing.
- D. Resilient tile flooring.
- E. Resilient base.
- F. Installation accessories.

1.3 RELATED REQUIREMENTS

- A. Section 02 2080 - Asbestos Removal and Disposal.
- B. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- C. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.
- D. Section 03 5400 - Cast Underlayment.

1.4 REFERENCE STANDARDS

- A. ASTM C501 - Taber Abrasion
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2017.
- C. ASTM E662 - Smoke Generation
- D. ASTM F150 - Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring; 2006 (Reapproved 2018).
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2017.
- G. ASTM F925: Standard Test Method for Resistance to Chemicals of Resilient Flooring.
- H. ASTM F1861 - Standard Specification for Resilient Wall Base; 2016.
- I. ASTM F-1869 Test Method for Measuring Moisture Vapor Emissions in Concrete.
- J. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs.
- K. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

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. Installer's Qualification Statement.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- H. 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 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 five (5) 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.
- B. Provide mockup 10' x 10', adhered in place indicating jointing.
- C. Final approved mockup may remain.
- D. 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.
 - 1. Deliver extra tile to Owner after completion of work.
 - 2. Furnish tiles in protective packaging with identifying labels.

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 to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

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 fifteen (15) 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. High Performance Tile - Type QT-1, QT-2 & QT-3): Compressed Quartz tile construction wear surface.
 - 1. Manufacturers:
 - a. "Mosaic Collection"; Upofloor Americas Inc. 940 Centre Circle, Suite 1000, Altamonte Springs, FL 32714, Phone: 1 800 800 5247, Fax: 407 260 9933, www.upofloor.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements
 - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 - 3. VOC Content Limits: As specified in Section 01 6116.
 - 4. Square Tile Size: 24 by 24 inch or 12 by 12 inch.
 - 5. Thickness: 0.080 inch nominal.
 - 6. Static Load Resistance: 3500 psi minimum, when tested as specified in ASTM F970.
 - 7. Pattern: As indicated on drawings.
 - 8. Color: As indicated on finish schedule.

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.
 - 4. Thickness: 0.125 inch.
 - 5. Length: Roll.
 - 6. Color: Solid color as indicated on drawings.
 - 7. Accessories: Premolded external corners and internal corners.

2.3 ACCESSORIES

- A. Subfloor Crack and Joint Repair: .
 - 1. 03 0100 - Maintenance of Concrete
- B. Self-Drying, Cement-Based Finish Underlayment
 - 1. Refer to Section 03 5400 - Cast Underlayment.
- C. Adhesive for Quartz Tile Flooring:
 - 1. Adhesive shall be as recommended by the manufacturer, compatible with tile and substrate.
 - a. Note that recommendations shall be made which reflect and are compatible with the results of moisture level tests in the concrete substrate.

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 in accordance with ASTM F710.
 - 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: Concrete must be structurally sound, solid, dry, and free of laitance, dirt, debris, coatings, sealers, solvent base adhesives and any contaminant that may act as a bond breaker.
 - 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.
- 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.
- F. Use trowelable leveling and patching compound, according to manufacturer's written instructions, to fill cracks, holes and depressions in substrates.
- G. Provide leveling compound over 100% of all existing substrates receiving resilient flooring as required to meet existing flooring.

3.3 INSTALLATION GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Crack and Joint Repair: During set-up of cartridge (purging air and balancing) and initial dispensing of material, keep cartridge and nozzle assembly pointed straight up to prevent material in the nozzle from flowing back into the cartridge.
 - 1. Apply continuously once opened to prevent the tip from becoming clogged.
 - 2. Immediately broadcast clean sand size #30 or #35 into the freshly applied material.
 - 3. Fill the crack, joint or repair area so the material is slightly higher than the face of the concrete slab.
 - 4. 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.
- D. Underlayment: Installed from a true featheredge up to 1/2 in. (12.7 mm).
 - 1. Verify crack/joint repair has dried thoroughly.
 - 2. Use the least amount possible to attain the desired smoothness.
 - 3. Allow to dry in accordance to manufacturer's recommendations.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.
- E. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- F. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Resilient Strips: Attach to substrate using adhesive.
- G. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- H. Install flooring in recessed floor access covers, maintaining floor pattern.
- I. Install feature strips where indicated.
- J. Do not mix manufacturing batches of a color within the same area.
- K. Do not install resilient flooring over building expansion joints.
- L. Do not install defective or damaged resilient flooring.
- M. 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.
- N. Install resilient flooring without voids at seams. Lay seams together without stress.
- O. 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 flooring with joints and seams parallel to building lines to produce symmetrical pattern.
- C. 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.

- D. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles
 - 1. Lay tiles with grain running in one direction for multicolor tiles.

3.5 INSTALLATION RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches 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 9123
PAINTING**

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. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Steel door frames
 - 3. Plaster or stucco.
 - 4. Gypsum Board/Plaster soffits.
 - 5. Concrete masonry units (CMU).
 - 6. Exposed surfaces of steel lintels
 - 7. Mechanical and Electrical:
 - a. In finished areas, paint shop-primed items.
 - b. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
- 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 05 5000 - Metal Fabrications: Shop-primed items.
- C. Section 09 2116 - Gypsum Board Assemblies.
- D. Section 09 9113 - Exterior Painting.

- E. Section 23 0480 - General Labeling, Valve Charts And Piping Identification: Color coding scheme for items to be painted under this section.
- F. Section 26 0550 - General Labeling And Identification: Color coding scheme for items to be painted under this section.

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. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- D. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- E. SSPC-SP 2 - Hand Tool Cleaning; 1982, with Editorial Revision (2004).

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 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 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 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 5 years experience.

1.8 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Provide frame assembly illustrating paint color, texture, and finish.
- C. Locate Where directed by the YPS Office of Facilities Management.

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 and a maximum of 90 degrees F, 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 for interiors unless required otherwise by manufacturer's instructions.
- D. Provide lighting level of 80 ft candles 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.
- B. Paints:
 - 1. Base Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: 01 6000 - Product Requirements.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless intended 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. 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.
 - 4. 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.
 - 5. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 6. 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; 1.7 mils dry.
 - a. Sherwin Williams ProMar 200 Zero VOC Eggshell
- B. Concrete/Masonry, Opaque, Latex, 2 coat: (Existing surfaces)
 - 1. Latex Primer Sealer: Two Coats latex enamel spreading rate recommended by manufacturer to achieve a dry film thickness of 4 mils wet; 1.7 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 200 Zero VOC Eggshell
- 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 1.7 to 6.4 mils.
 - a. Sherwin Williams Direct-to-Metal Semi-Gloss.
 - 2. Topcoat: Three coats Acrylic Latex
 - a. Sherwin Williams ProMar 200 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; 1.7 mils dry to 6.4 mils:
 - a. Sherwin Williams ProMar 200 Zero VOC Semi-Gloss
- E. Aluminum and Galvanized Metals, Not Primed, Acrylic Latex, 3 coat:
 - 1. One Coat latex primer spreading rate recommended by manufacturer to achieve a film thickness of 5.0 to 10 mils wet; 1.8 to 3.6 mils dry..
 - a. Sherwin Williams Pro-Cryl Universal Primer
 - 2. Two Coats Acrylic Latex spreading rate recommended by manufacturer to achieve a dry film thickness of 4 mils wet; 1.7 mils dry to 6.4 mils:
 - a. Sherwin Williams ProMar 200 Zero VOC Semi-Gloss
- F. Gypsum Board/Plaster, Latex, 3 coat: (New Surfaces)
 - 1. One Coat latex primer spreading rate recommended by manufacturer to achieve a dry film thickness of 4 mils wet and 1.3 mils dry.
 - a. Sherwin Williams QUICK DRY Interior Exterior Stain Blocking Primer Latex
 - 2. Topcoat: Two Coats of Acrylic Latex spreading rate recommended by manufacturer to achieve a dry film thickness of 4 mils wet; 1.7 mils dry to 6.4 mils
 - a. Sherwin Williams ProMar 200 Zero VOC Eggshell
- G. Gypsum Board/Plaster, Latex, 2 coat: (Existing Surfaces)
 - 1. One Coat latex primer spreading rate recommended by manufacturer to achieve a dry film thickness of 4 mils wet and 1.1 mils dry..

- a. Sherwin Williams QUICK DRY Interior Exterior Stain Blocking Primer Latex
2. Topcoat: One Coat of Latex spreading rate recommended by manufacturer to achieve a dry film thickness of 4 mils wet; 1.7 mils dry to 6.4 mils
 - a. Sherwin Williams ProMar 200 Zero VOC Eggshell

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.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

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.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Gypsum Wallboard: 12 percent.
 2. Plaster and Stucco: 12 percent.
 3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 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 eyewear, waterproof gloves, and protective clothing.
- F. Masonry:
 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or 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.
- G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- H. 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.
- I. Galvanized Surfaces:

1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- J. 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 using methods recommended in writing by paint manufacturer and SSPC-SP 3. Protect from corrosion until coated.
- K. 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.
- L. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

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. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Sand metal surfaces lightly between coats to achieve required finish.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. 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.
- B. Emergency evacuation maps. (Correct floor plans will be provided by YPS Office of Facilities Management. (Contractor shall fabricate and install).

1.3 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls for temporary Project identification signs and for temporary information and directional signs
- B. Section 09 2116 - Gypsum Board Assemblies: For signage on fire walls above finished ceilings.
- C. Section 14 2400 - Hydraulic Elevators: Modernization for code-required elevator signage.
- D. Division 26 for signage required for elevator.

1.4 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 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. When content of signs is indicated to be determined later, request such information from YPS Office of Facilities Management and Fuller and D'Angelo, P.C. at least 2 months prior to start of fabrication; include information on preliminary schedule.
 - 3. 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.

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 metal or polymer finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors and sign lamination.
 - 2. Warranty Period: 5 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: 01 6000 - Product Requirements.
- 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: 1/4 inch (3mm) or as shown on drawings.
 - b. Edge Treatment:
 - a) Standard 0.5" Radiused Corners.
 - c. Color: Black
 - 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 match existing gymnasium signage.
 - 6. Contrast: Letters, numbers and symbols shall contrast with background.
 - a. Provide colors as shown on drawings.
 - 7. Inserts as indicate on signage types shown on drawings.
 - a. 1/16" photopolymer painted charcoal gray, mounted in frame w/ snap locks.

- b. Text: integral raised & tipped As selected from standard colors to match existing.
- c. Mounting: Snap locks.
- 8. Color of Background: Gray to match existing.
- 9. Color of Text and Raised Characters: As selected from standard colors to match existing.
- 10. Surface Texture: Matte

2.2 MATERIALS

- A. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).
 - 1. Plastic (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.

2.3 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. Provide for locations and rooms as scheduled and shown on drawing. **In addition to those indicated on drawings:**
 - 1. Ten (10) type 'A' signs
 - 2. Twenty (20) type 'B' signs
 - 3. Ten (10) type 'C' signs.
 - 4. Twenty (20) type 'D' signs for way finding to be determined at a later date.
- C. Emergency Evacuation Maps:
 - 1. Plan will be provided by the YPS Office of Facilities Management.
 - 2. Fabricate and install as indicated on planes and schedule.
 - 3. Second surface direct print on non-glare clear acrylic, back painted.
 - 4. Location: Where shown on drawings.

2.4 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 Substantial Completion; repair or replace damaged items.

END OF SECTION

SECTION 12 3600
SOLID SURFACING WINDOW SILLS

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. Window Sills.

1.3 RELATED REQUIREMENTS

- A. Section 06 1000 - Carpentry.
- B. Section 08 5130 - Steel Fire Rated Windows
- C. Section 09 2300 - Gypsum Plastering.

1.4 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- B. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

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. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation .
- D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- B. Manufacturer: Company specializing in manufacturing the products specified in this section, with minimum ten years of documented experience.

1.7 MOCK-UP

- A. Erect 1 full size mock-up of each component at Project site demonstrating quality of materials and execution for YPS Office of Facilities Management and Fuller and D'Angelo, P.C. approval.
 - 1. Provide mockup of sill.
- B. Should mock-up not be approved, rework or remake until approval is secured. Remove rejected units from Project site.
- C. Approved mock-up will be used as standard for acceptance of subsequent work.
- D. See Section 01 4000 - Quality Requirements for additional requirements.

- E. Locate where directed.
- F. Mock-up may remain as part of the Work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer Warranty: Provide manufacturer's standard warranty for material only for period of ten (10) years against defects and/or deficiencies.
- C. Correct defective Work within a two year period after Date of Substantial Completion, at no additional cost to Yonkers Public Schools. Defects include, but are not limited to:
 - 1. Cracks.
 - 2. Discoloration or lack of finish integrity.
 - 3. Cracking or peeling of finish.
 - 4. Failure of adhesives.

PART 2 PRODUCTS

2.1 WINDOW SILL ASSEMBLIES

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Solid Surfacing Window Sills: Solid surfacing sheet or plastic resin casting over continuous substrate:
 - 1. Flat Sheet Thickness: 1/2 inch, minimum.
 - 2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
 - a. Manufacturers:
 - a) Dupont : www.corian.com.
 - b) Substitutions: Refer to Section 01 6000 - Product Requirements
 - b. Surface Burning Characteristics: Flame spread 25, maximum; smoke developed 25, maximum; when tested in accordance with ASTM E84.
 - c. Finish on Exposed Surfaces: Polished, gloss rating of 55 to 80.
 - d. Color and Pattern: As indicated on finish schedule.
 - e. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; radiused edge.
 - f. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
 - g. Fabricate in accordance with manufacturer's standard requirements.

2.2 MATERIALS

- A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

- C. Joint Sealant: Refer to Section 07 9200 - Joint Sealants.

2.3 FABRICATION

- A. Field measure and verify all dimensions before fabrication is complete.
- B. Fabricate sills in the largest sections practicable, with top surface of joints flush.
 - 1. Join lengths of sills using best method recommended by manufacturer.
 - 2. Fabricate to overhang fronts and sides 1 inch or as shown on drawings.
- C. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 - 1. Secure sills with waterproof glue.
 - 2. Height: 4 inches, unless otherwise indicated.
- D. Solid Surfacing: Fabricate sills up to 72 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions. Form joints between components to be non conspicuous.

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 Fuller and D'Angelo, P.C. of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Verify dimensions of all existing countertops to be replaced.
- B. Clean surfaces thoroughly prior to installation.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Attach solid surfacing window sills using compatible silicone bonding material.
- B. Seal joint between window sills back and end splashes and adjacent surfaces.
- C. Cut and finish edges with clean sharpe returns.
- D. Provide radius at outside corners.
- E. Dress joints smooth, remove surface scratches and clean entire surfaces.
- F. Install to comply with all manufactures written instructions, including for adhesive, sealers, fabrication and finishing.

3.4 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.

3.5 CLEANING

- A. Clean surfaces thoroughly. Remove adhesives, sealant and other stains.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

**SECTION 14 2100
ELECTRIC TRACTION ELEVATORS**

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. Complete electric traction elevator systems.
 - 1. Passenger type.
 - 2. Machine-Room Less.
- B. Elevator Maintenance.

1.3 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls
- B. Section 01 7000 - Execution.
- C. Section 03 3000 - Cast-in-Place Concrete: Includes elevator machine foundation, elevator pit, and grouting thresholds.
- D. Section 04 2000 - Unit Masonry: Masonry hoistway enclosure; building-in enclosed hoistway, overhead hoist beams, grouting thresholds, and grouting hoistway entrance frames hoistway door frames.
- E. Section 05 5000 - Metal Fabrications: Includes elevator pit ladder, sill supports, overhead hoist beams, and sump pit cover.
- F. Section 04 0511 - Mortar and Masonry Grout .
- G. Section 07 1300 - Sheet Waterproofing: Waterproofing of elevator pit walls and floor.
- H. Section 08 7100 - Finish Hardware: Product requirements for key cylinders provided by this section.
- I. Section 09 6500 - Resilient Flooring: Floor finish in car.
- J. Division 26 Electrical: Conduit, power, fire alarm, wiring, smoke detectors and telephone.

1.4 REFERENCE STANDARDS

- A. Refer to Section 01 4100 - Regulatory Requirements.
- B. ANSI A117.1, Buildings and Facilities, Providing Accessibility and Usability for Physically Handicapped People.
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- D. ADAAG, Americans with Disabilities Act Accessibility Guidelines.
- E. ANSI/NFPA 70, National Electrical Code
- F. ASME A17.1 - Safety Code for Elevators and Escalators; 2016.
- G. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks; 2014.
- H. ASME QEI-1 - Standard for the Qualification of Elevator Inspectors; 2013.
- I. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- J. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.
- K. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

- L. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.
- M. ITS (DIR) - Directory of Listed Products; current edition.
- N. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- O. NEMA MG 1 - Motors and Generators; 2017.
- P. ANSI/UL 10B, Fire Tests of Door Assemblies.
- Q. UL (DIR) - Online Certifications Directory; Current Edition.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate work with other installers to provide necessary conduits for proper installation of wiring, including but not limited to, the following:
 - a. Telephone service from controller cabinet.
 - b. Elevator pit for lighting and sump pump.
 - c. Fire alarm panel from controller cabinet.
 - 2. Coordinate work with other installers for equipment provisions necessary for proper elevator operation, including but not limited to, the following:
 - a. Automatic transfer switches with auxiliary contacts for emergency power transfer status indication.
- B. Preinstallation Meeting: Convene meeting at least two (2) weeks prior to start of this work.
 - 1. Review schedule of installation, proper procedures and conditions, and coordination with related work.
- C. Construction Use of Elevator: Not permitted.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on following items:
 - 1. Signal and operating fixtures, operating panels, and indicators.
 - 2. Car design, dimensions, layout, and components.
 - 3. Car and hoistway door and frame details.
 - 4. Electrical characteristics and connection requirements.
- C. Shop Drawings: Include appropriate plans, elevations, sections, diagrams, and details on following items:
 - 1. Elevator Equipment and Machines: Size and location of driving machines, power units, controllers, governors, and other components.
 - 2. Hoistway Components: Size and location of car machine beams, guide rails, buffers, ropes, and other components.
 - 3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
 - 4. Individual weight of principal components; load reaction at points of support.
 - 5. Loads on hoisting beams.
 - 6. Clearances and over-travel of car and counterweight.
 - 7. Locations in hoistway of traveling cables and connections for car lighting and telephone.
 - 8. Location and sizes of hoistway and car doors and frames.
 - 9. Calculated heat dissipation of elevator equipment.
 - 10. Electrical characteristics and connection requirements.
 - 11. Indicate arrangement of elevator equipment and allow for clear passage of equipment through access openings.

- D. Samples: Submit samples illustrating car interior finishes, car and hoistway door and frame finishes, and handrail material and finish in the form of cut sheets or finish color selection brochures.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Testing Agency's Qualification Statement.
- H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Yonkers Public Schools's name and registered with manufacturer.
- I. Maintenance schedule for two year warranty period.
- J. Initial Maintenance Contract.
- K. Maintenance Contract: Submit proposal to Owner for standard one year continuing maintenance contract agreement in accordance with ASME A17.1 and requirements as indicated, starting on date initial maintenance contract is scheduled to expire.
 - 1. Indicate in proposal the services, obligations, conditions, and terms for agreement period and for renewal options.
- L. Operation and Maintenance Data:
 - 1. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
 - 2. Operation and maintenance manual.
 - 3. Schematic drawings of equipment, and wiring diagrams of installed electrical equipment with list of corresponding symbols to identify markings on machine room and hoistway apparatus.

1.7 QUALITY ASSURANCE

- A. Designer Qualifications: Design guide rails under direct supervision of a licensed Professional Structural Engineer experienced in design of this type of work and licensed in State of New York.
- B. Permits, Inspections and Certificates: The Elevator Contractor shall obtain and pay for necessary Municipal or State Inspection and permit as required by the elevator inspection authority, and make such tests as are called for by the regulations or such authorities. These tests shall be made in the presence of such authorities or their authorized representatives.
- C. Regulatory Requirements:
 - 1. Elevator design, clearances, construction, workmanship, materials, and installation, unless specified otherwise, shall be in accordance with ANSI/ASME A17.1, handicap accessibility, Americans with Disabilities Act, and other codes having legal jurisdiction.
 - 2. ANSI/ASME A17.1 shall govern, except where codes having legal jurisdiction include more rigid requirements or conflict with ANSI/ASME A17.1.
 - 3. Elevator shall follow design and manufacturing procedures certified in accordance with ISO 9001-2000 to meet product and service requirements for quality assurance for new products.
 - 4. Where product is in variance to the published ANSI/ASME A17.1 model code, provide a 3rd party AECO certification demonstrating equivalent function, safety, and performance
- D. Manufacturer Qualifications: Company specializing in manufacturing and installing products specified in this section with minimum ten years documented experience.
- E. Installer Qualifications: Supervisor along with trained elevator installation personnel on staff of elevator equipment manufacturer.
- F. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.
- G. Products Requiring Fire Resistance Rating: Listed and classified by ITS (DIR) or UL (DIR).

- H. Products Requiring Electrical Connection: Listed and classified by UL (DIR) or testing agency acceptable to authorities having jurisdiction as suitable for the purpose indicated in construction documents.
- I. Pre-installation Meeting:
 - 1. Convene pre-installation meeting before start of installation of elevators.
 - 2. Require attendance of parties directly affecting work of this section, including YPS Office of Facilities Management, Fuller and D'Angelo, P.C., Contractor, and elevator manufacturer/installer.
 - 3. Review examination, installation, field quality control, adjusting, cleaning, protection, and coordination with other work.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer/installer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer/installer.
- B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer/installer's instructions.
- C. Handling: Protect materials during handling and installation to prevent damage.
- D. Should the building or the site not be prepared to receive the elevator equipment at the agreed upon date, the Contractor will be responsible to provide a proper and suitable storage area on or off the premises at no cost to the Owner.

1.9 NON-PROPRIETARY EQUIPMENT

- A. Equipment and component systems shall not employ any proprietary designs that could hamper and/or otherwise prohibit subsequent maintenance, repairs or adjustments by all qualified contractors.
- B. Manufacturer's of apparatus shall provide parts replacements on open market to all maintenance providers for equipment and component systems for as long as said parts are available to ensure apparatus or systems remain maintainable regardless of who may be selected for future service. Prior to final acceptance complete parts manuals for all major and minor component parts shall be provided.
- C. Prior to final acceptance a complete set of as-built, "adjustor-level" wiring diagrams shall be provided to the Owner along with any nomenclature documents.
- D. Manufacturer shall, if not maintaining the equipment, promptly notify Owner of any safety bulletins affecting said microprocessor-based control systems of which Owner or Owner's agent should take action.
- E. Prior to final acceptance, YPS Office of Facilities Management and Fuller and D'Angelo, P.C. reserve the right to accept or reject materials submitted in compliance of these paragraphs, Contractor shall have thirty (30) days to resubmit for approval, replacements for any items rejected.

1.10 PROJECT CONDITIONS

- A. Temporary Electrical Power:
 - 1. Contractor will arrange for temporary 220 VAC, single-phase, 60 Hz., GFCI-protected electricity to be available for installation of elevator components.
 - 2. Comply with Section 01 5000 - Temporary Facilities and Controls.
- B. Installation of the Elevator:
 - 1. Contractor will provide permanent three-phase power prior to installation start.
 - 2. Contractor will provide clear, rollable access to a 20' x 10' secure and dry storage area prior to delivery.
 - 3. Contractor will provide a clean, dry, and complete hoistway along with temporary installation platform and all required OSHA-compliant barricades prior to delivery.
- C. Temporary Use of Elevator:

1.11 WARRANTY

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

- B. Provide manufacturer's warranty for elevator operating equipment and devices for two (2) years from Date of Substantial Completion.
 - 1. 24 months after acceptance of elevator by Owner including maintenance and emergency callback service during normal working hours

1.12 MAINTENANCE AND SERVICE EQUIPMENT REQUIREMENTS

- A. Elevator maintenance service shall be performed by elevator manufacturer/installer.
- B. Elevators shall receive regular maintenance on each unit for period of 24 months after completion of work specified herein or acceptance thereof by beneficial use, whichever is earlier.
- C. Trained employees shall make periodic examinations and perform work including necessary adjusting, greasing, oiling, and replacing parts to keep elevators in operation, except parts that require replacement because of accidents, vandalism, misuse, or negligence by parties other than manufacturer/installer.
- D. Manufacturer/installer shall perform all Work, except emergency minor adjustment call-back service, during regular working hours. Manufacturer/installer shall provide emergency minor adjustment call-back service, during regular working hours.
- E. Should Owner request that examinations, cleaning, lubrication, adjustments, repairs, replacements, or emergency minor adjustment call-back service, unless specified herein, be performed on other than manufacturer/installer's regular working hours of regular working days, manufacturer/installer shall absorb straight-time labor charges and Owner will compensate manufacturer/installer for overtime premium, travel time, and expense at normal billing rates.
- F. Elevator Control System:
 - 1. Include built-in remote diagnostic module to relay constant status of elevators and control system to a 24-hour, 7-days-a-week central-monitoring facility.
 - 2. Remote Monitoring Device: Transmit information on current status of elevators, including malfunctions, system errors, and shutdown.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design - Electric Traction Elevators: 3300 Gearless Traction Elevator by Schindler Elevator Corporation; including control system and car design.
 - 1. Elevator shall be installed by elevator manufacturer.
- B. Substitutions: 01 6000 - Product Requirements.
- C. Products other than Basis of Design are subject to compliance with specified requirements. By using products other than Basis of Design, the GC accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.
- D. Source Limitations: Provide elevator and associated equipment and components produced by the same manufacturer as the other elevator equipment used for this project and obtained from a single supplier.

2.2 ELECTRIC TRACTION ELEVATORS

- A. Elevator Equipment Summary:
 - 1. Application: Machine Room Less (MRL)
 - 2. Counterweight Location: Side
 - 3. Machine Location: Top of the hoistway mounted on car and counterweight guide rails
 - 4. Control Space Location: Top landing entrance frame or entrance frame at one floor below the top landing
 - 5. Service: General Purpose Passenger
 - 6. Quantity: 1 Unit
 - 7. Capacity: 2100 lbs
 - 8. Speed: 100 fpm

YONKERS PUBLIC SCHOOLS
CAPITAL IMPROVEMENT REHABILITATION PHASE 3
CHARLES E. GORTON HIGH SCHOOL YPS #10909
ELECTRIC TRACTION ELEVATORS

9. Travel: 25' 7"
 10. Landings: 3
 11. Front Openings: 3
 12. Rear Openings: 0
 13. Door Hand: Right
 14. Rear Door Hand: N/A
 15. Operation: Microprocessor Single Car Automatic Operation
 16. Clear Inside Dimensions: 5' 9-3/8" Wide X 4' 4-7/8" Deep
 17. Cab Height: 7'-9"(93")
 18. Guide Rails: Equivalent to 12 lb. per foot
 19. Entrance Type and Width: Two Speed Side Opening 3' 0" Wide X 7' 0" High doors
 20. Entrance Height: 7'-0"
 21. Power Supply: 208 Volts 3 Phase 60 Hz
- B. Performance:
1. Car Speed: -10% to +5% of contract speed under any loading condition or direction of travel.
 2. Car Capacity: Safely lower, stop and hold up to 125% of rated load per code.
- C. Ride Quality:
1. Vertical Vibration (maximum): 25 mg
 2. Horizontal Vibration (maximum): 15 mg
 3. Vertical Jerk (maximum): 2 ft/sec³
 4. Acceleration (maximum): 1.6 ft/sec²
 5. In Car Noise: 53-60 dB(A)
 6. Stopping Accuracy: ±5mm
 7. Starts per hour (maximum): 180
- D. Elevator Operation:
1. Simplex Collective Operation: Using a microprocessor based controller, operation shall be automatic by means of the car and hall buttons. When all calls have been answered, the car shall park at the last landing served.
 2. Group Automatic Operation with Demand-Based Dispatching: Provide reprogrammable group automatic system that assigns cars to hall calls based on a dispatching algorithm designed to minimize passenger waiting time.
- E. Operating Features - Standard:
1. Door Light Curtain Protection
 2. Static AC Drive
 3. Phase Monitor Relay
 4. Cab Overload with Indicator
 5. Load-weighing
 6. Central Alarm
 7. Remote Monitoring
 8. Firefighter's Operation
 9. Automatic Evacuation
 - a. When the main line power is lost for longer than 5 seconds the emergency battery power supply provides power automatically to the elevator controller. If the car is at a floor when the power fails, it remains at that floor, opens its doors, and shuts down. If the car is between floors, it is raised or lowered to the first available landing, opens its doors, and shuts down.
 10. Independent Service.

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ARCHITECTS AND PLANNERS

- F. Equipment: Control Components And Control Space
1. Controller: Provide microprocessor based control system to perform all of the functions of safe elevator operation, as well as perform car and group operational control.
 - a. All high voltage (110v or above) contact points inside the inspection and test panel shall be protected from accidental contact in a situation where the access panels are open.
 - b. The controller shall be distributed throughout the elevator system located in the overhead, cab and inspection and test panel. The inverter will be mounted in the overhead adjacent to the hoist machine and an inspection and test panel will be located in the door jamb at the top floor or one floor below the top floor. No elevator equipment mechanical rooms or closets are required.
 - c. Provide multi-bus control architecture to reduce cabling, material and waste.
 2. Drive: Provide a Variable Voltage Variable Frequency AC Closed Loop drive system. Provide stable start without high peak current, quickly reaching a low energy consumption level.
 3. Inspection and Test Panel: Integrated control equipment, main inspection and test panel in door frame at top level served or at one floor below the top level served.
- G. Equipment: Hoistway Components
1. Machine:
 - a. Gearless asynchronous AC motor with integral drive sheave, service and control.
 - a) emergency brakes.
 - b) Design machine to enable direct power transfer, thereby avoiding loss of power.
 - c) Design machine to be compact, lightweight and durable to optimize material usage and save space.
 - d) Mount to structural support channels on top of guide rail system as applicable in hoistway overhead.
 2. Governor:
 - a. Tension type over-speed governor with remote manual reset.
 - b. Mount to structural support channels as applicable in hoistway overhead.
 3. Buffers, Car and Counterweight: Compression spring type buffers to meet code.
 4. Hoistway Operating Devices:
 - a. Emergency Stop switch in the pit.
 - b. Terminal stopping switches.
 - c. Emergency stop switch on the machine.
 5. Positioning System: System consisting of proximity sensors and door zone vanes.
 6. Guide Rails and Attachments: Provide Tee-section steel rails with brackets and fasteners. Side counterweight arrangements shall have a dual purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening.
 7. Suspension System: Non circular Elastomeric coated suspension media with high tensile grade steel cords.
 8. Governor rope: Steel wire rope with 6 mm diameter.

2.3 EQUIPMENT: HOISTWAY ENTRANCES

- A. Hoistway Doors and Frames:
1. UL rated with required fire rating.
 2. Doors: Rigid flush panel construction with reinforcement ribs.
 3. Frames: Securely fasten at corners to form unit frame. Frames shall be bolted.
- B. Finish:
1. Exposed Areas of Corridor Frames: Stainless Steel - All Floors
 2. Doors: Stainless Steel - All Floors
 3. Sills: Aluminum - All Floors

- C. Entrance Markings and Jamb Plates: Provide standard entrance jamb tactile markings on both jambs, at all floors. Plate Mounting: Refer to manufacturer drawings.

2.4 EQUIPMENT: CAR COMPONENTS

- A. Car Frame and Safety: Provide car frame with adequate bracing to support the platform and car enclosure. The safety shall be integral to the car frame and shall be flexible guide clamp type.
- B. Platform: Provide platform of steel construction with plywood subfloor and aluminum threshold.
- C. Car Guides: Provide sliding guide shoes mounted to top and bottom of both car and counterweight frame. Arrange each guide shoe assembly to maintain constant contact on the rail surfaces. Provide retainers in areas with Seismic design requirements.
- D. Provide central guiding system to reduce mechanical friction and energy consumption.
- E. Steel Cab:
 - 1. Fire rating: Provide Class B fire rating for cab, or Class A fire rating where required by local Code.
 - 2. Design cab to comply with LEED Indoor Environmental Quality requirements through use of Low-Emitting Materials on walls, ceiling and subflooring.
 - 3. Car wall finish: Steel #4 Stainless Steel
 - 4. Base and frieze: Aluminum.
 - 5. Car front finish: Brushed stainless steel.
 - 6. Car door finish: Brushed stainless steel.
 - 7. Ceiling: Canopy ceiling, finished in #4 Stainless Steel With Down Lit Led Lighting. Provide lighting consisting of four compact fluorescent energy saving lights located in two semi-oval lateral cutouts located on the center-sides of the cab ceiling, Lexan lens cover.
 - 8. Handrail: 1 3/8" Round And Curved Painted Aluminum. Locate on Rear Wall.
 - 9. Flooring: By others. Not to exceed 3/8" finished depth. Refer to Section 09 6500 - Resilient Flooring
 - 10. Ventilation: Provide one-speed fan in canopy.
 - 11. Emergency Car Lighting: Provide an emergency power unit employing a 12 volt sealed rechargeable battery and static circuits to illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
 - 12. Emergency Siren: Provide siren mounted on top of the car that is activated when the Alarm button in the car operating panel is engaged.
 - 13. Emergency Exit Switch: Provide an electrical contact to open the safety circuit when the emergency car top exit is opened. When the exit door is opened, the top exit switch shall signal the control and the car will be unable to move.
 - 14. Emergency Exit Lock: Provide an emergency exit lock where required by local code.
 - 15. Emergency Exit Guard: Provide emergency exit guard on top of car when required for hoistway wall to platform clearance exceeds 12" or for multiple cars in hoistway.

2.5 DOOR OPERATOR AND REOPENING DEVICES

- A. Door Operator: Provide a closed loop VVVF high performance door operator with frequency controlled drive for fast and reliable operation to open and close the car and hoistway doors simultaneously.
- B. In case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in accordance with applicable code. Provide emergency devices and keys for opening doors from the landing as required by local code.
- C. Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or immediately upon pressing of a car button. Provide door open button in the car operating panel. Momentary pressing of this button shall reopen the doors and reset the time interval.

- D. Provide door hangers and tracks for each car and hoistway door. Contour tracks to match the hanger sheaves. Design hangers for power operation with provisions for vertical and lateral adjustment. Hanger sheaves shall have polyurethane tires and pre-lubricated sealed for life bearings.
- E. Electronic Door Safety Device: Equip car doors with concealed transmitter and receiver infrared beam devices to detect presence of object in process of passing through hoistway entrance and car doorway (light curtain device).
 - 1. Use multi-beam scanning without moving parts to detect obstructions in door opening.
 - 2. Detector Device: Prevent doors from closing, or if they have already started closing, cause doors to reopen and remain open while object is within detection zone.
 - 3. Horizontal Beams: Minimum of 33 infra red beams to fill doorway from ground level to a height of 6 feet.

2.6 SIGNAL DEVICES AND FIXTURES

- A. Car Operating Panel: Provide a car operating panel with all push buttons, key switches and message indicators for elevator operation.
 - 1. Full height car operating panel shall be surface-mounted on front return.
 - 2. Comply with handicap requirements.
 - 3. Push Buttons: Mechanical, illuminating using long-lasting LEDs for each floor served.
 - 4. Emergency Buttons: Provide in accordance with code. Emergency alarm button, door open and door close buttons.
- B. Features of the Car Operating Panel Shall Include:
 - 1. Audible chime to signal that the car is either stopping at or passing a floor served by the elevator.
 - 2. Raised markings and Braille provided to the left hand side of each push button.
 - 3. Car Lantern: Provide LED illuminated car lantern with direction arrows to comply with local code when hall lanterns are not provided.
 - 4. Door open and close push buttons.
 - 5. Firefighter's hat and Phase 2 Key-switch.
 - 6. Inspection key-switch.
 - 7. Key-switch for optional Independent Service Operation.
 - 8. Illuminated alarm button with raised marking.
 - 9. Elevator Data Plate marked with elevator capacity and car number.
 - 10. Help Button: Activation of help button will initiate two-way communication between car and a location inside the building, switching over to alternate location if call is unanswered, where personnel are available to take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
 - 11. Two-Way Emergency Communications Visual Device: Provide separate Two-Way Emergency Communications Visual Device with video camera connected to elevator service network or another point of contact as designated by the Owner.
- C. Hall Fixtures: Provide hall fixtures with necessary push buttons and key switches for elevator operation.
 - 1. Push buttons: Metallic tactile push buttons, up button and down button at intermediate floors, single button at each terminal floor.
 - 2. Height: Comply with handicap requirements.
 - 3. Illumination: Illuminating using long-lasting low power LEDs.
- D. Hall Lanterns and Position Indicators.
 - 1. LED illuminated direction arrows with audible and visible call acknowledgement.
- E. Hoistway access switches: Provide key-switch at top and/or bottom floor in entrance jamb as required by local code.
- F. Firefighter's Phase 1 Service: Key switch in brushed stainless steel cover plate.

- G. Fixture Cover Plates: For push buttons, hall lanterns and position indicators, resistant white back-printed glass, no screws required for mounting. Provide stainless steel cover plates for Firefighter's Phase I switch and hoistway access switches, with tamper resistant screws in same finish.
- H. Mounting: Mount hall fixtures in entrance frames.

2.7 OPERATION CONTROLS

- A. Elevator Controls: Provide landing operating panels, landing indicator panels, and _____.
 - 1. Landing Operating Panels: Metallic type, one for originating "Up" and one for originating "Down" calls, one button only at terminating landings; with illuminating indicators.
 - 2. Landing Indicator Panels: Illuminating.
 - 3. Comply with ADA Standards for elevator controls.
- B. Interconnect elevator control system with building security, fire alarm, card access, smoke alarm, building management control, and _____ systems.
- C. Door Operation Controls:
 - 1. Program door control to open doors automatically when car arrives at floor landing.
 - 2. Render "Door Close" button inoperative when car is standing at dispatch landing with doors open.
 - 3. Door Safety Devices: Moveable, retractable safety edges, quiet in operation; equipped with photo-electric light rays.

2.8 OPERATION CONTROL TYPE

- A. Single Automatic (Push Button) Operation Control: Applies to car in single elevator shaft.
 - 1. Refer to description provided in ASME A17.1.
 - 2. Set system operation so that momentary pressure of landing button dispatches car from other landing to that landing.
 - 3. Allow call registered by momentary pressure of landing button at any time to remain registered until car stops in response to that landing call.
 - 4. If elevator car door is not opened within predetermined period of time after car has stopped at terminal landing allow car to respond to call registered from other landing.

2.9 SERVICE CONTROL TYPE

- A. Independent Service Control:
 - 1. Provide key operated "Independent Service" on car operating panel. Key activation will remove that car from normal operation and cancel pre-registered car calls.
 - 2. Car will respond to selected floor. Car will not respond to any calls from landing call buttons. Car will only respond to calls placed on the car operating panel. Doors will remain open at last landing requested. Doors will close with a constant pressure on "Door Close" button.
 - 3. Key activation to normal operation will return car to normal operation.

2.10 EMERGENCY POWER

- A. Elevator Emergency Power Supply: Supplied by battery backup; provide elevator system components as required for emergency power characteristics.
 - 1. Provide internal battery power to allow elevator to return to level of exit discharge and for hoistway and cab doors to open.
- B. Emergency Lighting: Comply with ASME A17.1 elevator lighting requirements.

2.11 MATERIALS

- A. Rolled Steel Sections, Shapes, Rods: ASTM A36/A36M.
- B. Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel), with matte finish.
- C. Stainless Steel Sheet: ASTM A666, Type 304; No. 4 Brushed finish unless otherwise indicated.
- D. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.

- E. Extruded Aluminum: ASTM B221 (ASTM B221M), natural anodized finish unless otherwise indicated.
- F. Resilient Flooring: Vinyl tile flooring, as specified in Section 09 6500.
- G. Plastic Laminate: NEMA LD 3, Type HGS, color as selected by Fuller and D'Angelo, P.C. from manufacturer's standard line of colors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting this work.
- B. Verify that hoistway, pit, overhead, and openings are ready for work of this section.
- C. Verify hoistway shaft and openings are of correct size and within tolerance and ready for entrance sill installation. Traditional sill angle or concrete sill support shall not be required.
- D. Verify hoistway is clear and plumb, with variations not to exceed -0 to +1 inch at any point. Verify projections greater than 4" must be beveled not less than 75 degrees from horizontal. No negative tolerance is permitted for minimum hoistway dimensions.
- E. Verify that electrical power is available and of correct characteristics.
- F. Verify minimum fire-resistance rating of shaft walls.
- G. Notify YPS Office of Facilities Management and Fuller and D'Angelo, P.C. in writing of dimensional discrepancies or other conditions detrimental to proper installation or performance of elevators.
- H. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to manufacturer/installer.

3.2 PREPARATION

- A. Arrange for temporary electrical power for installation work and testing of elevator components. Comply with requirements of Section 01 5000 - Temporary Facilities and Controls.
- B. Maintain elevator pit excavation free of water.

3.3 INSTALLATION

- A. Install elevators in accordance with manufacturer/installer's instructions and ANSI/ASME A17.1.
- B. Coordinate this work with installation of hoistway wall construction.
- C. Install system components, and connect equipment to building utilities.
- D. Provide conduit, electrical boxes, wiring, and accessories. Refer to Electrical Divisions.
- E. Install hoistway, elevator equipment, and components in accordance with approved shop drawings.
- F. Install guide rails to allow for expansion and contraction movement of guide rails.
- G. Accurately machine and align guide rails, forming smooth joints with machined splice plates.
- H. Bolt or weld brackets directly to structural steel hoistway framing or inserts incorporated into masonry or concrete construction.
- I. Field Welds: Chip and clean away oxidation and residue with wire brush; spot prime with two coats.
- J. Install hoistway door sills, frames, and headers in hoistway walls; grout sills in place, set hoistway floor entrances in alignment with car openings, and align plumb with hoistway.
- K. Fill hoistway door frames solid with grout in accordance with Section 04 2000.
- L. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime with two coats.
- M. Adjust equipment for smooth and quiet operation.

3.4 TOLERANCES

- A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 and ASME A17.2.
- B. Car Movement on Aligned Guide Rails: Smooth movement, without any objectionable lateral or oscillating movement or vibration.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Contractor shall provide testing and inspections ANSI/ASME A17.1 and governing codes.
 - 1. Schedule tests with agencies and notify YPS Office of Facilities Management and Fuller and D'Angelo, P.C.
 - 2. Obtain permits as required to perform tests.
- C. Perform testing and inspection in accordance with requirements.
 - 1. Inspectors shall be certified in accordance with ASME QEI-1.
 - 2. Perform tests in accordance with ASME A17.2.
 - 3. Provide at least two weeks written notice of date and time of tests and inspections.
 - 4. Supply instruments and execute specific tests.
- D. Operational Tests:
 - 1. Perform operational tests in the presence of YPS Office of Facilities Management and Fuller and D'Angelo, P.C..
 - 2. Provide load test in accordance with NYS Building code.
 - 3. Test single elevator system by transporting at least four (4) persons up from main floor to top floor landings during a five minute period.
 - 4. At an agreed time, and the building occupied with normal building traffic, conduct tests to verify performance.
 - a. Furnish event recording of each landing call registrations, time initiated, and response time throughout entire working day.

3.6 ADJUSTING

- A. Adjust elevators for proper operation in accordance with manufacturer/installer's instructions.
- B. Adjust for smooth acceleration and deceleration of car to minimize passenger discomfort.
- C. instructions.
- D. Adjust doors to prevent opening of doors at landing on corridor side, unless car is at rest at that landing, or is in leveling zone and stopping at that landing.
- E. Adjust with automatic floor leveling feature at each floor landing to reach 1/4 inch maximum from flush with sill.
- F. Repair minor damages to finish in accordance with manufacturer/installer's instructions and as approved by YPS Office of Facilities Management and Fuller and D'Angelo, P.C.
- G. Remove and replace damaged components that cannot be successfully repaired as determined by YPS Office of Facilities Management and Fuller and D'Angelo, P.C.

3.7 CLEANING

- A. Remove protective coverings from finished surfaces.
- B. Clean surfaces and components in accordance with manufacturers written instructions.
- C. Do not use harsh cleaning materials or methods that could damage finish.
- D. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.

3.8 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. See Section 01 7900 - Demonstration and Training, for additional requirements.
- C. Demonstrate proper operation of equipment to YPS Office of Facilities Management's designated representative.
- D. Training: Train Yonkers Public Schools's personnel on cleaning and operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours of training.
 - 3. Instructor: Manufacturer's training personnel.
 - 4. Location: At project site, unless otherwise indicated.

3.9 PROTECTION

- A. Do not permit construction traffic within car after cleaning.
- B. Protect installed products until Date of Substantial Completion.
- C. Touch-up, repair, or replace damaged products and materials before Date of Substantial Completion.

3.10 MAINTENANCE

- A. Provide Initial Maintenance Contract of elevator system and components in accordance with ASME A17.1 and requirements as indicated for 24 Months from Date of Substantial Completion.
- B. Submit proposal for continuation of Maintenance Contract in accordance with ASME A17.1 and requirements as indicated for installed elevator equipment.
- C. Perform maintenance contract services using competent and qualified personnel under the supervision and direct employ of the elevator manufacturer or installer.
- D. Maintenance contract services shall not be assigned or transferred to any agent or other entity without prior written consent of YPS Office of Facilities Management.
- E. Examine system components bi-monthly.
- F. Include systematic examination, adjustment, and lubrication of elevator equipment.
- G. Maintain and repair or replace parts, whenever required, using parts produced by original equipment manufacturer.
- H. Replace wire ropes when necessary to maintain the required factor of safety.
- I. Perform work without removing cars from use during peak traffic periods.
- J. Provide emergency call back service during regular working hours throughout period of this maintenance contract.
- K. Maintain an adequate stock of parts for replacement or emergency purposes, and have personnel available to ensure the fulfillment of this maintenance contract without unreasonable loss of time.
- L. Cost of 24 month maintenance contract shall be included in contract cost.

END OF SECTION

**SECTION 23 0125
MECHANICAL SPECIFICATIONS**

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 work to be completed under this division of the specifications shall include the furnishing of all supplies, equipment, labor, supervision and all materials not specifically mentioned, ready for use, in accordance with all applicable codes and authorities having jurisdiction, including heating, ventilation, air conditioning, plumbing, sprinkler equipment, associated items and Automatic Temperature Control components. It is the intention of these specifications and drawings to indicate finished work that is tested and ready for operation including but not limited to:
 - 1. Removals.
 - 2. Cutting and Patching
 - 3. Piping.
 - 4. Drainage from noted equipment to floor drains, roof, sink, or funnel drains.
 - 5. Piping connections to equipment.
 - 6. Vibration isolation elements for piping and equipment.
 - 7. Equipment isolation bases.
 - 8. Seismic restraints for isolated and non-isolated ductwork, VAV boxes, and equipment
 - 9. Testing.
- B. The data indicated in these drawings and specifications are as exact as could be secured. But their absolute accuracy is not guaranteed. Do not scale drawings. Exact locations, distances, levels and other conditions will be governed by the building. Use the drawings and specifications for guidance and secure the engineer's approval of changes in locations.
- C. Construction methods and good installation practice.
 - 1. The contractor shall visit the site and become thoroughly familiar with all existing conditions under which the work and work of other trades will be installed. This contract includes all necessary offsets, transitions, modifications and relocation required to install all new equipment in new or existing spaces. Contractor shall include any modifications required in existing ductwork and/or equipment for installation of new HVAC equipment and new equipment of other trades. All new and existing equipment and systems shall be fully operational under this contract before the project is considered complete.
 - 2. The contractor shall be held responsible for any assumptions that are made, any omissions or errors made as a result of failure to visit the site and become thoroughly familiar with the existing conditions and the contract documents of all trades.

1.3 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary of Contract: Contract descriptions, description of alterations work, work by others, future work, occupancy conditions, use of site and premises, work sequence.
- B. Section 01 2000 - Price and Payment Procedures: Applications for payment, Schedule of Values, modifications procedures, closeout procedures.
- C. Section 01 2100 - Allowances: Cash, testing, and contingency allowances.
- D. Section 01 2200 - Unit Prices: Descriptions of unit price items, administrative requirements.

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- E. Section 01 2300 - Alternates: Descriptions of items, administrative requirements.
- F. Section 01 3000 - Administrative Requirements: Submittal procedures, project meetings, progress schedules and documentation, reports, coordination.
- G. Section 01 3050 - Design Procedures and Substantiation Requirements.
- H. Section 01 3114 - Facility Services Coordination.
- I. Section 01 3216 - Construction Progress Schedule.
- J. Section 01 3329 - Sustainable Design Reporting.
- K. Section 01 3553 - Site Safety and Security Procedures.
- L. Section 01 4000 - Quality Requirements: Procedures for testing, inspection, mock-ups, reports, certificates; use of reference standards.
- M. Section 01 4100 - Regulatory Requirements.
- N. Section 01 4216 - Definitions.
- O. Section 01 4219 - Reference Standards: Consolidated list of citations with edition dates.
- P. Section 01 4533 - Code-Required Special Inspections and Procedures.
- Q. Section 01 5000 - Temporary Facilities and Controls.
- R. Section 01 5100 - Temporary Utilities.
- S. Section 01 5213 - Field Offices and Sheds.
- T. Section 01 5500 - Vehicular Access and Parking.
- U. Section 01 5713 - Temporary Erosion and Sediment Control.
- V. Section 01 5719 - Temporary Environmental Controls: Procedures and testing.
- W. Section 01 5813 - Temporary Project Signage.
- X. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.
- Y. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- Z. Section 01 6116.01 - Accessory Material VOC Content Certification Form.
- AA. Section 01 7000 - Execution: Examination, preparation, and general installation procedures; preinstallation meetings; cutting and patching; cleaning and protection; starting of systems; demonstration and instruction; closeout procedures except payment procedures; requirements for alterations work.
- AB. Section 01 7419 - Construction Waste Management and Disposal.
- AC. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance (O&M) data, warranties and bonds.
- AD. Section 01 7900 - Demonstration and Training: Detailed requirements.
- AE. Section 01 9113 - General Commissioning Requirements.
- AF. Section 02 4100 - Demolition: Selective demolition, site demolition, structure removal.
- AG. Section _____ : _____.

1.4 DEFINITIONS

- A. Refer to Section 01 4216 - Definitions.

1.5 CODES, REGULATIONS AND STANDARDS

- A. Refer to Section 01 4100 - Regulatory Requirements for additional requirements
- B. Published specifications, standards tests, or recommended methods of trade, industry or governmental organizations apply to work in all Sections as noted below:

FULLER AND D'ANGELO, P.C.
ARCHITECTS AND PLANNERS

1. ASHRAE - American Society of heating, Refrigerating and Air Conditioning engineers.
2. AABC - Associated Air Balance Controls.
3. AMCA - Air Moving and Conditioning Association.
4. ADC - Air Diffuser Council.
5. NEMA - National Electrical Manufacturers' Association.
6. ANSI - American National Standards Institute.
7. ASME - American Society of Mechanical Engineers.
8. ASTM - American Society for Testing and Materials.
9. EPA - Environmental Protection Agency
10. NFPA - National Fire Protection Association.
11. NFPA 101 - Life Safety Code
12. NFPA 70 - National Electrical Code
13. NFPA 72 - National Fire Alarm Code
14. ARI - Air-Conditioning and Refrigeration Institute.
15. UL - Underwriters' Laboratories, Inc.
16. OSHA - Occupational Safety and Health Administration Regulations

1.6 PERMITS, FEES AND INSPECTIONS

- A. The contractor shall give all necessary notices, obtain all permits, and pay for all government, state sales taxes and applicable fees. The contractor shall file all drawings, complete all documents and obtain all necessary approvals from the proper authorities or agency having jurisdiction. Obtain all required certificates of inspection covering work. The contractor shall see that all required inspections and tests are made and shall cooperate to make these tests as thorough and as readily made as possible.

1.7 MATERIALS AND WORKMANSHIP

- A. Refer to Section 01 4000 - Quality Requirements for additional requirements.
- B. All materials and apparatus required for the work, except as otherwise specified, shall be new and of first-class quality. It shall be furnished, delivered, erected, connected, finished in every detail and so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality material is given, a first-class standard article as accepted by the engineer shall be furnished.
- C. All equipment and materials shall be specification grade and bear the underwriter's label. No substitute or alternate equipment, material, etc. Will be considered for this project.
- D. All work shall be of a quality consistent with good trade practice and shall be installed in a neat, workmanlike manner. The engineer/owner reserves the right to reject any work which, in his opinion, has been installed in a substandard, dangerous or in an unserviceable manner. The contractor shall replace rejected work in a satisfactory manner at no extra cost to the owner.

1.8 GUARANTEE AND SERVICE

- A. The contractor shall. Guarantee all workmanship and materials for a period of two year from the date of acceptance of the installation. In addition, the contractor shall Provide, free of charge, one year 's maintenance guarantee on maintained service and adjustment of all equipment in this contract.

1.9 RECORD DRAWINGS

- A. Refer to Section 01 7800 - Closeout Submittals for additional requirements.
- B. Maintain, at the job site, a set of drawings indicating all changes in location of the equipment, devices, etc. From the original layout. Clearly mark in red all changes on the drawings. At the completion of the project the contractor shall turn over the record drawings to the engineer/owner.

1.10 COORDINATION

- A. All work shall be carried out in conjunction with other trades and full cooperation shall be given in order that all work may proceed with a minimum of delay and interference.

1.11 SHOP DRAWING

- A. Refer to Section 01 3000 - Administrative Requirements for additional requirements.
 - 1. Prior to delivery to the work area, but well in advance of requirements necessary to allow engineer ample time for review, contractor shall submit for approval, in PDF format of each shop drawing. Indicate on each submission:
 - a. Location
 - b. Architect/Engineers names
 - c. Item identification/description
 - d. Approval stamp of prime contractor
 - e. All shop drawings and coordination drawings shall include locations and sizes of existing equipment along with new work. Drawings shall include locations and sizes of existing equipment along with new work. Drawings shall indicate locations of hangers, supports, expansion joints, guides, anchors and anchor loads. Submit shop drawings for the following
 - a) Piping.
 - b) Pipe insulation.
 - c) Duct insulation.
 - d) Valves
 - e) Ductwork layout, coordination drawings, sheet metal standards and details
 - f) Air outlets (exhaust grilles
 - g) Air and piping balancing reports
 - h) Heating element covers
 - i) Fans
 - j) Dielectric fittings.
 - k) Through-penetration firestop assemblies.
 - l) Design Calculations: Signed and sealed by a qualified professional engineer, licensed in the state where the work is being performed for selecting seismic restraints
 - m) Testing.
 - n) Controls

1.12 OPERATING INSTRUCTIONS

- A. Refer to Section 01 7800 - Closeout Submittals for submittal and additional requirements.
- B. The contractor shall furnish to the architect/engineer instructions for operating and maintaining all systems and equipment.
 - 1. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions
- C. The contractor, in the above- mentioned instructions, shall include the maintenance schedule for the principal items of equipment furnished under this division.
- D. An authorized manufacturer's representative shall attest in writing that his equipment has been properly installed prior to startup. These letters will be bound into operating and maintenance books.

1.13 MANUFACTURER'S INSTRUCTION

- A. Install all equipment in accordance with manufacturer's instructions or requirements for proper operation and maintenance.

1.14 CUTTING, PATCHING, REPAIRING AND PAINTING

- A. Refer to Section 01 7000 Execution for additional requirements.
- B. The general contractor shall perform all cutting, patching, repairing and painting for all electrical items and equipment called for under this contract.

1.15 TEMPORARY FACILITIES AND CONTROLS

- A. Refer to Section 01 5000 - Temporary Facilities and Controls for additional requirements.

1.16 DRAWING AND INTENT

- A. Drawings are intended as working drawings for general layout of the various items of equipment. However Layout of accessories, specialties, equipment and piping systems are diagrammatic unless specifically dimensioned, and do not necessarily indicate every required valve, fittings, elbow, pipe, transitions, trap, junction or pull box, offsets or similar items required for the installation to be complete

1.17 INSURANCE

- A. Refer to General Conditions Article 10

1.18 CONTINUITY OF EXISTING SYSTEM;

- A. Maintain continuity of the existing vent, waste, soil, hot and cold water systems to the areas not affected by the alteration.

1.19 INTERRUPTION OF SERVICE

- A. Contractor shall request shut down of service for all mechanical and electrical systems. Contractor shall coordinate with Owner's Representative. All shut downs shall be scheduled by the Owner's Representative.

1.20 WORK NOT INCLUDED

- A. All electrical work, cutting and patching, piers lintels, all concrete work and all painting. This contractor shall furnish the general contractor with the sizes and locations of chases and openings which occur in walls, partitions, floors, etc., required for the installation of the work called for under this contract, will be done by the general contractor. Except cutting required for the installation of hangers.

1.21 MEASUREMENTS

- A. All measurements taken at the building shall take precedence over scale dimensions. Every part of the plans shall be fitted to the actual conditions at the building. If there is a conflict with the scale dimensions. Contact architect and/or engineer for direction/clarification

1.22 PROTECTION OF EQUIPMENT MATERIALS AND FIXTURES

- A. Close pipe openings with caps or plugs during installation. Tightly cover and protect fixtures and equipment against dirt, water and chemical or mechanical injury. At completion of all work, fixtures, exposed materials and equipment shall be thoroughly cleaned.

1.23 SCAFFOLDING, RIGGING AND HOISTING:

- A. Unless otherwise specified, contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for the erection and delivery into the premises of any equipment and apparatus furnished. This will apply to any equipment that is being removed from the premises.

1.24 HOUSEKEEPING

- A. This contractor shall be responsible for keeping stock of materials and equipment stored on premises in a tidy and orderly manner and, at all times, keep the premises free from accumulation of waste material or rubbish caused by their employees at work. He shall remove his rubbish and surplus materials from the job site and shall have the premises and their work in a clean and well maintained condition.

1.25 QUIET OPERATION

- A. All work shall operate under all conditions of load without my sound or vibration which is offensive in the opinion of the engineer. In the case of the moving machinery, sound or vibration noticeable outside of room in which it is installed, or annoying inside given room, will be consider unacceptable by the engineer and shall be remedied in approved manner by the contractor at their own expense

1.26 COORDINATION DRAWINGS

- A. Coordination drawings shall indicate all MEP equipment, ducts and pipes. Mounting height shall be noted on drawings

1.27 EQUIPMENT SUBSTITUTIONS

- A. Refer to Section 01 6000 - Product Requirements

1.28 ELECTRICAL CONNECTIONS

- A. Power supply and alarm wiring will be provided under Division 26, and connections made to any new equipment, pumps, valves, fixtures, and other items receiving electrical connection.
- B. To facilitate electrical connections provide electrical items with NEMA enclosures having sufficient knockouts, connectors, terminal blocks and/or contacts.

1.29 ACCESSIBILITY

- A. Place valves, unions Drains, and items requiring maintenance, adjustment, or repair, in accessible locations. Coordinate final location of access panels with architect.

1.30 OWNER'S INSTRUCTIONS AND SYSTEM OPERATION

- A. Refer to Section 01 7900 - Demonstration and Training

1.31 At the time of the job's acceptance by the owner, contractor shall furnish one complete set of approved certified drawings to the owner. In addition the contractor shall furnished maintenance and operating instructions for all equipment. The instructions shall be written in layman's terms and shall be inserted in vinyl-covered three ring binder. The information in the binder shall be first sent to and approved by the architect/engineer before turning over to the owner.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All materials and equipment provided under this section shall be new, first grade, best of their respective kinds and in no way shall they be less than the quality and intent set forth under this section. They shall meet the requirements of all standards set up to govern the manufacturer of HVAC materials and comply with all applicable codes and standards

2.2 SLEEVES

- A. Provide No. 22 USSG galvanized iron sleeves extend through construction in ceilings, walls and partitions. For insulated piping sized to allow insulation to pass through the sleeve. Provide 1/2" space between pipe and/or insulation and sleeve. Seal all sleeves in accordance with building code and fire department requirements.

2.3 EXPANSION HANGERS

- A. Suspend hangers from expansion anchors in solid concrete slabs similar to Hilti HDI. Provide hanger in place with double nuts. Provide protection shields in insulated pipes. Install hangers over insulations and shields. Where overhead construction does not permit fastening hanger rods in required locations, provide additional steel framing as required and reviewed.

2.4 LABELING

- A. On all piping in ceiling. 10' on center indicating system size and direction of flow.

2.5 DISSIMILAR METALS:

- A. Where copper or brass alloy connected to galvanized metal, the two shall be separated with an insulation connection fitting.

2.6 HANGERS AND SUPPORT

- A. Hanging and supporting - piping shall not be supported by other piping, but shall be supported with copper pipe hangers suitable for the size of pipe and proper strength and quantity at proper intervals so that the piping cannot be move accidentally from the installed positions follows:
- | | | |
|----|---|---------|
| 1. | 1/2" pipe or tubing | 6 feet |
| 2. | 3/4" or 1" pipe or tubing | 8 feet |
| 3. | 1-1/4" or larger (horizontal) | 10 feet |
| 4. | 1-1/4" or larger (vertical) every floor level | |

2.7 SEISMIC RESTRAINTS

- A. Provide required bracing material. Ductwork shall be supported and braced to resist all directional (lateral, longitudinal and vertical) forces equal to 10x of the weight of the system of duct as a whole
- B. Seismic restraints designed and constructed for latera forces in any direction shall be provided for all mechanical equipment in accordance with the state building code.
- C. Seismic restraints shall not be required for the following:
1. Piping in boiler and mechanical rooms less that 1-1/4" inside diameter.
 2. All other piping less than 2-1/2" inside diameter.
 3. All rectangular air handling ducts less than 6 square feet in cross sectional area.
 4. All round air handling ducts less than 26" in diameter.
 5. All piping suspended by individual hangers 12" or less in length from the top of the pipe to the bottom of the support for the hanger.
 6. All duct suspended by hangers 12" or less in length from the top of the duct to the bottom of the support for the hanger.

2.8 DUCT INSULATION

- A. Where indicated of the drawings, ductwork shall be lined with Manville Permacote Linacoustic. Thickness, unless otherwise indicated, shall 1" liner shall be applied to duct in strict accordance with manufacturer's instructions and SMACNA guidelines, latest edition. Where sound insulation Is indicated, ductwork sizes indicated are the clear inside dimensions after the insulation has been installed. Cover all unlined supply ductwork with 1-1/2" fiberglass duct wrap equal to Manville R-series Microute with F.R.G. vapor barrier. Exposed ductwork does not require insulation.

2.9 DUCT INSULATION - EXTERIOR DUCTWORK

- A. Exterior ductwork should first be wrapped with 1-1/2" fiberglass insulation, covered with F907 mastic weatherproof membrane applied and wrapped for the entire length, then re-apply mastic as a final sealing agent.

2.10 SHEET METAL DUCTWORK

- A. All ductwork shall be constructed of # 1 quality first sheets of galvanized steel free of cracks or blemishes. When pittsburging or snap locking a joint, the galvanized steel shall not be clipped off.
- B. All parts of the sheet metal duct system shall be constructed and installed in strict accordance with the first edition 1985 for pressures 2" w.g. maximum static pressure as outlined and detailed by SMACNA., April 1966.
- C. Flexible duct may be used to connect rigid ductwork to supply diffusers. Duct shall be SMACNA Form M-1" insulated metal liner. Flexible duct shall not exceed 3' in length. If longer branch duct is required, Contractor shall extend galvanized sheet metal to a point within 3'-0"(max.) of diffuser.

2.11 FLEXIBLE CONNECTIONS

- A. Shall be 29 oz. Neoprene coated fiberglass, 6" wide. Burning properties shall conform to NFPA 90A. Fasten to ductwork per manufacturer's recommendations. Fabric shall not be stressed other than by air pressure. Allow at least one inch slack to insure that no vibration is transmitted.

2.12 SEISMIC RESTRAINT FOR DUCTWORK

- A. Provide required bracing material, ductwork shall be supported and braced to resist all directional (traverse, longitudinal and vertical) forces equal to 10x of the weight of the system of duct as a whole

2.13 VOLUME DAMPERS

- A. Single blade or opposed blade multi-louver type as detailed in SMACNA standards. Refer to figure 2-11 and 2-12. Provide end bearing for all dampers. Quadrant or other operator for externally insulated duct shall have stand-off mount so operation is clear of the insulation.

2.14 SMOKE AND/OR FIRE DAMPERS

- A. Provide smoke and or fire dampers, as required, weather shown or not, at all fire and smoke rated partitions. Architect's plans must be reviewed and coordinated for all fire and smoke rated partitions.

2.15 FIRE DAMPERS

- A. Fire dampers shall be Ruskin IBD2, vertical or horizontal, Style B or Style C for round ducts, or equal. Each shall be furnished and installed in accordance with NFPA 90A latest edition and includes a UL label and shall conform to bulletin UL 555. Fire dampers to be installed in all fire rated walls and ceilings as required and/or indicated on drawings.

2.16 DUCT ACCESS DOORS

- A. Provide access doors, sized and located for maintenance work, upstream where possible, for each fire damper. Access sections in insulated duct shall be double-wail insulated. Refer to SMACNA LPDS Figure 2-24.
- B. Provide lock type 2 (door latch, not a sash lock)

2.17 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 Anemostat Co., Carnes or Hart and Cooley

2.18 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

2.19 ROOF EXHAUST FANS

- A. All roof exhaust fans shall be centrifugal roof exhausters of aluminum rustproof construction.
- B. Units shall be direct connected with direct drive motor out of airstream. Power unit shall be isolated against vibration heavy duty neoprene vibration isolators.
- 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.

2.20 OUTDOOR CONDENSING UNIT

- A. Outdoor mounted, air-cooled unit suitable for ground installatio.
- B. Refer to Drawung schedule for required accessories and related appurtenances.

2.21 HEAT PUMP

- A. Ceiling cassette with built-in condensate pump, cleanable filter, auto and seletable fan speed including:
 - 1. In ceiling grill.
 - 2. Wired room control.

3. Room control wiring for kit for future multiple unit.
4. Power ventilation kit.
5. Wind baffle.

2.22 CONVECTORS

- A. Furnish and install Convectors as manufactured by Sterling Co., Airtherm Co. and American Air Filer Co. considered equal as indicated on the Drawings. Type and size as noted on Drawing. Unit shall be installed in a neat and workmanlike manner in accordance with the Specifications and manufacturer's recommendations.
- B. Convector element shall be constructed of copper tubes expanded and rolled into cast iron headers with contact further strengthened by brass bushings, aluminum fins, ribbed steel side plates and fin tube supports.
- C. Cabinet shall have a one piece 14 gauge steel front panel. Front panel shall be held in place by camlock fasteners.
- D. Dampers shall be factory mounted on the element to reduce heating capacity up to 70% when closed. Key operated damper-tamperproof. Baked enamel finish shall be provided in standard manufacturer's colors as selected by the Architect. Unit shall have (camlock) access doors to provide access to valves.

2.23 TEST AND BALANCE

- A. Completely Test and balance all supply, return and exhaust air systems and hot water systems and prove: the capacities of the system and the system components. Submit results to engineer for approval. Also provide single line drawings of the system with locations and capacities of all diffusers and equipment.

2.24 HOT WATER PIPING

- A. Water supply and return piping shall be Type L copper tubing with sweat fittings made up with 95-5 solder or standard weight schedule 40, open hearth steel, National or equal. Fittings for steel pipe shall be as follows: generally, butt welding fittings over two inches shall be used and either socket-weld or screwed for two inches or under. Welding fittings shall be standard forged steel with chamfered ends. All branches shall be welded with either Weldolete or tees.
- B. All steel pipe, all fittings shall be of the best gray cast iron by Crane or Walworth with true clean tapered treads, free of sand holds or other defects. Flanges shall be below 8 inches, 150 lb. welding neck.

2.25 BALANCING FITTINGS

- A. Provide B&G circuit setter balancing fittings on each hot water coil and whenever required for balancing of systems.

2.26 HOT WATER PIPING INSULATION

- A. Insulate with rigid preformed fiberglass with AP-T Plus jacket. Schuller Micro-Lok or equal. Insulation thickness shall be 1" for below 2" piping, 1-1/2" for 2" to 3" piping and 2" for 4" and above piping. Provide Zeston covers on all fittings.

2.27 PIPE SUPPORT

- A. All pipes shall be supported in a good, firm and substantial manner by means of adjustable malleable iron or copper hangers or approved method.

2.28 HOT WATER VALVES:

- A. Valves shall be ball. Type Jamesbury Clincher or Apollo, or gate type, Milwaukee #F-2885M (flanged), OS&Y. Iron body, bronze mounted or #148 (screwed), bronze. rising stem.

2.29 THERMOMETERS

- A. Thermometers shall be Terrice Universal Angle Type #L80732, solid liquid filled, 4.5 dial size furnish with separable socket with 2" extension neck.

2.30 GENERAL. PIPE TEST

- A. Unless otherwise noted:
- B. Test all piping hydrostatically at not less than 200 psi pressure for two hours and all defective material shall be replaced. Before making final approval the subcontractor should produce a written statement signed by a representative of the owner's underwriter, that the work has been completed and tested in accordance with approved specifications and plans.
- C. Unless otherwise noted, perform pressure tests and obtain approval of test results before starting cleaning or concealing of pipe under insulation or other finish. Insulation removal and re-installation which is required because insulation was not installed prior to testing shall be done at the contractor's expense.
- D. Tests are satisfactory only when joints show no visible leaks and test pressure remains constant after continuous test period. Repair leaks, and remove and replace defective pipe, fittings and joists with new material, until accepted by architect/engineer and inspecting authority. Wicking, caulking, compounding, peening, or other make shift type of repairs are unacceptable and will not be approved.
- E. Repeat tests after repairs until systems are proven tight.

2.31 HOT WATER PIPE TEST

- A. Tests shall be maintained as long as necessary to completely inspect piping (minimum 4 hours).
- B. Test water piping by applying hydrostatic pressure using pump. Ensure that lines are vented of all air.
- C. Following precautions shall be taken during pressure tests:
 - 1. Hot water system relief valve shall be removed.
 - 2. Pressure gauges with scale ranges lower than test pressure shall be removed or isolated.
 - 3. Water control valves shall be removed.

2.32 AUTOMATIC TEMPERATURE CONTROLS

- A. Provide all required controls for new equipment as an extension of existing building/District control panel including all valves, dampers, sensors, relays and panels and wiring. Provide new graphics programming as required to indicate all new controlled devices on existing central work station as directed by the town.
 - 1. Yonkers Public Schools to review and approve all systems and functions.
 - 2. All devices etc. to be compatible to existing systems.
 - 3. Input of block and individual schedules shall be reviewed with Yonkers Public Schools.
 - 4. All new graphic shall match existing.
 - 5. Sequence of operation shall match existing building standards and be approved by Yonkers Public Schools

2.33 SEQUENCE OF OPERATION

- A. Exhaust Fans
 - 1. Provide start/stop signal for new exhaust fans with occupied/unoccupied schedule.
- B. Radiant Panels
 - 1. Provide 2 position normally open hot water control valve to open on a call for heat from local wall sensor with building set back schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that existing conditions are acceptable prior to starting installations.
- B. Preinstallation Testing: Test substrate for existing fire alarms system prior to modifications.

3.2 PREPARATION

- A. Protection of In-Place Conditions: Prior to removals and during new work protect existing, floor, walls, ceilings, equipment and furnishings.

- B. Removal: Removing existing equipment, ductwork, devices, wiring as required to install new work.
- C. Measure indicated mounting heights to bottom of unit, devices, registers, etc. for suspended items and to center of unit for wall-mounting items.
- D. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

3.3 INSTALLATION GENERAL

- A. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- B. Right of Way: Give to piping systems installed at a required slope.
- C. All work, materials and manner of installing same shall be in strict accordance with the latest code.
- D. Unless otherwise indicated all wiring exposed in finished and occupied areas shall be wire mold (2000 series or equal). Conduit shall be installed within new stud partitions, mechanical room, above ceilings in rigid galvanized steel conduit (RGS) shall be used for wiring in the following locations:
 - 1. Exposed to moisture or mechanical damage.
- E. Electrical metallic tubing (EMT) shall be used for concealed and exposed wiring in dry locations as follows:
 - 1. Interior receptacle and power branch circuit wiring
- F. All conduit shall be installed in parallel and perpendicular to the building lines. All conduit shall be supported using cadmium plated conduit straps and hangers. Separate conduit systems shall be installed for normal, and low voltage power.
- G. Mechanical equipment shall be isolated from the building structure by means of noise and vibration isolators as scheduled on the drawings or within these specifications.
- H. No rigid connections between equipment and building structure shall be made that degrades the noise and vibration isolation systems herein specified.
- I. Electrical circuit connections to isolated equipment shall be looped to allow free motion of isolated equipment.
- J. The contractor shall not install any equipment, piping or conduit which makes rigid contact with the "building" unless permitted in this Specification. Building includes, but is not limited to, slabs, beams, columns, studs and walls.
- K. Isolation mounting deflection shall be minimum as specified or scheduled on drawings.
- L. Coordinate work with other trades to avoid rigid contact with the building. Inform other trades following work, such as plastering or electrical, to avoid any contact which would reduce the vibration isolation.

3.4 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.
- I. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."
- J. Seal duct seams and joints for duct static-pressure and leakage classes specified in "Performance Requirements" Article, according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Standard Duct Sealing Requirements," unless otherwise indicated.

3.5 PIPING INSTALLATIONS

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- L. Install drains, consisting of a tee fitting, NPS 3/4 (DN 20) ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
- M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.
- N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.
- O. Install branch connections to mains using tee fittings in main pipe, with the branch connected to the bottom of the main pipe. For up-feed risers, connect the branch to the top of the main pipe.
- P. Install valves in accessible locations. Coordinate final location of access panels with architect.
- Q. Install unions in piping, NPS 2 (DN 50) and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.
- R. Install flanges in piping, NPS 2-1/2 (DN 65) and larger, at final connections of equipment and elsewhere as indicated. Slip-on flanges shall be back welded.
- S. Install strainers on inlet side of each control valve, pressure-reducing valve, solenoid valve, in-line pump, and elsewhere as indicated. Install NPS 3/4 (DN 20) nipple and ball valve in blowdown connection of strainers NPS 2 (DN 50) and larger. Match size of strainer blowoff
- T. Install expansion loops, expansion joints, anchors, and pipe alignment guides as required.

3.6 EXHAUST FAN INSTALLATION

- A. Inspection
 - 1. 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.
- B. Installation
 - 1. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.
 - 2. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.
- C. Cleaning
 - 1. 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

3.7 ADJUSTING

- A. Repair or remove and replace defective work, as directed by (Architect/Owner) upon completion of installation.
- B. Adjust moving or operating parts to function smoothly.

3.8 CLEANING AND PROTECTING

- A. Thoroughly clean all electrical equipment, devices and enclosures upon completion of all work. Repaint any equipment whose finish is damaged or rusted. Match manufacturer's original finish.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- C. Properly and completely protect against all damage, all apparatus, equipment, etc., included in this contract. The contractor will be held responsible for any damage to furnished apparatus, equipment, etc., until final acceptance.
- D. The contractor shall take whatever means necessary and/or required to protect owner's property within the working areas from dust, debris and other matter generated by the work. No work shall commence in areas where protection is required until approval has been given to the contractor by the owner.

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 - Rotating Electrical Machinery
 - 4. ANSI C51.1 - Construction and guide for selection, installation and use of electric motors.
 - 5. ANSI C52.1 - 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.

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- 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. Clocks and P.A. system components.
 - 6. Fire alarm system.

1.9 MATERIALS AND WORKMANSHIP

- A. All materials and apparatus necessary for the work, except as specifically indicated otherwise, shall be new, of first class quality and shall be furnished, delivered, erected, connected and finished in every detail and shall be so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of material is given, a first class standard article as accepted by the Architect shall be furnished.
- B. Furnish the services of an experienced Superintendent who shall be constantly in charge of the installation of the work, together with all skilled workmen, helpers, and labor to unload, transfer, erect, connect up, adjust, start, operate and test each system.
- C. Unless otherwise specifically indicated on the Drawings or Specifications, all equipment and materials shall be installed in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

1.10 PROTECTION

- A. Work under each Section shall include protecting the work and materials of all other Sections from damage from work or workmen and shall include making good all damage thus caused. Be responsible for work and equipment until finally inspected, tested, and accepted; protect work against theft, injury or damage; and carefully store material and equipment received on site, which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of obstructing or other foreign material.
- B. Work under each section includes receiving, unloading, uncrating, storing, protecting, setting in place and connecting up completely of any equipment supplied under each section. Work under each section shall also include exercising special care in handling and protecting equipment and fixtures, and shall include the cost of replacing any of the above equipment and fixtures which are missing or damaged by reason of mishandling 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.

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- 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. 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.
- C. Junction boxes, pullboxes, wireways, conduits, or any other devices required to reconnect circuitry shall be installed concealed within the ceilings, partitions and/or walls, floors, no surface or exposed circuiting shall be permitted, unless specifically indicated.
- D. 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. Modifications to existing electrical distribution system as indicated on the Drawings.
 4. Distribution panelboard, circuit breaker panelboards, feeder, conduit, cables and branch circuit wiring with all connections complete.
 5. Conduit, conduit fittings, junction and pull boxes and all appurtenances necessary for the raceway systems including necessary supports and fasteners.
 6. Electrical conductors, connectors, fittings and connection lugs.
 7. Branch circuit devices, outlet boxes, pull boxes, motor disconnect switches, etc.
 8. Power wiring to HVAC and Plumbing equipment including disconnect switches as shown and/or required by NEC.
 9. Empty conduit for telephone.
 10. Lighting fixtures and lamps including site lighting and occupancy sensor.
 11. Public address speakers.
 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. Temporary light and power.
 15. Licenses, permits, inspection and approvals.
 16. Grounding as required as per NEC.

17. Sleeves for conduit and watertight caulking between conduit and sleeve.
18. Testing.
19. Cutting, patching and drilling.
20. Excavation and backfill by others. Sand bedding by Electrical Contractor.

B. Pump Discharge Piping

1. Piping: Galvanized steel pipe, Schedule 40 with marker's name rolled into each length.
2. Fittings
 - a. Threaded: Galvanized malleable iron with flat band steam pattern. Cast iron drainage pattern for waste piping.
 - b. Mechanical Joints: Victaulic couplings style 07 for grooved piping only, with gasket.
 - c. Bolted flange with gasket.
3. Joints: Teflon tape for threaded, Victaulic couplings for gasket for mechanical joint.
4. Application: Schedule 40 steel for sump pump discharge.

C. Elevator Sump Pump:

"Oil Minder" by Stancor Model AHS-05 with plug for outlet. Oil sensor to send signal to alarm panel and prevent operation when oil is detected. Vertical float switch 10 gpm @ 20ft. HD, 1/2 hp, 120/1/60. Type K NEMA enclosure. Mount panel in elevator machine room. Coordinate pit size with General Contractor.

D. 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 or approved equal |
| 12. | Public Address System | Rauland-Borg 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.

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- 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.

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- 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. 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.
- D. Splice only in junction or outlet boxes.
- E. Neatly tag, identify, train and lace wiring inside boxes, equipment and panelboards.
- F. Make conductor lengths for parallel circuits equal.

3.2 WIRING INSTALLATION IN RACEWAYS

- A. Pull all conductors into a raceway at the same time. Use UL listed wire pulling lubricate for pulling 4 AWG and larger wires.
- B. Completely and thoroughly swab raceway system before installing conductors.
- C. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.

3.3 CABLE INSTALLATION

- A. Support cables above accessible ceilings; do not rest on ceiling tiles. Use spring metal clips or metal cable ties to support cables from structure (not ceiling suspension system). Include bridle rings or drive rings.
- B. Use suitable cable fitting and connectors.

3.4 WIRING CONNECTIONS AND TERMINATIONS

- A. Splice only in accessible junction boxes.
- B. Use solderless pressure connections with insulating covers for copper wire splices and tape, 8 AWG and smaller. For 10 AWG and smaller, use insulated spring wire connectors with plastic caps.
- C. Provide extended gutters and tap blocks or pull boxes with tap rail systems similar to Burndy MT Series or Burndy Electrorail system for wire splices 6 AWG and larger.
- D. Tape uninsulated conductors with electrical tape to 150 percent of the insulation value of conductor.
- E. Thoroughly clean wires before installing lugs and connectors.
- F. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- G. Terminate spare conductors with electrical tape.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of the Specifications.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Torque test conductor connections and terminations to manufacturer's recommended values.
- D. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

3.6 WIRE AND CABLE INSTALLATION SCHEDULE

- A. All wiring and cable shall be installed in conduit unless otherwise noted. Refer to conduit section 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.

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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. Individual enclosures.
 - 3. 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. Sheet metal boxes: ANSI/NEMA OS 1; Galvanized steel.
- B. Sheet metal boxes larger than 12 inches in any dimension: hinged enclosure in accordance with Section 26 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 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. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
- B. Do not use powder-actuated anchors.
- C. 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.
- D. In wet locations install free-standing electrical equipment on concrete pads.
- E. Install surface mounted cabinets and panelboards with minimum of four anchors. Provide steel channel supports to stand cabinet one inch off wall.
- F. 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

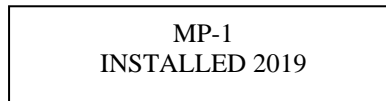
- A. De-grease and clean surfaces to receive nameplates and tape labels.
- B. Install nameplates and tape labels parallel to equipment lines.
- C. Secure nameplates to equipment fronts using screws, rivets, or adhesive. Secure nameplate to inside face of recessed panelboard doors in finished locations.
- 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).

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.

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- B. Support luminaires 2 x 4 foot (600 x 1200 mm) and larger in size independent of ceiling framing.
- C. All lay-in luminaires 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 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

3.2 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.

3.3 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.

3.4 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.

3.5 TESTING

- A. Upon completion of the installation, confirm the grounding continuity of all raceways, conductors and equipment. Maximum allowable resistance is 25 ohms.

3.6 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 0700

PANELBOARDS

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. The work under this section shall include the furnishing of all materials, labor, tools and services necessary to install the power system grounding to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

- A. Grounding.
- B. Overcurrent Protection.

1.3 SUBMITTALS

- A. Submit shop drawings for equipment and component devices under provisions of Division 1.
- B. Include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
- C. Furnish two (2) sets of keys to Owner.

1.4 REFERENCES

- A. FS W-C-375 - Circuit breakers, molded case, branch circuit and service.
- B. FS W-P-115 - Power distribution panel.
- C. NEMA AB 1 - Molded case circuit breakers.
- D. NEMA KS 1 - Enclosed switches.
- E. NEMA PB 1 - Panelboards.
- F. NEMA PB 1.1 - Instruction for safe installation, operation and maintenance of panelboard rated 600 volts or less.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - PANELBOARD AND LOAD CENTERS

- A. Siemens.
- B. Square "D".
- C. General Electric.
- D. Or approved equal.

2.2 BRANCH CIRCUIT PANELBOARDS

- A. Lighting and appliance branch circuit panelboards: NEMA PB 1; circuit breaker type.
- B. Enclosure: NEMA PB 1; Type 1.
- C. Cabinet size: Approximately 6 inches deep; 20 inches wide for 240 volt and less panelboards. Verify field conditions and alter dimensions to suit at no additional cost.
- D. Provide surface cabinet front door-in-door with concealed trim clamps, concealed hinge and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.
- E. Provide panelboards with copper bus, rating as scheduled on Drawings. Provide copper ground bus in all panelboards and isolated ground bus in those as indicated on Drawings.
- F. Minimum integrated short circuit rating: 10,000 amperes rms symmetrical for 240 volt rated for 125 amps or less, 22,000 amperes rms symmetrical for 240 volt rated greater than 125 amps to 225 amps and 30,000 amperes for emergency power panelboards (verify in field). If panelboard is noted as a main distribution panelboard, than panel shall be rated as a distribution panelboard. Contractor shall provide short circuit study to ensure adequacy.
- G. Molded case circuit breakers: Bolt-on type thermal magnetic trip handle for all poles. Provide circuit breakers UL listed as type SWD for lighting circuits. Breaker handle to indicate ampere rating.

2.3 DISTRIBUTION PANELBOARDS

- A. Description: NEMA PB 1, circuit breaker type. The bus of all panels rated a minimum 400 amps shall be distribution type.
- B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard.
- C. Minimum integrated short circuit rating: 65,000 amperes rms symmetrical for 240 volt panelboards; 65,000 amperes rms symmetrical for 480 volt panelboards, unless otherwise noted on Drawings.
- D. Model Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR as specified on Drawings.
- E. Enclosure: NEMA PB 1, Type 1.
- F. Cabinet Front: Surface type, fastened with screws. Double hinged doors with flush lock, metal directory frame, finished in manufacturer's standard gray enamel. One hinged door to access breakers, the other to access wiring compartment.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install panelboards flush or surface mounted as indicated on Drawings.
- B. Mounting height maximum 6 ft. (2 m) to top circuit breaker.
- C. Provide filler plates for unused spaces in panelboards.

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- D. Provide type written circuit directory for each branch circuit panelboard. Indicate loads served and panel name by matching that shown on panel schedules on Drawings. Revise directory to reflect circuiting changes required to balance phase loads. Provide a second copy and turn over to Owner.
- E. Provide 3/4" thick plywood backboard for mounting of panels. Paint backboard with fire retardant paint.
- F. Provide nameplates as indicated in Section 26 0550.

3.2 FIELD QUALITY CONTROL

- A. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20 percent, rearrange circuits in the panelboard to balance the phase loads within 20 percent. Take care to maintain proper phasing for multi-wire branch circuits.
- B. Visual and mechanical inspection: Inspect for physical damage, proper alignment, anchorage and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches and fuses.
- C. Provide thermographic inspections in accordance with Section 26 0100.

3.3 TESTS

- A. Submit certification that each panelboard has withstood, without breakdown, a factory dielectric (Hi-Pot) test consisting of a one minute application of a 60 cycle AC test voltage applied between phase legs and from each phase leg to enclosure.
- B. The applied test voltage shall have an RMS value of at least twice the line to line system voltage to which the panelboard is to be applied, plus one thousand volts (minimum 1500V).

3.4 RECORD DRAWINGS

- A. Submit As-Built Drawings indicating the location of all panelboards.

END OF SECTION

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, NFPA-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.

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 and backfilling for footings, foundations, slabs-on-grade, and grade beams.
- B. Dewatering.
- C. Excavating and backfilling trenches required in conjunction with underground mechanical and electrical utilities and buried mechanical and electrical appurtenances where indicated to be provided under this contract.
- D. Preparing subgrades for all excavate areas.
- E. Drainage course for slabs on grade, footings, and foundation walls
- F. Select fill.
- G. Subsurface drainage and backfill for walls.
- H. Final grading

1.3 RELATED REQUIREMENTS

- A. Section 01 7000 - Execution: Project conditions; protection of scoping and dewatering
- B. Section 03 3000 - Cast-in-Place Concrete.
- C. Section 31 5260 - Excavation Support and Protection: Shoring and underpinning.
- D. Section 31 2323 - Fill: Fill materials, backfilling, and compacting.
- E. Section 32 1313 - Concrete Paving.
- F. 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 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Temporary Support and Excavation Protection Plan.

- 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. Shoring Installer's Qualification Statement.
- E. Field Quality Control Submittals: Document visual inspection of load-bearing excavated surfaces.
- F. Product Data: For the following:
 - 1. Sieve Analysis, Proctor Compaction Test and Certification of Specification Compliance for e 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. Controlled low-strength material, including design mixture.
 - 5. Geofoam.
 - 6. Contractor shall submit copies of proposed materials with locations, methods and operations of backfilling and compaction.
- G. 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 Geotech Engineer. Use of these proposed materials by the Contractor prior to testing and approval or rejection shall be at the Contractor's own risk.
- H. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
 - 2. Laboratory compaction curves according to ASTM D 2487 for each on-site or borrow soil material proposed for fill and backfill.
 - 3. Optimum moisture-maximum density curve for each soil material.
 - 4. Environmental testing results according to NYSDEC Part 375-6 and NYSDEC Policy Document CP-51 for all off-site imported fill/topsoil material proposed for fill or backfill. Provide results to be reviewed and approved by Geotech Engineer for all analyses corresponding to the full list of Volatiles, Semi-volatiles, TAL metals, Pesticides/Herbicides, and PCB's. Results will be compared to Part 375-6.8 Unrestricted Use Soil Cleanup Objectives (SCO's). One composite sample analysis required per 1,000 cubic yards of imported fill.
 - 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 Geotech Engineer.
 - 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.
- I. 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.

1.6 QUALITY ASSURANCE

- A. Comply with: New York State Department of Transportation (NYSDOT) "Standard Specifications for Construction and Materials". Notify YPS Office of Facilities Management and Fuller and D'Angelo, P.C. of conflicts with these specifications.
- B. Temporary Support and Excavation Protection Plan:
 - 1. Refer to Section 31 5260 - Excavation Support and Protection

2. Include drawings and calculations for bracing and shoring.
3. Bracing and shoring design to meet requirements of OSHA's Excavation Standard, 29 CFR 1926, Subpart P.

1.7 DEFINITIONS

- A. **Unauthorized Excavation:** Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of YPS Office of Facilities Management and Architect. Unauthorized excavation and remedial work directed by YPS Office of Facilities Management and Architect shall be at Contractor's expense.
 1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to YPS Office of Facilities Management and Architect.
 2. 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 and Architect.
- B. **Authorized Additional Excavation:** If the YPS Office of Facilities Management and Architect determines bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered. Replace excavated material as directed by YPS Office of Facilities Management.
 1. Removal of unsuitable material and replacement as directed will be paid on basis of conditions of contract relative to Allowances listed in changes in the work.
- 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 slab-on-grade, concrete pavement, and footings used to minimize capillary flow of pore water.
- G. **Select Fill:** Soil material to raise existing grades supporting slab-on-grade and footings.
- 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. **Structures:** footings, retaining walls, or slabs, or other man-made stationary features constructed above or below the ground surface.
- 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. **Utilities** include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.
- M. **Controlled Low Strength Material:**

1.8 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. **Project Site Information:** A geotechnical report has not been prepared for this Project.

- D. The contractor, subject to approval of the YPS Office of Facilities Management may make additional test borings and conduct other exploratory operations as necessary.

1.9 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor shall provide adequate survey control to locate building lines, parking areas, driveways, top of slopes, 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.
- B. 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.

1.10 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 Owner 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. 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.
- C. 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

1.11 PRODUCT HANDLING

- A. Store materials to preserve their quality and fitness for work.

1.12 WORKMANSHIP

Contractor shall be responsible for correction of work not conforming to specified requirements. Correct deficient work as directed by Owner's Representative and Construction Manager.

- 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 ""classified" as earth".
 - 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. If excavated materials intended for fill and backfill include unsatisfactory soil material and rock, replace with satisfactory soil materials. Backfill removed from existing building foundation is considered as not suitable for backfilling and shall not be used.
- C. If rock is encountered the following shall apply:

1. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches beneath bottom of concrete slabs-on-grade.

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 slabs, over undisturbed soil, and against basement walls.
- 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
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 and footings.
- G. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448 meeting the following:

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.
- 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, subsoil, debris, large weeds and foreign matter.
- J. Follow NYSDOT Standard Specifications if gradation data varies from those listed above for approval.
- K. Recycled material shall not be permitted.
- L. Slag of any kind shall no be permitted.

2.3 ACCESSORIES

- A. Bedding and Fill to Correct Over-Excavation:
 - 1. Select Fill.

PART 3 EXECUTION

3.1 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.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.
- C. 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 YPS Office of Facilities Management and Architect .
- D. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- E. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.
- F. 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.
- G. Protect and maintain erosion and sedimentation controls, which are specified in Section Site Clearing" during earthwork operations.

3.3 TEMPORARY EXCAVATION SUPPORT AND PROTECTION

- A. Refer to Section 31 5260 - Excavation Support and Protection.
- B. Excavation Safety: Comply with OSHA's Excavation Standard, 29 CFR 1926, Subpart P.

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. 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. Hand trim excavations. Remove loose matter.
- C. Notify YPS Office of Facilities Management of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- D. Provide temporary means and methods, as required, to remove all water from excavations until directed by YPS Office of Facilities Management. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.7 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 .

3.8 REPAIR

- A. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.

3.9 STABILITY OF EXCAVATIONS

- A. Comply with Section 31 5260 Excavation Support and Protection.

3.10 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. 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.
 - 2. When rock is encountered, remove additional 12" of material and provide compacted drainage fill to eliminate differential settlement.
 - 3. Footing adjacent to existing building shall bear at same elevation or deeper.

3.11 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. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.12 UNAUTHORIZED EXCAVATION

- A. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

3.13 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.

3.14 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.

3.15 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 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.

3.16 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.

3.17 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.

3.18 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.

3.19 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 in size. Remove soil contaminated with petroleum products.
 4. Where topsoil is to be placed, scarify surface to depth of 3 inches.
 5. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.

3.20 SUBSURFACE DRAINAGE Refer to Section 33 4600

- A. 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.

3.21 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

3.22 DRAINAGE FILL

- A. Under slabs-on-grade and footings 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.

3.23 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 Owner 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 Architect
 - 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.
- 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.

3.24 CLEANING

- A. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 2200.
- B. Remove excavated material that is unsuitable for re-use from site.
- C. Remove excess excavated material from site.

3.25 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.

3.26 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.

END OF SECTION

**SECTION 31 5260
EXCAVATION SUPPORT AND PROTECTION**

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 temporary excavation support and protection systems.

1.3 PERFORMANCE REQUIREMENTS

- A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
 - 1. Provide professional engineering services needed to assume engineering responsibility, including preparation of Shop Drawings and a comprehensive engineering analysis by a qualified professional engineer.
 - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 3. Install excavation support and protection systems without damaging existing buildings, pavements, and other improvements adjacent to excavation.

1.4 SUBMITTALS

- A. Shop Drawings for Information: Prepared by or under the supervision of a qualified professional engineer for excavation support and protection systems.
 - 1. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Qualification Data: For Installer and professional engineer.
- C. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection systems.

1.5 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by YPS Office of Facilities Management and then only after arranging to provide temporary utility services according to requirements indicated.
- B. Survey adjacent structures and improvements, employing a qualified professional engineer or land surveyor; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
 - 1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify YPS Office of Facilities Management if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.

- C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.
- D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of 3 inches (75 mm).

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
 - 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct walks, exits, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- D. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 SOLDIER BEAMS AND LAGGING

- A. Install steel soldier beams before starting excavation. Space soldier beams at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment.
- B. Install wood lagging within flanges of soldier beams as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.
- C. Install wales horizontally at centers indicated and secure to soldier beams.

3.3 SHEET PILING

- A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Limit vertical offset of adjacent sheet piling to 60 inches (1500 mm). Accurately align exposed faces of sheet piling to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment. Cut tops of sheet piling to uniform elevation at top of excavation.

3.4 UNDERPINNING

- A. Excavate as required for placing underpinning in alternate sections not exceeding 2'-0" in width and to depths required to install the concrete Work as shown. If not otherwise shown carry the underpinning down to the level of the footings of the new construction. Alternate sections of concrete underpinning shall be in place supporting the superimposed loads properly before adjacent sections of earth are excavated.
- B. Provide approved shoring as required to prevent damage to existing Work until the under pinning is complete and in condition to support the structure.
- C. Install forms for exposed faces and at each end of each section of the concrete underpinning. No forms will be required for underpinning in contact with existing Work.
- D. Roughen and clean existing concrete surfaces that will be in contact with concrete underpinning. Wet such surfaces and then coat with neat cement grout. Place new concrete before the grout has attained its initial set.
- E. Install concrete underpinning in alternate sections not exceeding 4'-0" in width and up to approximately 3 inches below the bottom of the existing foundations to be supported. Provide a 2 x 4 inch key type

construction joint for full height of the concrete at each end of each section. After the underpinning has set for 24 hours, pack the void between the top of the underpinning and the existing Work full with stiff concrete solidly rammed in place.

- F. Provide wedges, plates and beams to transfer the load of the structure to the underpinning if required to prevent settlement.

3.5 BRACING

- A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
 - 1. Do not place bracing where it will be cast into or included in permanent concrete work, unless otherwise approved by YPS Office of Facilities Management and Architect.
 - 2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
 - 3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
 - 1. Repair or replace, as approved by YPS Office of Facilities Management and Architect, adjacent work damaged or displaced by removing excavation support and protection systems.
- B. Leave excavation support and protection systems permanently in place.

END OF SECTION

**SECTION 32 1313
CONCRETE 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. Concrete sidewalks.
- B. Concrete Admixtures.

1.3 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete.
- B. Section 07 9200 - Joint Sealants: Sealing joints.
- C. Section 31 2316 - Excavation: Preparation of site for base and preparation of subsoil.

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. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018, with Editorial Revision (2018).
- G. ASTM A 820 / A 820M - Standard Specification for Steel Fibers for Fiber-Reinforced Concrete
- H. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- I. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).
- J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.
- K. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2018.
- L. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- M. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- N. ASTM C 989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
- O. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2018.
- P. ASTM D8139 - Standard Specification for Semi-Rigid, Closed-Cell Polypropylene Foam, Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction; 2017.

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. Fiber reinforcement.
 - 4. Admixtures.
 - 5. Curing compounds.
 - 6. Bonding agent or adhesive.
 - 7. 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 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. 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.
- D. 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 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.
- 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

1.8 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. Steel form material, profiled to suit conditions.

2.2 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 80 (80,000 psi) yield strength; deformed billet steel bars; unfinished.
- B. Steel Welded Wire Reinforcement: Plain type, ASTM A1064/A1064M; in flat sheets; unfinished.
- C. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi yield strength; deformed billet steel bars; epoxy coated finish.
- D. Tie Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- E. 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, buff color.
- B. Fine and Coarse Mix Aggregates: ASTM C33/C33M.
- C. Water: Clean, and not detrimental to concrete.
- D. Fiber Reinforcement: Synthetic fibers shown to have long-term resistance to deterioration when in contact with alkalis and moisture; 1/2 inch length.
 - 1. Manufacturers:
 - a. Grace Construction Products, W. R. Grace & Co.; Grace Fibers.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- E. Air-Entraining Admixtures: ASTM C260/C260M.

2.4 ACCESSORIES

- A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- B. Expansion Joint Cap Strip: Extruded, plastic, removable strip made specifically for forming recessed joint. Vinylex, Knoxville, TN 37921 (615) 690-2211

2.5 CONCRETE MIX DESIGN

- A. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.
- B. 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.
 - 4. Maximum Aggregate Size: 3/4 inch.

2.6 MIXING

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

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.

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.

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 24 hours after concrete placement. Provide edge forms for all area where brick pavers or installed in concrete pavements.

3.5 REINFORCEMENT

- A. Place reinforcement at top of slabs-on-grade.
- B. Interrupt reinforcement at contraction joints.

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, 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 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.

3.8 JOINTS

- A. Place 3/8 inch wide expansion joints at 20 foot 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 of finished surface.

2. Secure to resist movement by wet concrete.
- B. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Provide scored joints.
 1. At 3 feet intervals.

3.9 FINISHING

- A. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.

3.10 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.

3.11 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.
- 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 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.

3.12 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.

**SECTION 33 4100
SUBDRAINAGE**

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. Footings and foundation drainage systems.
- B. Filter aggregate and fabric and bedding.

1.3 RELATED REQUIREMENTS

- A. Section 31 2316 - Excavation: Excavating for subdrainage system piping and surrounding filter aggregate.

1.4 REFERENCE STANDARDS

- A. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2011.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pipe drainage products, pipe accessories and molded sheet drainage board
- C. Shop Drawings: Indicate dimensions, layout of piping, high and low points of pipe inverts, gradient of slope between corners and intersections.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Project Record Documents: Record location of pipe runs, connections, cleanouts and principal invert elevations.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer, with a minimum of 5 years experience, who has completed foundation drainage systems similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.7 DEFINITIONS

- A. PVC: Polyvinyl chloride plastic.
- B. Subdrainage: Drainage system that collects and removes subsurface or seepage water.

1.8 COORDINATION

- A. Coordinate foundation drainage system installation with excavating, trenching, and backfilling.
- B. Coordinate drainage panel installation with waterproofing of walls below grade.
- C. Coordinate piping termination with storm drainage system.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Comply with applicable code for materials and installation of the work of this section.

2.2 PIPE MATERIALS

- A. Perforated, Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: ASTM D 2729, bell-and-spigot ends, for loose joints, minimum 6" unless shown otherwise.

2.3 CLEANOUTS

- A. Description: ASME A112.36.2M, with round-flanged, cast-iron housing, and secured, scoriated, Medium-Duty Loading class, cast-iron cover. Include cast-iron ferrule and countersunk, brass cleanout plug.

2.4 AGGREGATE AND BEDDING

- A. Impervious Fill: Clayey gravel and sand mixture capable of compacting to dense state.
- B. Drainage Fill: ¾" washed evenly graded mixture of crushed stone or crushed gravel.

2.5 ACCESSORIES

- A. Pipe Couplings: Solid plastic.
- B. Geotextile fabric in one or more layers for minimum weight of 6 oz./sq. yd.
- C. Drainage panels are specified in Section 07 1300 - Sheet Waterproofing

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that excavated base is ready to receive work and excavations, dimensions, and elevations are as indicated on layout Drawings.

3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over-excavation with Lean concrete.
- B. Remove large stones or other hard matter that could damage drainage piping or impede consistent backfilling or compaction.

3.3 INSTALLATION

- A. Install and join pipe and pipe fittings in accordance with pipe manufacturer's instructions.
- B. Place drainage pipe on clean cut subsoil.
- C. Apply and compact drainage fill material to raise low areas or where unsatisfactory bearing soil may occur.
- D. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.
- E. Install piping pitched down in direction of flow, at a minimum slope of 1 percent and with a minimum cover of 36 inches, except where otherwise indicated. Do not place piping above finish floor slab.
- F. Place pipe with perforations facing down. Mechanically join pipe ends.
- G. Install drainage fill at sides, over joint covers and top of pipe. Provide top cover compacted thickness of 12 inches.
- H. Lay geotextile filter fabric in trench and overlap trench sides
- I. Place aggregate in maximum 4 inch lifts, consolidating each lift.
- J. Connect to storm sewer system with unperforated pipe.

3.4 FIELD QUALITY CONTROL

- A. Section 01 4000 - Quality Requirements: Field inspection and testing.
- B. Testing: Test drain piping with water or visually check piping to ensure free flow before backfilling. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.
 - 1. Place additional filtering material to depth of 8 inches around sides and top of drains after testing.

3.5 PROTECTION

- A. Protect pipe and aggregate cover from damage or displacement until backfilling operation begins.

END OF SECTION