Division 00 – Procurement and Contracting Requirements

As required by Owner

Division 01 – General Requirements

01 1000 - Summary

New construction of a new high school on the existing high school site. Existing high school building stays online as new high school is constructed on corner of the site behind it, and then existing high school will be demolished and new parking areas for the school will be constructed. New site items include new turf varsity baseball field, new grass practice baseball field, varsity turf softball field, tennis/ practice field, band practice field, access road around track to lower site, access road from bus lot to lower site, dedicated bus parking, and pedestrian improvements on site. Project also includes road improvements as defined by the township.

01 1200 – Contract Summary

Project includes single prime contracts as divided by CM

Separate Professional Services Contracts by Easton Area School District

- Construction Testing
- HVAC Balancing
- Waste Management

01 2300 – Alternates

Below is a list of proposed alternates to date:

- TBD

01 5000 - Temporary Facilities

Project requirements include but are not limited to temporary site sign, directional signs, soil and erosion control provisions, common use temporary modular facility for meetings; temporary water, telephone and electric service from public utilities for common use and contractor temporary facility; temporary water to support construction activities, temporary enclosure of building; temporary heating and dehumidification equipment. Provide temporary 8' high chain link fence enclosure with gates for secure enclosure of contractor staging area.

Division 02 – Existing Conditions

02 4116 - Demolition

Site Demolition will include removal of existing baseball field and tennis courts to prepare for new building location, as well as site prep for new grass practice baseball field.

Building Demolition consists of phased demolition of the existing building to keep infrastructure online while the new building is being constructed.

Division 03 – Concrete

03 3300 - Cast In Place Concrete

In general, the construction consists of structural concrete slab on grade with foundations and standard weight concrete slab on composite deck. There will be exterior concrete steps and sidewalks. Concrete

mixes will be selected for strength durability and economy. Under slab vapor retarder will be no less than 15 mil thick polyethylene or as required based upon selected floor finish materials.

03 3543 – Polished Concrete Finishing
Ground and polished concrete floors in art rooms and technology / manufacturing labs, mechanical rooms, and back of house rooms.

03 4500 – Precast Architectural Concrete
Precast concrete cladding units on exterior face of building, with standard of selected sizes and textures for economy of scale.

Division 04 - Masonry

04 2200 – Concrete Unit Masonry
Masonry products shall consist of concrete block walls as needed at fire separation, interior walls of the building and for exterior backup as larger spaces such as athletic spaces, auditorium, and kitchen / mechanical / back of house spaces. All of the exterior wall construction type shall be cavity wall with the concrete block as backup. Special types of masonry units shall consist of bullnose corners. Masonry cavity wall construction will include composite copper laminated rubberized asphalt flashing, stainless steel counter flashing, and color matched cellular weeps.

04 7200 – Stone Masonry
Limestone shall be used for wall caps and building branding as indicated on the exterior elevations.

Division 05 - Metals

05 1200 – Structural Steel Framing
Structural steel shall consist of wide flange columns and beams.

05 1213 – Architecturally Exposed Structural Steel Framing
Structure steel tube members used for structural framing exposed in selected locations.

05 2100 – Steel Joist
Roof Structure shall consist of steel joists supported by structural steel.

05 3100 - Steel Deck
Roof deck shall be used typically for low-sloped roof construction. Floor decking will be for composite construction.

05 5400 – Cold-Formed Metal Framing
Galvanized steel 20 gage, or thicker, studs will be employed for various miscellaneous applications for exterior closure. CFMF is a delegated design.

05 5000 - Metal Fabrications
Shall consist of loose lintels, bearing plates, and steel stairs. Exterior steel components shall be galvanized and painted.

05 5200 - Metal Railings
Interior steel guardrails and handrails will be fabricated of tube steel and U channels. Guardrails and handrails and brackets will be powder coated in color from manufacturer's standard range of colors to be selected by architect.

Division 06 – Wood, Plastics and Composites

06 0150 - Rough carpentry
Will include blocking and nailers only.

06 1600 - Exterior Sheathing
5/8" fiberglass faced gypsum panel will be used in exterior cold formed framing walls.

06 4023 – Interior Architectural Woodwork
Will include reception desk at administration, media center, display shelving, display cases, and benches in common areas. Also to include wood detailing at specialty areas.

Division 07 – Thermal and Moisture Protection

07 1100 – Damp-proofing
Asphalt damp-proofing will be utilized on below grade foundation walls and elevator pits. Spray on type damp-proofing shall be used over block in cavity walls.

07 1326 Waterproofing
Self-adhesive sheet type waterproofing membrane shall be used over below grade concrete retaining walls enclosing the building.

07 2100- Thermal Insulation
Building insulation types include both rigid, batt type and spray polyurethane foam. Rigid type insulation shall consist of 2" extruded polystyrene board.
Expanding Foam Sealant, non-shrinking expanding polyurethane foam sealant for sealing infiltration pathways in building construction.

07 2726 – Fluid Applied Air Barrier Membrane
The air barrier will be a continuous spray on product with taped reinforced joints.
The air barrier will be applied on the exterior face of CMU in the new cavity walls.

07 4243 – Composite Metal Wall Panels
A composite panel consisting of aluminum sheet and plastic core shall be used for smooth wall and fascia.

07 5113 – Modified Bituminous Membrane Roofing
Roofing will be a 30 year, 80 mil base sheet, 115 mil rubber modified roofing membrane with Kevlar fibers and cold applied coal tar pitch flood coat adhesive with roofing aggregate.

07 5323 - EPDM Roofing - Alternate
Roofing will be a 20 year, 60 mil, and fully adhered black EPDM roofing system over 5" Minimum polyisocyanurate rigid insulation. The membrane shall be fully adhered to rigid insulation board, which will

be sloped and/or tapered at some areas to provide positive drainage. Basis of Design – Tremco. Multiple manufacturers and systems will be bid as alternates to provide cost control.

07 6200 – Metal Flashing and Trim
Sheet metal fabrication shall consist of break formed fascias with factory fluoropolymer finishes. Asphalt coated copper flashing shall be used at cavity through-wall flashing. Stainless steel counterflashing will be utilized at roof to wall terminations of the roofing membrane.

07 7100 – Manufactured Roof Specialties
Manufactured metal expansion joints with flexible bellows shall be used. Manufactured roof edge, gravel stops and copings will also be used.

07 8413 - Fire Stopping and Smoke Stopping
Fire stopping and smoke stopping shall consist of fire-resistant caulking, batting, blocking at fire rated walls and floor assemblies.

07 9200 - Joint Sealers
In general, exterior joint sealers shall be multi-part Polyurethane with some use of silicone at metal work and non-curing butyl at concealed locations.

07 9500 - Expansion Joint Cover Assemblies
Aluminum expansion joint cover assemblies with flexible seal inserts and fire barriers shall be used at interior floor, wall and ceilings.

Division 08 – Openings

08 1113 – Hollow Metal Doors and Frames
Exterior door frames shall be formed of minimum 14-gauge galvanized steel. Interior door frames shall be formed of minimum 16-gauge steel. All frames are to be welded and painted. Exterior doors shall be heavy duty type seamless flush design formed of 16-gauge galvanized sheet steel. Interior frames shall be 18-gauge seamless design, flush painted steel. In general, both interior and exterior steel doors may have glass lites, both interior door and exterior door shall be seamless construction, 1-3/4 inches thick, and painted finish.

08 1119 – Stainless Steel Doors and Frames
All doors at natatorium areas to be stainless steel doors and frames due to corrosive nature of chlorine pool chemicals.

08 1416 – Flush Wood Doors
Wood doors shall be solid core, flush, with hardwood veneer faces. The wood doors shall be factory finished, some with lite kits, and installed in painted steel door and aluminum frames. Match between veneer leaves to be slip match; assembly of veneer leaves on door faces to be running match; pair and set match doors hung in same opening or separated only by mullions.

08 3323 – Overhead Coiling Doors

Exterior, electrically-operated service door with galvanized steel curtain and factory applied finish. Some locations exterior overhead doors to have glass lites. Interior, manually-operated counter door with aluminum curtain.

08 4113 - Aluminum Framed Entrances and Storefronts

Exterior aluminum stile and rail glazed entrance doors, exterior flush aluminum doors, vestibule doors and other interior doors matching entrance doors, frames for entrances. Storefront-type framing system for exterior glazed openings, including fixed glass and insulated metal panels. Storefront-type framing system for interior applications.

08 4413 – Glazed Aluminum Curtain Wall

In general, a thermally broken, extruded, factory fluoropolymer finished aluminum with internal reinforcement shall be used. Snap covers shall be of various depths and contrasting color from main bearing elements. This framing system shall receive fixed glazing and swing doors.

08 7100 - Door Hardware

In general, all door hardware shall be ADA compliant and durable. All hardware will be brushed chrome finished. Lock systems will be designed to match the District's preference for style and keying. Classrooms will have Classroom locksets. Base bid manufacturer on locksets will match the current district wide system. Exterior entrance doors will have either electric strikes or magnetic locks and be tied into an electronic locking/card access system. Stair tower doors and fire doors will be held open with magnetic hold opens tied into the fire alarm system.

08 8000 - Glazing

In general, clear standard glass (i.e., plate, insulating, tempered, laminated etc.) and glazing systems shall be used throughout. Translucent light transmission glass will be used as well. Exterior insulated glass will be low-e coated for energy efficiency.

CG Clear Glass - Monolithic ¼"
CTG Clear Tempered Glass - Monolithic Tempered ¼"
CIG Clear Insulated Glass - Insulated 1"
CIT Clear Insulated Tempered Glass - Insulated Tempered 1"
Insulated Intruder Resistant Glass 1" (3/8" Security Glazing outdoor lite, ¼"
Tempered indoor lite)
SP Spandrel Glass - Insulated Ceramic Coated Spandrel Glass 1"
FRG Fire Rated Glass
DP – Insulated Glass Panel with light diffusing capillary

08 8300 – Mirrors

Wall mirrors in the bathroom areas shall be ¼" tempered, vinyl backed safety glass with polished edges and top and bottom J-channels for anchorage.

Division 09 - Finishes

09 2116 - Gypsum Board Systems

Abuse resistant gypsum board construction over steel studs shall be used for interior partitions in classrooms and administration. Horizontal shaft wall assemblies will be incorporated where required for fire rating. Some of these partitions may be rated construction. Moisture resistant gypsum products will be specified adjacent to wet areas.

09 3000 - Tiling
In general, ceramic mosaic, quarry and glazed wall tile systems shall be used in wet areas such as the toilet rooms, locker rooms, and natatorium areas. Corridor walls will be tiled with porcelain tile with aluminum trim at corners in select areas.

09 5100 - Acoustical Ceilings
Humidity resistant suspended acoustical panel ceilings shall be used throughout. Water and vandal resistant tile will be used in toilet rooms and kitchen.

09 5423 – Linear Metal Ceilings
Perforated metal ceilings will be utilized at specialty spaces

09 6400 – Wood Flooring
Wood flooring for new auditorium stage

09 6466 – Athletic Wood Flooring
Athletic floating wood flooring for new main gymnasium area.

09 6516 - Resilient Sheet Flooring
Homogeneous rubber sheet flooring in Science Labs and Nurses Suites

09 6519 - Resilient Tile Flooring
Vinyl composition tiles in classroom areas.

09 6566 - Resilient Athletic Flooring
Resilient floor for auxiliary gymnasium areas, indoor running track, and fitness areas.

09 6624 - Terrazzo
Base bid in corridors and common spaces will include poured epoxy terrazzo floors and base.

09 6813 - Carpet
Carpeting that is of the anti-static nylon variety with anti-microbial treatment shall be installed with rubber base in administration and guidance areas and Library. Walk off carpet sheet goods will be used in vestibules.

09 7200 – Digital Wall Covering & Wall Covering
Digital wall covering will be used in specialty areas. Standard wall covering to be used at accents.

09 8413 – Fixed Sound Absorptive Panels
Acoustical fabric wrapped fiberglass panels will be installed in the Media Center, Instrumental Rooms, Auditorium, and other areas needing acoustical sound treatments.

09 9133 - Painting
High durability painting systems shall be used throughout for walls, ceilings and trim. Low VOC enamel systems shall be used in classrooms, water-based epoxy systems shall be used elsewhere.

Division 10 - Specialties

10 1100 - Visual Display Boards
Visual display boards of marker board type and tackboard type shall be used.

10 1400 - Signs
ADA compliant panel signs will identify room names and wayfinding.
An aluminum dedication plaque will be provided at the interior.

10 2113 - Toilet Partitions
Solid plastic HDPE floor mounted, overhead braced toilet partitions shall be used.
ASI Global Partitions

10 2123 - Toilet Partitions
Cubicle curtains in health suite areas.

10 2233 – Folding Partitions
Folding partitions located in select classroom areas.

10 2813 - Toilet Accessories
Durable stainless steel components will be used. Grab bars and hand dryers will be provided in toilet rooms. Toilet paper dispensers, paper towel dispensers, and soap dispensers will be owner provided.

10 4400 - Fire Extinguishers
Multipurpose dry chemical type extinguishers will be provided typically in recessed cabinets. Special K-type extinguishers will be provided in the Kitchen.

10 5113 - Lockers
Lockers shall be used in athletic locker room spaces, instructional planning areas, maintenance staff locker rooms, and in select areas for student use.

Division 11 - Equipment

11 3100 - Residential Appliances – TBD
Electric ranges, microwave ovens, refrigerators, freezers and dishwashers will be provided at Family and Consumer Science rooms.

11 4000 – Food Service Equipment
Food service equipment layouts for new serving areas, kitchen, storage areas, and walk-in coolers / freezers.

11 5213 - Projection Screens
Electrically operated screens will be provided at the Auditorium.

11 6143 – Auditorium Curtains
Curtains for new Auditorium Space

11 6623 – Gymnasium Equipment
Gymnasium equipment for all interior athletics areas. Not limited to basketball backstops, gymnasium curtain dividers, scoreboards, and volleyball stanchions.

Division 12 - Furnishings

12 2413 – Window Shades
Manual shades will be provided in classrooms at exterior windows. Motor operated shades will be provided in taller areas as needed.

12 3216 – Manufactured Plastic Laminate Cad Casework
Full overlay high pressure plastic laminate wall, base, and tall cabinets in all areas. Base cabinet epoxy tops will have integral sinks in all Science Labs and new Art rooms. All other areas to have solid surface countertops.

12 5651 - Library Furniture
Solid wood furniture, such as tables, chairs, shelves, etc., shall be installed.

12 6600 – Telescoping Stands
New bleachers in Main gymnasium.

12 9300 – Site Furnishings
TDB with courtyard design

Division 14

14 2000 –Elevator
A two-stop and three-stop machine room-less limited use elevator(s) will be utilized to connect levels of new building to ensure ADA access. Basis of Design TBD

Division 21 – Fire Protection

Summary

Provide a complete automatic wet pipe sprinkler system throughout the new 457,000 square foot High School for the Easton Area School District. building in accordance with International Building Code and NFPA-13. The facility shall be served from a separate fire water service. The new fire service within the building shall include a backflow preventer and alarm check valve with associated trim. The building shall be zoned into 52,000 square foot areas or less. The fire service shall also include a fire department connection located on the exterior wall in a location approved by the local fire department.

A dry pipe system will be provided as required for areas subject to freezing.

Sprinkler coverage shall be provided in accordance with the requirements of NFPA 13. Sprinkler Heads shall be quick response type. Sprinkler heads in GWB or ACT ceilings shall be concealed pendent type with covers provided in color and finish as selected by the Architect. Sprinklers in ACT tile ceilings

shall be centered in tile and coordinated with other ceiling fixtures. Sprinkler heads located in exposed structure ceiling areas shall be upright type with guards and provided in finishes as selected by the Architect.

Provide a standpipe system if required by the local Authority Having Jurisdiction. A standpipe system is not required by International Building Code.

Fire Protection Piping shall be UL listed Schedule 40 black steel with threaded joints for piping up to 1-1/2 inch, and Schedule 10 grooved piping with Victaulic grooved fittings and couplings for piping larger than 1-1/2 inch. Fire protection piping in exposed ceiling areas shall be painted to match architectural finish.

Supervisory and alarm devices shall be provided as required by NFPA-13.

All accessories and appurtenances used in the fire protection system shall be UL listed for use in Fire Protection Systems.

Division 22 - Plumbing

Summary

The project scope is to provide all labor and materials, equipment, services, and perform all operations necessary and incidental to complete Plumbing System to a new 457,000 square foot High School for the Easton Area School District.

The plumbing work will generally include but not be limited to the following:
- Plumbing fixtures.
- Plumbing specialties.
- Domestic water piping, valves, insulation, hangers, and appurtenances.
- Hot water heaters and circulating pumps.
- Emergency shut-off system for water, gas and electric in Science Classrooms
- Drain, waste and vent piping, insulation, hangers, and appurtenances.
- Fuel gas piping, valves, hangers, and appurtenances.

Plumbing Fixtures

All required “accessible” fixtures will be installed in accordance with ICC/ANSI A117.1 requirements.

- Water Closet - Public and private: wall-hung, siphon-jet, elongated bowl, vitreous china, complete with chair carrier and open-front seat. Water closets and flush valves shall be specified for 1.6 gallons per flush and shall be provided with manual flush-valve operation as specified by the District during detailed design.

- Urinals: Wall-hung siphon-jet, vitreous china, complete with concealed carrier system. Urinals shall be specified for 0.125 – 0.5 gallons per flush and shall be provided with as specified by the District during detailed design.

- Lavatories:
  - Laminate countertop applications: Drop-in, vitreous china lavatories.
  - Wall hung applications: Wall hung vitreous china lavatories, complete with integral backsplash and floor mounted carrier.
  - Multi Station Solid Surface Lavatories shall be provided in gang toilet rooms, with hands free operation.
  - All lavatories shall be provided with grid strainer, chrome plated drain and P-trap, chrome plated quarter-turn stop valves, below deck thermostatic mixing valve conforming to ASSE-1070 and supply and drain insulating covers.
  - Lavatory faucets shall be deck-mounted faucets rated for 0.5 gallons per minute, with manual, mechanical metering, or infrared sensor faucet operation (w/hardwired or battery power) as specified by the District during detailed design.

- Electric Water Coolers: Wall hung double bowl, stainless steel construction. Electric water coolers shall include bottle fillers. Electric water coolers, in conjunction with sink mounted bubblers, will be provided in quantity and location to comply with the plumbing code. All water coolers shall be provided with PVC P-trap and quarter-turn stop valve.

- Sinks - Faculty: Stainless steel, Drop-in single or multiple compartment sinks mounted in countertops were indicated, complete with single lever faucet, spray if required, basket strainer, chrome plated drain and P-trap, chrome plated quarter-turn stop valves, below deck thermostatic mixing valve conforming to ASSE-1070, and supply and drain insulating covers.

- Sinks - Classroom applications: Stainless steel, Drop-in single compartment sinks mounted in countertops where indicated, complete with accessible bubbler, gooseneck faucet with wrist blade handles, grid strainer, chrome plated drain and P-trap, chrome plated quarter-turn stop valves, below deck thermostatic mixing valve conforming to ASSE-1070, and supply and drain insulating covers.

- Sinks – Science Classroom applications: Epoxy Coated Resin, single compartment sinks mounted in countertops where indicated, complete with accessible bubbler, gooseneck faucet with wrist blade handles, grid strainer, chrome plated drain and P-trap, chrome plated quarter-turn stop valves, below deck thermostatic mixing valve conforming to ASSE-1070, and supply and drain insulating covers.

<u>Plumbing Specialties</u>

Floor Drains – Finished Areas: Cast iron drain body with nickel-bronze round strainer. Floor drains will be provided in all janitor's closets, all public restrooms with two or more water closets, and all individual toilet rooms. Floor drains not receiving regular discharge will be furnished with trap seal protection.

Floor Drains – Mechanical Equipment Rooms: Cast iron drain body with nickel-bronze round strainer. Floor drains receiving clear water discharge, primarily HVAC condensate, will be excluded from the sanitary system and discharged to the storm water system in compliance with the rules and

regulations of the Sewer Authority (This will be verified during detailed design). Minimum size of floor drains to be 3-inch. Floor drains not receiving regular discharge will be furnished with trap maintenance.

Floor Sinks - Indirect Drains: 14-gauge stainless steel, 12" square drain body, stainless steel grate/strainer. Indirect drains shall be provided for all equipment in finished areas requiring an indirect drain connection including ice makers, kitchen equipment, etc.

Roof Drains / Overflow Drains: Cast iron drain body with cast iron domed strainer, sump receiver and under deck clamp. Secondary roof drains will discharge to grade via cast bronze downspout nozzle with bird screen.

Cleanouts: Cast iron body with nickel bronze round cover adjustable to finish floor elevation. Cleanouts shall be provided in quantities as required by code and not to exceed 100 feet between cleanouts.

Valves: Domestic water shut-off valves shall be "Lead Free", full port ball valves with chrome plated ball and thermally insulated extension handles. Shut-off valves shall be provided as necessary at branch lines and groups of fixtures to permit isolation without interruption of the building water supply.

Freeze-proof Wall Hydrants: Polished bronze or stainless steel, backflow protected recessed wall box with lockable cover and hose bib.

Washdown Connections/Box: Washdown connections shall be provided in gang toilet facilities. Connections shall include stainless steel lockable cabinet with independent valved hot and cold-water supplies and garden hose threaded outlets with vacuum breakers.

Grease Interceptor: Underground grease interceptor will be located outside the school and sized as required by IPC and the rules and regulations of the Sewer Authority and the Health Department.

Domestic Water Systems

Domestic water will be provided from the public water supply. A separate 4-inch domestic water service shall be required for the new school. The underground service piping shall be ductile iron with mechanically restrained joints. The meter and valves shall be located as per local water authority either in a meter pit or in the main mechanical room. Backflow prevention (dual backflow preventers) shall be provided on the incoming water service in accordance with IPC and the local water department requirements. Fire Water service to the facility shall be a separate water service.

Domestic hot water will be distributed throughout the facility at 110°F – 120°F with 140°F hot water being provided to the kitchen. A Kitchen domestic water booster shall be provided for the dishwasher (by food service contractor). Water Heaters will be located in the mechanical room. Hot water recirculating pumps and recirculation piping system will be provided to provide for timely delivery of hot water temperature at each outlet. The water recirculation system shall be controlled by the BAS, if applicable, to operate during occupied hours and to control the temperature in the return loop.

The Domestic piping systems within the building will be Type "L" hard copper with wrought fittings and

solder joints. The piping will be insulated and sized in accordance with The International Plumbing Code. Domestic water piping installed under slab will be Type "K" soft copper or PEX tubing with no joints below slab. All materials and appurtenances used in the construction of the domestic water system shall meet the "Lead Free" requirements of the Safe Water Drinking Act.

Sanitary Systems

A complete drain, waste and vent system will be provided throughout the building to allow for gravity drainage to a point of connection to the site drainage systems 5 feet from building. Drain, waste and vent systems will be cast iron above slab and Sch. 40 PVC below slab. All drain piping 6 inch and larger will be sloped at a minimum of 1/8-inch per foot; all other piping at 1/4-inch per foot. Vent piping will slope to drain at 1/16-inch per foot minimum.

Storm Drainage Systems

Roof drainage for the building will be provided from a combination of sloped roofs and flat roof areas. Sloped roofs will be provided with gutters and downspouts. Flat roof areas will be provided with primary and secondary roof drains with interior drainage piping. All storm drainage piping will be sloped a minimum 1/8" per foot and sized for a 100-year hourly rainfall rate according to the International Plumbing Code.

Secondary (emergency) overflow roof drain system will consist of architectural roof scuppers or overflow drains where scuppers are not possible. Emergency roof drains will terminate with Emergency Rainwater outlet min. 24" above grade.

Horizontal and vertical roof drainage piping will be provided with 1" fiberglass pipe insulation and all-purpose service jacketing.

Clear water discharge, primarily HVAC condensate, will be excluded from the sanitary system and discharged to the storm water system in compliance with the rules and regulations of the sewer authority (This will be verified during detailed design).

Fuel Gas System

A natural gas system will be provided to serve building heating equipment, Domestic water heaters, gas cooking appliances, and science classrooms as required.

The gas meter will be installed on the exterior of the building, with adequate protection from damage or vandalism.

Natural gas piping will be Schedule 40 black steel with threaded joints for piping up to 2" and welded joints for piping larger than 2".

Division 23 – Heating, Ventilation, and Air Conditioning (HVAC)

Summary

The project scope is to provide all labor and materials for HVAC systems to serve a new 457,000 square foot High School for the Easton Area School District. The HVAC system will be a 4-pipe system, primarily consisting of outdoor air-handling units providing heating, cooling, ventilation, and dehumidification for all normally occupied spaces.

Central Heating and Cooling Plant

The central heating plant shall consist of (4) 6000 MBH natural gas condensing boilers. Hot water will be generated and pumped throughout the building to various air handling systems. There shall be (1) primary pump per boiler and a pair of pumps to circulate hot water throughout the building. The building pumps shall be lead/lag configuration with variable frequency drives (VFDs) to modulate flow based on demand.

The central chilled water plant shall consist of (4) 300-ton air-cooled chillers located outside on grade. There shall be (1) primary pump per chiller and a pair of pumps to circulate chilled water throughout the building. The building pumps shall be lead/lag configuration with variable frequency drives (VFDs) to modulate flow based on demand. The chilled water loop will contain 25% propylene glycol for freeze protection.

Central Station Air Handling Units

Central station air handling units will be located on the roof and will provide heating, cooling, and ventilation to spaces throughout the building. There will be several different variations of air handlings depending on the type of space or spaces it serves. Units will consist of MERV-13 filters, hot water heating coils, chilled water cooling coils, and variable speed supply fans. Units may also include variable speed exhaust fans, energy recovery devices, and/or face and bypass dampers on the heating/cooling coils.

Units that serve multiple spaces will have downstream shut-off VAV boxes with reheat for temperature/humidity control.

The units are described below:

- Large volume spaces like the gymnasium, auditorium, and cafeteria shall be served by single zone energy recovery units (ERU).
  - The ERUs shall include a variable speed supply fan, variable speed exhaust fan, hot water heating coil, chilled water cooling coil, face and bypass dampers on the cooling coil, enthalpy wheel w/ bypass, demand control ventilation and MERV-13 filtration.

- The Classroom Wings, Music Wing, and Library/Media Center shall be served by multiple zone energy recovery units (ERU).
  - The ERUs shall include a variable speed supply fan, variable speed exhaust fan, hot water heating coil, chilled water cooling coil, enthalpy wheel w/ bypass and MERV-8 filtration.
  - There shall be shut-off VAV terminals with hot water reheat coils downstream of the units for

zoning.

- The Locker Rooms shall be served by a multiple zone heat recovery units (HRU).
  - The ERU shall include a variable speed supply fan, variable speed exhaust fan, hot water heating coil, chilled water cooling coil, plate heat exchanger w/ bypass and MERV-13 filtration.
  - There shall be shut-off VAV terminals with hot water reheat coils downstream of the unit for zoning.

- The Stage, Kitchen, and Lobbies shall be served by single zone rooftop air handling units (RTU).
  - The RTUs shall include a variable speed supply fan, hot water heating coil, chilled water cooling coil w/ face and bypass dampers, and MERV-13 filtration.

- The Pool shall be served by single zone dehumidification units (DHU).
  - The DHU shall include a variable speed supply fan, variable speed exhaust fan, purge fans, hot water heating coil, DX cooling, hot gas reheat coil, glycol runaround loop HEX, and MERV-13 filtration.

Unitary Air Conditioning Units

Self-contained ductless split-system air handling units will be provided to serve spaces that require continuous cooling such as MDF rooms, IDF rooms, and electrical rooms. Units shall consist of an indoor air handling unit and an outdoor condensing unit connected by refrigerant piping.

Kitchen Hood Makeup Air and Exhaust

A roof mounted up-blast exhaust fan and a direct-fired gas make-up air unit will be provided to serve each kitchen hood. The exhaust fan will remove grease-laden vapors collected at the hood during cooking. The make-up air unit will provide supply air to the hood to prevent the space from being negatively pressurized. The make-up air unit will heat the make-up supply air to a space neutral temperature when the outside air temperature is below the space set-point.

The up-blast exhaust fan shall be of NFPA-96 grease construction and include a VFD, access door, drain connection, and grease trough. The fan shall be interlocked with the kitchen hood through the kitchen hood controls.

The make-up air unit shall consist of an intake w/ filter, direct fired natural gas heater, and a centrifugal supply fan with a VFD. The make-up air unit shall be interlocked with the kitchen hood through the kitchen hood controls.

An additional exhaust fan will be provided and interlocked with the dishwasher.

General Exhaust Systems

A combination of inline and roof mounted down-blast exhaust fans will be provided to serve restrooms, custodial closets, and mechanical/electrical spaces. Exhaust for restrooms shall be combined, where possible, to a single exhaust fan.

Terminal Heating Units

Any space that is not conditioned by an air handling unit or has a high heating load shall be provided with a terminal heating unit. Such spaces include mechanical spaces, vestibules, and stairwells. All terminal heating units shall utilize hot water coils.

Building Automation System (BAS)

All controls shall utilize Direct Digital Controls (DDC) to monitor and control mechanical equipment shown on the drawings. Monitoring functions shall include status and alarm of different points on the HVAC equipment. Control functions shall include a centralized occupancy schedule and manual overrides. All data shall be graphically represented and accessible via an internet-based interface.

Control sequences for HVAC equipment shall reside in terminal equipment controllers for each application. Space sensors will be wired to the controllers and the data shall be available through the user interface. The system basis of design will be an open-protocol system. Preferred vendors for ATC systems will be coordinated with the District.

Ductwork Criteria

All ductwork shall be constructed, installed, and sealed in accordance with the 2012 edition of "HVAC Duct Construction Standards – Metal and Flexible," published by SMANCA. Ductwork will be fabricated from galvanized steel, stainless steel and/or aluminum as required by the application. All ductwork shall be insulated as outlined in the specifications.

Piping

All piping up to and including 2" in diameter shall be type L copper tubing with solder or mechanically pressed joints. All piping greater than 2" in diameter shall be schedule 40 black steel. Provide automatic air vents on all piping system high points and drain valves on all low points. Provide swing joints at all connections to piping mains. All piping shall be insulated as outlined in the specifications.

Hangers, Supports, And Anchors

All necessary supports and bracing shall be provided as required for the installation of equipment, ductwork, and piping.

Cleaning

All ductwork shall require cleaning at project completion.

Water Treatment

All hydronic piping shall be cleaned, flushed, filled, and treated prior to equipment start-up. Water treatment will be coordinated with District's preferred vendor.

Testing And Balancing (TAB)

TAB shall be performed by a third-party AABC accredited testing, adjusting, and balancing firm licensed in the State of Pennsylvania with a minimum of three (3) years of experience. The firm shall balance the HVAC systems as indicated in the design documents. A commissioning agent may be hired to verify the systems' design intents have been properly applied by the installing contractors. If a Commissioning Agent is hired by the District the TAB work will be part of the Mechanical Contract. If a Commissioning Agent is not hired by the District the TAB firm will be hired directly by the District.

Division 26 - Electrical

Electrical Load Analysis

Electrical Load - The total connected electrical load is estimated to be 6,358 kVA. This load estimate is based on volt-ampere/square foot per IECC for the required unit light load, RS-Means average electrical loads (for Schools) and past experiences with similar facilities. "Electrical Load Tabulation" included herewith provides a detailed breakdown of electrical loads.

ELECTRICAL LOAD TABULATION		
Total Square Footage (approx.)		457,000
Description	Volt-Amperes/Sq. Feet	Total Connected Load(kVA)
Lighting	0.81	370
Receptacles	2.5	1,143
Equipment	2.4	1,097
Miscellaneous	4	1,828
HVAC	4.2	1,920
Total		**6358**

Emergency Distribution - The total emergency electrical load is estimated to be 1,097 kVA with 20% spare capacity for future loads. To provide for this load, two emergency generators are estimated. The "Emergency Load Tabulation" included below provides a detailed breakdown of the electrical loads.

Note that the emergency load tabulation values are estimates to be solidified during the design process based on supplied equipment. Typically, lighting loads are to address egress lighting. The receptacle loads will be limited to those devices feeding the data/security/fire alarm/telecommunications and BAS controls. Miscellaneous loads include possible fire pump, elevator/stage lift systems, as well as any possible sewage ejector systems, if necessary. HVAC loads typically include any kitchen related equipment; telecommunications/elevator machine room split systems, hot water pumps, or any smoke control systems, if required.

EMERGENCY LOAD TABULATION		
New Square Footage		457,000
Total Square Footage		457,000
Description	Volt-Amperes/Sq. Feet	Total Connected Load(kVA)
Lighting	0.25	114.25
Receptacles	0.25	114.25
Equipment	0	0
Miscellaneous	1	457
HVAC	.5	228.5
Subtotal		**914**
Spare @ 20%		182.8
Total		**1,096.8**
Based on estimated emergency load of 1,096.8 kVA or 987.1 kW (1096.8*0.9pf), (2) 500 kW emergency generators are recommended.		

The Preferred fuel choice for the generator set is diesel.

The generator as sized above would be intended to be used as an emergency source and only operate when the normal utility service is unavailable or for limited scheduled testing periods.

Electrical Service

Based upon the estimated electrical load identified above, it is anticipated that the power company (Met Ed) will provide a primary electrical service to the site. The Contractor will provide cable and conduit from a mutually agreed upon utility pole to new exterior, metal clad medium voltage switchgear. From the switchgear, service will be fed to liquid filled transformers around the site, with locations and sizes to be determined during the design process. Eaton shall be the basis of design for the switchgear and transformers.

Secondary Distribution

Low voltage feeders shall extend from the medium voltage transformer located around the site to interior 480V switchboards. These switchboards shall be strategically placed to feed interior panelboards and dry type transformers located in electrical closets which will feed local receptacle circuits. Interior panelboards will preferably be in a stacked configuration with the closet on the other floor(s). The 480V switchboard will also feed local panelboards for lighting and local mechanical equipment.

Any specialty spaces identified during design will receive independent power feeds sized to accommodate the realized load at the time of construction, plus 25% spare capacity. Areas treated as

specialty spaces are as indicated, but not limited to, the below:

- Full-service kitchens and/or cafeterias.
- Gymnasium
- Auditorium
- Natatorium

Any centralized mechanical room space identified during design for HVAC equipment, with a high electrical load density, shall receive independent power feeds sized to accommodate the realized load at the time of construction, plus 25% spare capacity. With the main distribution located in close proximity to the mechanical room, the services to the mechanical equipment may originate in the main electric room.

- HVAC equipment includes, but is not limited to Chillers, Pumps, Air Handling Units, and Exhaust Fans.

Emergency Power System

Based on the total estimated standby electrical load of 1,097 kVA identified above, (2) 500 kW, 480Y/277 Volt, three phase, four wire, 60 Hertz, stand-by generator units will be provided. The generators will be Kohler, Cummins or Generac. The standby systems will serve the following loads:

- ATS#1 – Life Safety
  - Interior and Exterior Egress Lighting.
  - Exit Signage.
  - Fire Alarm System.
- ATS #2 – Optional Standby
  - Select Equipment as indicated by owner during design.
  - Kitchen Walk-In Freezer and Cooler
  - Communication and Telephone System.
  - Security System. (Card Access Controls/Door Locks)
  - Elevator
  - Building Automation System (BAS).
  - Select HVAC equipment (boilers and associated pumps).

Grounding

Power distribution system grounding shall be in accordance with Article 250 of the National Electrical Code. Copper steel ground rods of at least 10 feet long and 3/4 inch in diameter will be driven in a grounding triad near the service entrance.

The following shall be solidly grounded: the conduit system, all equipment with electrical connections and the neutral lead of the secondary service.

A separate grounding conductor shall be furnished and installed for all electrical circuits. All electrical equipment enclosures and conductor enclosures shall be grounded.

All feeder disconnects and breakers rated 1000 amperes and above in a solidly grounded wye system with greater than 150 volts to ground, but not exceeding 600 volts phase to phase shall be provided with ground fault protection.

Lighting

General Lighting

- Lighting Basis of Design (BOD) shall be high efficiency LED.
- Lighting design shall comply with IECC 2018.
- Exit signs in general areas will utilize high efficiency LED.
- All lighting fixtures will be 3500K unless directed otherwise.
- Small aperture LED fixtures such as downlights, track fixtures, or decorative fixtures will be 3500K.
- Site lighting will be LED sources at 3000K. Site lighting will be controlled via digital lighting control panels with programmable time schedules.
- Daylight sensing will be decided on a case-by-case basis.
- Lighting throughout will be controlled through relay-based lighting controls with manufacturers to be coordinated with the district.
- A small percentage of fixtures in areas such as vestibules, stairwells and corridors will be on 24 hrs a day as a security measure.
- All lighting controlled by occupancy sensors shall be configured to “vacancy mode”

Classrooms

- High efficiency LED light fixtures will be used throughout.
- Fixture locations will be coordinated with AV equipment.
- Separation of lighting zones with dimming control will be provided (near projector/smart board) and away.
- Occupancy sensors will be used to meet energy code requirements.

LGI

- High efficiency LED light fixtures will be used throughout.
- Separation of lighting zones will be provided.
- Provide dimming control for zones at an agreed upon location.
- Lights will be controlled via Timeclock and Contactor/System Panel or with Occupancy sensors to meet energy requirements.
- Emergency lighting will be integrated with the standard lighting using the same fixtures, but circuiting them to a Life Safety branch circuit. All emergency lighting will be controlled by a code compliant emergency bypass relay. This lighting will be controlled along with the nearby “normal” distribution lights.

Corridors

- High efficiency LED light fixtures will be used throughout.
- Lights will be controlled via relay-based lighting controls or with Occupancy sensors to meet energy requirements.
- Emergency lighting will be integrated with the standard lighting using the same fixtures, but circuiting them to a Life Safety branch circuit. All emergency lighting will be controlled by a code compliant emergency bypass relay. This lighting will be controlled along with the nearby “normal” distribution lights.
- Select fixtures will be on 24/7 as a security measure. Locations/quantities of 24/7 fixtures will be coordinated with the district during design.

- Local override switches for corridor lighting shall be located behind closed doors, with specific locations to be coordinated with the district during design.

Lobby Spaces

- Lobby spaces may have specialty lighting including decorative fixtures, track or accent fixtures, or architecturally integrated fixtures to highlight the architecture. All lights will be LED.
- Lighting controls will be the same as corridor spaces.
- Emergency lighting will be integrated with the standard lighting using the same fixtures, but circuiting them to a Life Safety branch circuit. All emergency lighting will be controlled by a code compliant emergency bypass relay. This lighting will be controlled along with the nearby "normal" distribution lights.

Public Restrooms

- High efficiency LED light fixtures will be used throughout.
- Ultrasonic occupancy sensors will be used to control lights automatically.
- Emergency lighting will be integrated with the standard lighting using the same fixtures, but circuiting them to a Life Safety branch circuit. All emergency lighting will be controlled by a code compliant emergency bypass relay. This lighting will be controlled along with the nearby "normal" distribution lights.

Library

- High efficiency LED light fixtures will be used throughout.
- Separation of lighting zones will be provided.
- Provide dimming control for zones at an agreed upon location.
- Lights will be controlled via relay-based controls or with Occupancy sensors to meet energy requirements.
- Emergency lighting will be integrated with the standard lighting using the same fixtures and control as the "normal" fixtures however; the emergency lighting will also be controlled by a code compliant emergency bypass relay. This lighting will be controlled along with the nearby "normal" distribution lights.

Auditorium

- High efficiency LED light fixtures will be used for "house" lighting with specialty stage lighting to be coordinated with the district during design.
- Separation of lighting zones will be provided.
- Lights shall utilize DMX controls such that house lighting and specialty lighting can be controlled from a common lighting control panel.
- Emergency lighting will be integrated with the standard lighting using the same fixtures and control as the "normal" fixtures however; the emergency lighting will also be controlled by a code compliant emergency bypass relay. This lighting will be controlled along with the nearby "normal" distribution lights.

Gymnasium

- Durable, well protected LED fixtures will be used for high ambient light levels in Gym.
- Provide dimming control for zones at an agreed upon location.

- Lights will be controlled via relay-based controls and Occupancy sensors to meet energy requirements.
- Emergency lighting will be integrated with the standard lighting using the same fixtures and control as the "normal" fixtures however; the emergency lighting will also be controlled by a code compliant emergency by pass relay. This lighting will be controlled along with the nearby "normal" distribution lights.

Cafeteria

- The Cafeteria may have specialty lighting including decorative fixtures, track or accent fixtures, or architecturally integrated fixtures to highlight the architecture. All lights will be LED.
- Provide dimming control for zones at an agreed upon location.
- Lights will be controlled via relay-based controls and Occupancy sensors to meet energy requirements.
- Emergency lighting will be integrated with the standard lighting using the same fixtures and control as the "normal" fixtures however; the emergency lighting will also be controlled by a code compliant emergency by pass relay. This lighting will be controlled along with the nearby "normal" distribution lights.

Administrative Office Areas

- High efficiency LED light fixtures will be used throughout.
- Lighting throughout the open areas will be controlled via relay-based controls and Occupancy sensors to meet energy requirements. The individual offices will be controlled via occupancy sensors. Dimming will also be incorporated into the office controls.
- Emergency lighting will be integrated with the standard lighting using the same fixtures and control as the "normal" fixtures however; the emergency lighting will also be controlled by a code compliant emergency by pass relay. This lighting will be controlled along with the nearby "normal" distribution lights.

Utility Spaces

- Industrial style LED light fixtures will be used throughout using linear industrial style lights.
- Basic switching will be used at entry points with occupancy sensors.
- Select lighting in mechanical, electrical, telecommunications and similar rooms will be connected to emergency power. Emergency lighting will be integrated with the standard lighting using the same fixtures and control as the "normal" fixtures however; the emergency lighting will also be controlled by a code compliant emergency by pass relay. This lighting will be controlled along with the nearby "normal" distribution lights.

Storage Rooms

- High efficiency LED light fixtures will be used throughout.
- Occupancy sensors will be used for control. Fixtures with integral occupancy sensors will be used in small closets with wall mounted occupancy sensors in larger storage rooms.

Stairwells

- Decorative stairs will be addressed on a case by case basis
- Utility and fire rated stairs will utilize linear wall mounted fixtures with integrated occupancy sensors that communicate among fixtures using an RF technology.
- High efficiency LED light fixtures will be used throughout.

- Utility and fire rated stairs will be on emergency circuits for egress lighting.
- Select fixtures will be on 24/7 as a security measure. Locations/quantities of 24/7 fixtures will be coordinated with the district during design.

Kitchen

- Recessed gasketed lensed 2x4 troffers.
- High efficiency LED light fixtures will be used throughout.
- Lighting will be controlled via Timeclock and Contactor/System Panel or with Occupancy sensors to meet energy requirements.
- Emergency lighting will be integrated with the standard lighting using the same fixtures and control as the "normal" fixtures however; the emergency lighting will also be controlled by a code compliant emergency by pass relay. This lighting will be controlled along with the nearby "normal" distribution lights.

Exterior

- Provide LED fixtures connected to a Hubbell timeclock relay panel. If preferred by the District, the panel should allow for this programmed control over the Building Management System. Canopy and wall mounted fixtures at egress points shall be wired with emergency power.
- Emergency lighting will be integrated with the standard lighting using the same fixtures and control as the "normal" fixtures however; the emergency lighting will also be controlled by a code compliant emergency by pass relay. This lighting will be controlled along with the nearby "normal" distribution lights.
- All roadway, parking lot, and sidewalk lighting will comply with dark sky friendly practices and local ordinances for decorative style fixtures.
- Flagpoles will be illuminated.

<u>Fire Alarm Systems</u>

Provide a complete addressable voice fire alarm system throughout the building. The basis of design will be coordinated with the District.

Audible/ADA visible notification will be provided throughout the building utilizing listed wall mounted speaker strobes to the greatest extent possible.

Provide code required smoke detection at the elevator, in mechanical ducts where CFM dictates the requirement, at code required smoke dampers, door holders and above the fire alarm panels.

Provide manual pull stations at each required exit.

Provide an annunciator panel in the main entrance vestibule and at the loading dock per the district's preference with additional locations to be coordinated with the local fire marshal.

Provide knox-boxes interconnected to the fire alarm system as required per the local municipality.

The fire alarm system will be interconnected to the elevators, door holders, air handling units, smoke dampers and sprinkler system flow and tamper switches.

The system shall be provided with a UL listed dialer capable of reporting to the Owner selected central station.

Telecommunications

Provide all labor, materials, equipment, services, and perform all required procedures to allow for complete and successful operating technology systems serving the new High School. All systems will be designed in accordance with the School District IT standards.

Telecommunication systems will consist of the following elements:

- Infrastructure – The school shall have (1) main distribution facility (MDF) that shall contain the central infrastructure for building technology systems. In addition, the school shall have intermediate distribution facilities (IDF) in quantities and locations as required to serve all horizontal cabling throughout the building.
- Telecom/Cable Utilities – Telecommunications/Cable utility services (copper, public fiber, district fiber) shall be coordinated and brought into the MDF or a separate entrance facility (EF).
- Structured Cabling – The school shall have a TIA 568-C and BICSI compliant structured cabling system. There shall be a dedicated telecom grounding system for technology systems in accordance with BICSI and NEC standards. Voice backbone shall consist of Cat. 6A. Provide fiber and 25 pair power sum cables from each IDF to the MDF. Provide single mode 6-strand fiber. Provide j-hooks to support data cabling throughout the building in place of cable tray.
- Data Network (LAN) – The school shall have an active data network to support computer, building, WLAN, Video, VOIP, and all other IP devices.
- Wireless Network (WLAN) – The school shall have a wireless local area network (WLAN) and have complete coverage in the entire school space.
- Master Clock - The school shall have a master clock system with web interface management. Analog clocks shall be provided in each Classroom, Gym, Cafeteria, LGI, SGI, Library and Administrative Areas as requested. Clocks shall have 120V power and wireless correction.
- Voice System - The school shall have a Voice over IP system (VOIP). The VOIP system shall deliver toll quality voice service over the LAN. The VOIP system shall have centrally managed VM and other application servers that are centralized, including call managers, etc. VoIP system option shall be a mass-notification module for notifications and emergency dial out calls to parents. Local POTs lines will still have to be brought in for back-up lines, modems, fax, and fire alarm.
- Sound Reinforcement Systems (SRS) - The cafeteria, auditorium and gym shall have sound reinforcements systems. Speakers and amplifiers should be selected for appropriate coverage of both spaces. The system should amplify voice through wired and wireless microphones. SRS shall be tied into the PA system for override announcements in case of emergencies or other notifications.
- Public Address System (PA) – The school shall have a PA headend with IP web interface management The PA shall be zoned for each classroom or space and have dial accessibility (from the VoIP system). Speakers shall be ceiling mounted with talkback capability. Exterior speakers shall be provided for exterior building mounted applications to cover bus loops, playgrounds and associated spaces and shall be run separately from the head-end. Bell system shall be applied through the PA System. System shall be per the school district standard.
- Classroom AV – This system will include:

- AV System will consist of laser projectors with network connections and HDMI inputs for each projector.
- (2) AV speakers per classroom with local volume controls

- Gymnasium/Cafeteria/Library AV – This system will include:
  - AV System will consist of laser projectors with network connections and HDMI inputs for each projector.
  - Motorized Projection Screen.
  - Sound Reinforcement System with local volume controls.

Security

Provide all labor, materials, equipment, services and perform all required procedures to allow for a complete and operating security system serving the new High School.

Security system will consist of the following elements:

- Visitor Access –There shall be only one entrance available to the general public, including parents, located at the general office area. The visitor entrance shall be electronically controlled and secured at all times. Entry shall be via an audio/video intercom station reporting to the general office, allowing visitors to be "buzzed" in remotely via local Aiphone intercom stations.
- Access Control System – The access control system shall consist of card readers, controllers, panels, software, credentials, connections to electronic door hardware devices and power supplies. Card readers shall be installed at the locations specified by the school district. System will comply with school district standards and will be on the Normal/Emergency power system. All panels will be supported with backup batteries to cover the normal-emergency power transition period. As part of the contract, 2000 HID 37 bit cards with EASD facilities codes will be provided.
- CCTV Surveillance and Digital Recording – The system shall consist of cameras, supports, network video recorder, software and video monitor (as required) for a fully functioning system. Cameras shall be installed at the locations specified by the school district. System will comply with school district standards and will be on the Normal/Emergency power system. Camera locations shall receive dedicated cat 6A data drops routed back to local network closets to a patch panel that is separate from the building network.
- Intrusion Detection – The school shall be provided with an intrusion detection system integrated with the building access control system. Motion detections will be provided throughout the building.

Other System Elements

The following elements will be considered during Design Development and incorporated into the design in accordance with school district policy and direction.

- Survey for Emergency Responder's Radio Coverage System

Division 31 - Earthwork

Division 32 – Exterior Improvements

Division 33 – Utilites