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## **SECTION SEVEN**

## **SCHEMATIC DESIGN DOCUMENTATION**

The major building construction systems have been defined in the Progress Project Description. Key elements of the Project Description include:

### **CONSTRUCTION DELIVERY METHOD**

The decision for selecting the project procurement method (Design / Bid / Build or CM at Risk) has not yet been made by the committee. However, the Town of Grafton School Building Committee has voted to begin the application process with the attorney general's office to pursue a Construction Manager at Risk option

### **BUILDING MATERIALS**

The design incorporates cost efficient, low maintenance, and durable materials throughout. The building interior and exterior materials are consistent with the High School program.

### **BUILDING SYSTEMS**

The major building systems will be specified for maximum efficiency, long service life, and ease of maintenance. The systems will provide appropriate airflow and temperature control, and lighting and power in support of technology, and will have reduced energy and water consumption. The building will include a combination of full and partial air conditioning less the Gymnasium, locker rooms and kitchen. All systems will be specified to maximize life cycle value and to minimize long-term operating costs.

## 7.1 BUILDING SYSTEMS DESCRIPTION

This project places a new building in the middle of the Town's municipal property at 28 Providence Road. It will take the form of a site specific design high school building that would meet the educational program needs and maximize the use of the site for athletic fields, parking, and vehicular circulation. This option puts the majority of the parking in front of the school with the ball fields behind the school.



Figure 7.A: Schematic Design Site Plan

The image above depicts the placement of the new High School building on the Providence Road site, and shows the relationship to the existing High School building which will, separately, be converted to the Upper Middle School. The placement of the new High School building, along with the other community buildings, forms a quad with parking that serves the two school buildings.

This design also removes the vehicular relationship between the schools and the Municipal Building. The Municipal Building is proposed to have both access and egress only from Brigham Hill Road. This will reduce unrelated traffic on the high school site and will improve safety on the school site. A traffic study conducted during the Schematic Design phase confirms and reinforces this approach.

### Architectural Floor Plans

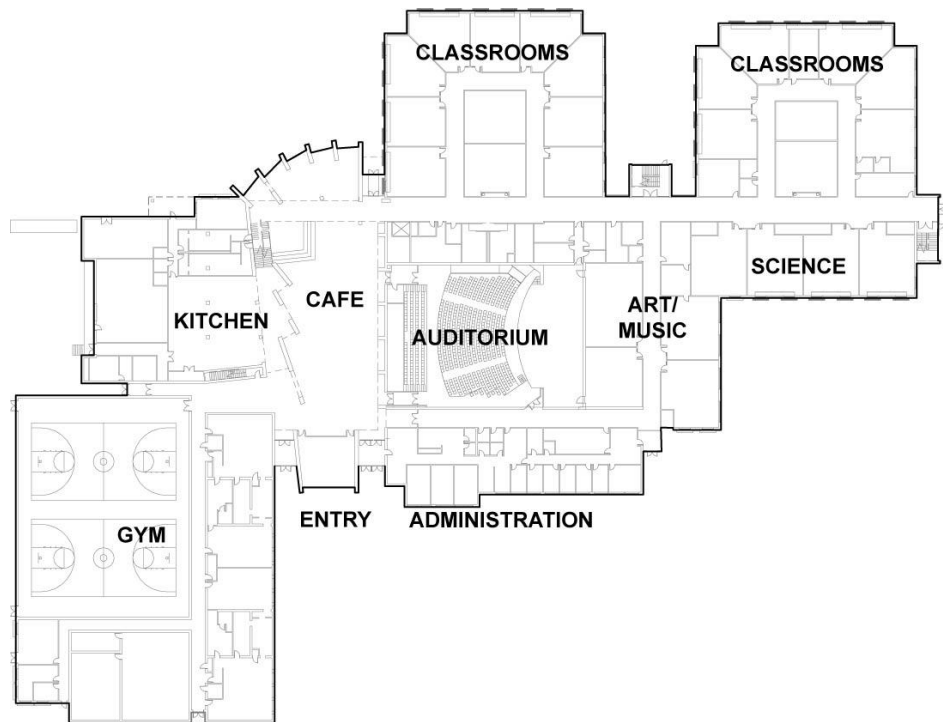


Figure 7.B: Proposed First Floor Plan

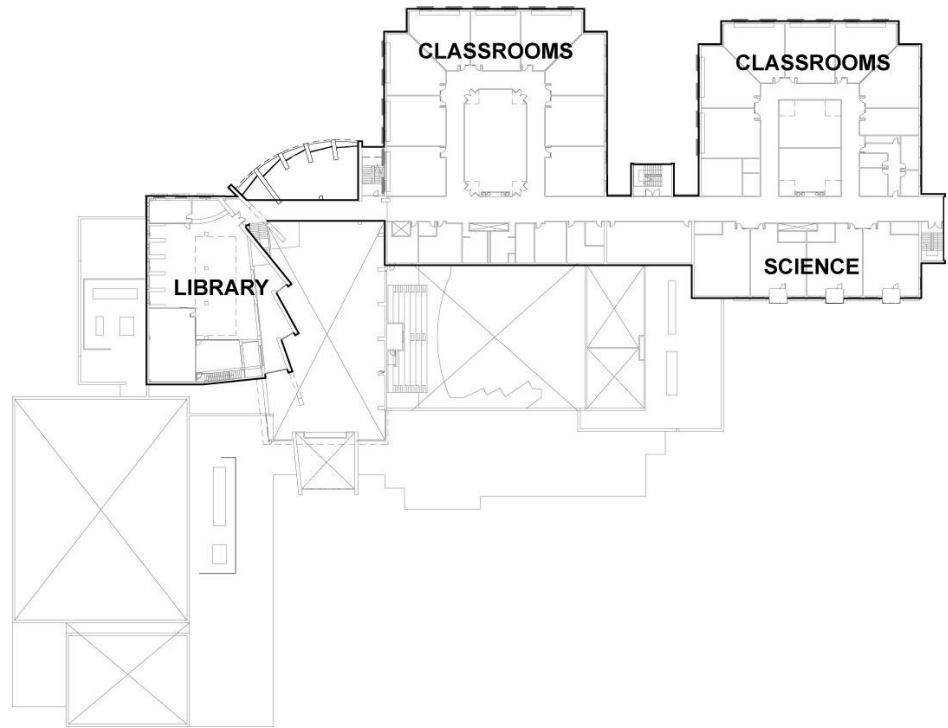


Figure 7.C: Proposed Second Floor Plan

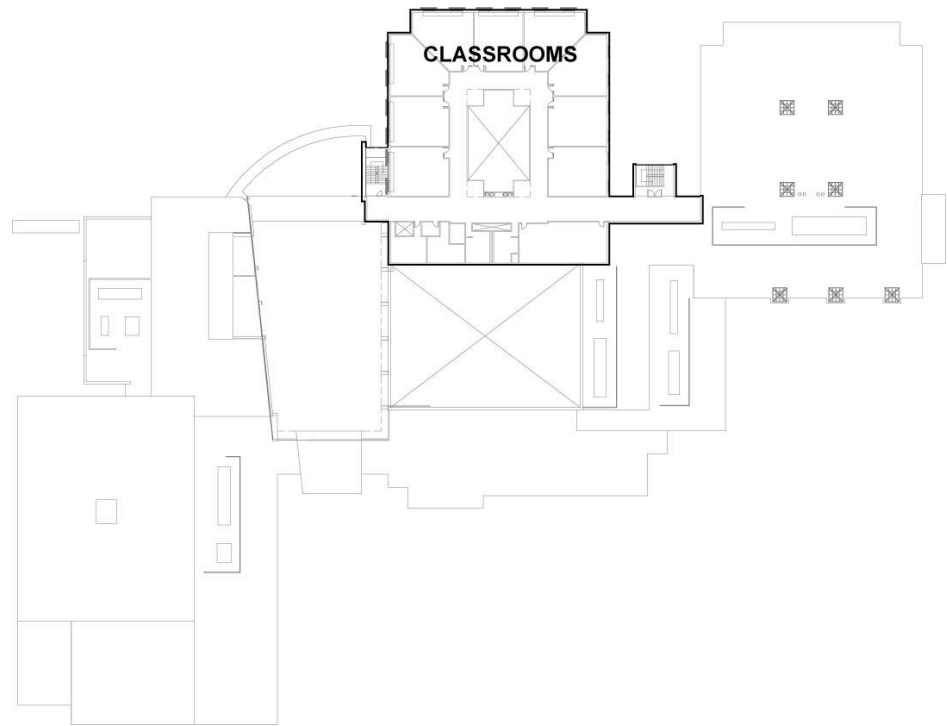


Figure 7.D: Proposed Third Floor Plan

## SITE SYSTEMS

The siting of the new High School allows for continued use of the existing Grafton High School throughout construction. This also maximizes site circulation and parking once construction is complete and the existing high school is converted for use as an Upper Middle School.

Grafton High School has substantial activity in the morning and afternoon peak times for parent drop-off and pick-up. The design of on-site drives accommodates necessary queuing distance. A 350-space parking lot is located at the center of the circulation drive, which conveniently provides access to both schools during the school day and to the general community during non-school activities. A 50-space teachers' lot is located between the schools, adjacent to the Upper Middle School loading zone.

The ball fields and courts are arrayed around the western side of the schools, using the school and municipal buildings as a buffer from the town roads and vehicular circulation. Both softball and baseball outfields are overlapped with soccer/lacrosse fields to maximize the use of the existing field space. The six lane track will be wide enough to accommodate a field that can be used for football, soccer, or lacrosse. A basketball court is located north of the High School near the teachers' parking lot. The tennis courts are located to the southeast of the High School, near the old police station. To maximize the flat space for these fields the hill occupied by the municipal buildings is cut back, which includes new access walkways and isolated retaining walls where necessary.

### Pavement and Circulation

Parking, driveways, and the emergency access around the High School will be constructed with bituminous concrete. Parking islands and driveways will be edged with vertical and sloped granite curbing. Traffic and direction signage will be installed.

Pedestrian sidewalks will be 6" cement concrete and unit pavers in the plaza area in front of the high school. Curb ramps at driveway crossings, pick-up/drop-off areas, and handicap parking spaces will be cement concrete and MAAB/ADA compliant, with tactile warning surfaces. A MAAB/ADA accessible cement concrete ramp with railings will connect the school, tennis courts, and municipal complex.

### Fields and Courts

All fields will provide a graded grass surface appropriate for athletics. Baseball and softball fields will also include skinned infields, pitching rubbers, bases, backstops, and players' benches. The baseball field will also include dugouts, scoreboard, and bleachers.

The six lane, 400-meter track will include a synthetic surface drained to the inside perimeter. The track & field facilities will include long/triple jump, shot put, and discus throwing rings. The interior of the track will be a grass turf field striped for football, soccer and lacrosse (a synthetic turf field is considered as an alternate). The track & field will include scoreboard and bleachers, and will be surrounded by a 4' black vinyl chainlink fence. Existing field lighting will be reinstalled for the new track & field layout.

The basketball and tennis courts will be bituminous concrete with an acrylic surface and include appropriate goals, posts, markings, and nets. The courts will be surrounded by a 10' black vinyl chainlink fence.

The existing maintenance building will be cleaned, repainted and reroofed for the storage of athletics and field equipment. An irrigation system will be installed to support the natural turf fields.

### **Site Improvements and Landscaping**

Site lighting will be installed in the parking lot, around the High School and other significant pedestrian routes. A 40' flagpole will be installed at the main entrance to the High School. Trash receptacles, benches, and water fountains will be strategically located around the school and field areas. Bike racks will be installed convenient to the main entrance.

Trees, shrubs, groundcover, perennials, and lawns will be grown to compliment the site and public areas

### **Storm Drainage**

The drainage system will follow the 2008 Massachusetts DEP Stormwater Handbook. Parking lot drainage will be collected with catchbasins and piping. Storm water runoff from all parking areas will be treated through stormwater treatment structures. Sub-surface infiltration systems will be used to store storm water runoff, reducing the impact on the Town's storm sewer system. Bio-swailes and bio-retention systems are under consideration as an alternative to the proposed water quality and infiltration systems. Stormwater runoff from the building roof will be captured and recharged directly to the ground via sub-surface infiltration systems.

### **Public and Private Utilities**

The High School will be serviced by municipal water and sewer. The site will include a water line loop through the site that will supply water for site hydrants and building fire suppression system. The domestic water will be serviced by this water loop.

Private natural gas, electricity and communications utilities are available at the site. Each of these utilities will be extended onto the site to serve the High School.

## **STRUCTURAL SYSTEMS**

### **Foundations**

Building columns of the proposed structure will bear on reinforced concrete spread footings. Perimeter foundation walls will be 16" thick, reinforced cast-in-place concrete walls on 24" wide continuous reinforced concrete strip footings around the perimeter of the building, extending a minimum of 4'-0" below finished grade.

The preliminary geotechnical investigation conducted during Schematic Design indicates that after the replacement of some unsuitable soil material, the building can be supported on shallow spread footings with an allowable bearing capacity of 4000 psf.

### **Ground Level Floor Construction**

The ground level of the proposed building will be a concrete slab on grade, varying between 4 ½" and 6" thick, reinforced with welded wire fabric over a vapor barrier, on 2" thick rigid insulation, on a compacted granular base course.

The preliminary geotechnical investigation conducted during Schematic Design indicates that after the replacement of some unsuitable soil material, a slab-on-grade may be used for the ground floor framing.

### **Typical Supported Floor Construction**

Typical supported floor construction will be a 3 ¼" lightweight concrete slab on composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and steel tube or wide flange columns. The roof of classroom Pod 2 will also be framed as a floor to enable a future third floor addition.

### **Roof Construction**

Typical roof construction will be 1 ½" deep galvanized roof deck, spanning between open web steel bar joists, which in turn would be supported by steel wide flange girders and steel tube or wide flange columns. At large open areas, the roof deck will be galvanized acoustic roof deck of various profiles spanning between long-span bar joists at the gymnasium; steel beams spanning between deep steel trusses that clear-span the auditorium space; and deep steel trusses that clear-span the cafeteria/commons area with matching bridging trusses at ¼

points of the cafeteria truss spans. Roofs will typically be sloped to roof drains at 1/4 inch per foot.

### **Lateral Load Resisting System**

The typical lateral load resisting system will be concentric steel braced frames comprised of hollow structural steel sections. At some exposed areas such as the gymnasium, the diagonal members will be either hollow steel tubes or rods.

## **PLUMBING SYSTEMS**

### **Water Supply Piping Systems**

#### Cold Water

The cold water supply system will be extended 10'-0" outside the building and connected to the underground yard main system. The service entrance will be equipped with a water meter that meets the requirements of the local water department. Duplex, parallel, approved type reduced pressure principle backflow preventers will be provided downstream of the meter.

Protected cold water shall be provided to the laboratories. A reduced pressure backflow preventer will be provided to separate the domestic water from the lab water. All classroom sink faucets shall have integral vacuum breakers as a secondary safety measure for backflow.

Non potable water shall be provided for HVAC equipment through reduced pressure principle backflow preventers

Cold water piping will be copper, insulated, distributed throughout the building serving all fixtures and equipment requiring cold water such as kitchen appliances, boilers, and ice machines.

#### Hot Water

Hot water for the kitchen, classroom sinks, and toilet rooms will be provided by two ASME gas-fired condensing water heaters in parallel. Each heater will be sized to provide 66% of the demand. Water will be heated to 140 deg. F. for delivery to the kitchen. A central, bronze, master thermostatic mixing valve will reduce the temperature to 120 deg. F. for delivery to hand wash lavatories, classroom sinks, showers, and kitchenette sinks. Lavatories will have integral temperature limit stops and/or point-of-use mixers to provide 110 deg. F. maximum temperature. A second master mixing valve shall be provided to reduce the temperature to 80 deg. F. for tempered water delivery to the emergency fixtures in the labs.

Protected hot water shall be provided to the laboratories. A reduced pressure backflow preventer will be provided to separate the domestic hot water from the lab water. A protected hot water recirculation system shall be provided to maintain the temperature on the protected hot water loop. A local electric water heater shall be provided for the recirculation system as the heat supply.

All hot water supply systems will be copper, insulated, circulated using bronze circulating pumps controlled by immersion aqua stats.

#### Waste and Vent

Waste and vent piping shall be cast iron and will exit the building and connect by gravity to the site sanitary sewer system 10'-0" outside the building.

A separate kitchen waste system shall be provided to collect the waste from all kitchen sinks and equipment that would discharge grease to the waste system. A point-of-use grease trap will be provided to receive the waste discharge at the triple pot sink. The unit at the triple pot sink will be floor recessed, PDI and ASSE approved, supplied with a flush floor access plate, and equipped with automatic draw-off hose. Kitchen waste will be piped separately and run by gravity outside the building to connect to the exterior grease trap. Kitchen waste and vent piping will be cast iron.

#### Lab Neutralization System

Waste and vent piping serving the lab fixtures shall be polypropylene (piping shall be PVDF in all ceiling plenums) and all the waste from the labs shall be treated to bring the pH level of the influent to between 6 and 9 before it is discharged to the site sewer system. The neutralization system shall be continuous flow type with two treatment tanks, mixers, acid and alkali tanks, related metering pumps, and the monitoring system. The effluent will exit the building and connect by gravity to the site sanitary sewer system 10'-0" outside the building.

#### Roof Drainage System

Roof drains will be cast iron construction, heavy duty, with flashing clamp for membrane roofing, under deck clamping device, and aluminum domes. Storm drain piping shall be cast iron and extend 10'-0" outside the building and connect to the site storm drainage system. Insulation will be applied to storm water piping and roof drain bodies to prevent condensation.

#### Compressed Air System

Compressed air may be required for the wood shop and similar machine shops that would have pneumatically operated equipment or tools. The system shall

compose of a reciprocating type compressor, refrigerated dryer, filters, and pressure regulating valves.

#### Fixtures

Water Closets shall be institutional grade, white vitreous china, wall hung, elongated bowl, low flow (1.28gpf) type, with exposed, electronic operated, flush valve, and open front white plastic seat and self-sustaining check hinge. Urinals shall be institutional grade, white vitreous china, wall hung, low flow urinals (water free urinals may be used as an alternate). Showers shall be low flow type with integral mixing valves. Emergency shower and eyewash stations shall be provided at the science labs, woodshop, nurse station, and mechanical equipment rooms with chemical treatment. Dual flush toilets at staff toilets shall be provided.

Multi-sink units shall be molded synthetic stone, multi-user units with electronic mixing and metering faucets and located in the central toilet rooms for student use. Single sink units shall be institutional grade, white vitreous china, and wall-hung type, with front overflow. Fixtures are to be provided with sensor operated chrome plated mixing and metering faucets, open grid drains, supplied with stops, and "P" traps.

Wall hydrants (freeze proof) shall be provided on the building perimeter. Hose bibs shall be provided for the mechanical rooms and toilet rooms.

### **Natural Gas System**

Natural gas will be brought to the building by the gas company, and include a meter and primary pressure regulator as needed on the exterior of the building. From the outlet of the meter/regulator set, natural gas piping will be extended throughout the building and serve all equipment requiring gas service. Gas pressure within the building will be low pressure, under 1/2 psig. The primary gas utilization equipment will be boilers, make-up air units, rooftop HVAC equipment, kitchen cooking appliances, and central domestic water heaters.

Natural gas shall also be extended to the science labs. The connections to each lab shall be controlled via a master shutoff valve located at the entry to the lab.

## **FIRE PROTECTION SYSTEMS**

### **Fire Sprinkler System**

The proposed High School building is to be protected throughout with a combination standpipe/sprinkler system. The system shall be hydraulically calculated in accordance with NFPA requirements. Sprinkler mains shall be equipped with control valves, inspector test stations and flow switches. Sprinkler spacing shall comply with NFPA-13 requirements.

Sprinklers for areas with ceilings will be recessed type, chrome plated. Mechanical rooms and other unfinished areas are to be provided with brass finish, exposed sprinklers, protected by sprinkler guards. Sprinklers for areas subject to freezing shall be dry type.

Areas of the building that will not be provided with wet-pipe type sprinkler protection are: the main electrical room, elevator machine room, and emergency electrical closets, which will be 2-hour rated construction.

### Standpipes

The building will be protected throughout with a combination standpipe / sprinkler system. The fire main shall enter the water service room located on the perimeter of the building. An approved type double check valve assembly will be provided on the fire service.

The standpipes shall be located in the stairwells, and be equipped with Class 1 (2-½ inch) Fire Department valves. The standpipes shall be interconnected by the fire main on the lowest level. Fire Department connections shall be provided at the building's main entrance and the water service room entrance. Fire Department connections shall be located within 100 feet of a fire hydrant.

## **HVAC SYSTEMS**

The concept for the HVAC system described below incorporates system types that will meet or exceed current energy code requirements. Energy modeling was used during the Schematic Design phase to consider selected design alternatives that would offer cost effective opportunities to optimize the overall energy efficiency of the school.

The heating system will be fed by hot water boilers located in the mechanical room. The plant will be configured with gas-fired condensing boilers sized to serve the entire heating load. The hot water system will be designed to return water at a maximum of 130°F all year to maintain the higher condensing efficiencies of the boilers. Each boiler will have a dedicated constant-volume primary pump to serve a primary loop. The secondary loop will include three (3) pumps (two as primary and one standby) with VFD control to serve the variable volume building load, which will use two-way modulating valves for temperature control for each terminal unit. The terminal units and miscellaneous heating elements (cabinet unit heaters, radiant panels, fin-tube radiation, etc...) will be sized to support the heating loads with a design temperature drop of 60°F. A modulating differential bypass control valve will be installed to ensure minimum flow is maintained to the boilers at low-load conditions. The hot water system will be 30% propylene glycol for freeze protection.

Heating distribution will be primarily through the use of radiant ceiling panels in most occupied spaces, such as the classrooms, the media rooms, the locker rooms and the administration areas. Corridors and vestibules will be heated with hot water cabinet unit heaters, and the back-of-house utility spaces will be heated with hot water unit heaters. The dining area will be heated with decorative fin-tube radiation.

The building cooling will be provided by a split air-cooled chiller located in the mechanical room, with the condenser section located on the roof of the maintenance area. The chiller water system will be designed with a supply water temperature of 44° F and a return water temperature of 56° F. The chilled water loop will include three (3) pumps (two as primary and one standby) with VFD control to serve the variable volume building load, which will use two-way modulating valves for temperature control for each air handling unit.

The library (or media room) and the auditorium will be air conditioned. Cooling will be provided through rooftop air handling units (AHU). These areas will incorporate a displacement ventilation strategy to optimize ventilation effectiveness and provide efficient cooling. Each unit will incorporate energy recovery wheels to minimize energy consumption. Units shall be provided with controls that will directly interface with the central building DDC control system. There shall be no chlorofluorocarbon (CFC) refrigerants specified. MERV 13 air filtration will be provided and will be typical for all air handling systems.

The administration area will be air conditioned. Cooling will be provided through rooftop air handling units (AHU). Units shall be provided with controls that will directly interface with the central building DDC control system. There shall be no chlorofluorocarbon (CFC) refrigerants specified. MERV 13 air filtration will be provided and will be typical for all air handling systems. Distribution will be through modulating variable air volume boxes and modulating fan-powered terminals with hot water coils. Radiant heating panels will be provided at the perimeter ceiling to provide space heating.

The classroom spaces will be not fully cooled, but tempered (the ventilation air for the space will be cooled, but no additional cooling will be included for building envelope loss). The classrooms will be fully heated and ventilated. Heating, cooling and ventilation will be achieved via AHUs, each one containing a sensible heat recovery wheel, a hot water heating coil, a chilled water cooling coil, a variable volume supply fan, a MERV 13 filter and a MERV 8 pre-filter. The exhaust sections will ventilate the classrooms to maintain a minimum of 6 air changes per hour. Distribution will be through two-position variable air volume boxes and modulating fan-powered terminals with hot water coils for occupied/unoccupied control. Radiant heating panels will be provided at the perimeter ceiling to provide space heating.

Each Tel/Data (IDF) room will be cooled by a dedicated split system air conditioning unit (approximate capacity = 1 ton). The condensing units will be located on the roof and supplied with a low ambient kit for year round operation (to 0 deg. F. outdoor air temperature).

The gymnasium system will be served by a rooftop heating and ventilating air handling unit capable of providing 100% outside air through economizer cycle. A special event control switch will be provided to modulate the amount of scheduled outdoor air to accommodate the occupancy level; the event switch is to be key operated. Heat recovery will be included in the unit. The unit will be configured as a constant volume, draw through type with mixing plenum, filters (minimum of MERV 13), hot water heating coil, supply fan, and exhaust fan with economizer cycle.

The locker rooms and bathroom area will be served by a rooftop heating and ventilating air handling unit capable of providing 100% outside air through economizer cycle. Heat recovery will be included in the unit. The unit will be configured as a constant volume, draw through type with mixing plenum, filters (minimum of MERV 13), hot water heating coil, supply fan, and exhaust fan with economizer cycle.

The second floor storage area will be served by a rooftop heating and ventilating air handling unit capable of providing 100% outside air through economizer cycle. The unit will be configured as a constant volume, draw through type with mixing plenum, filters (minimum of MERV 13), hot water heating coil, supply fan, and exhaust fan with economizer cycle.

A rooftop makeup air handling unit will provide heating and ventilation for the kitchen. The unit will be configured with outside intake louvers, outside air control damper, filters (minimum of MERV 13), a centrifugal supply fan, and a gas direct-fired furnace. The ventilation will be relieved through via roof mounted kitchen hood exhaust fan and other kitchen equipment. The system will be balanced to make the kitchen 5% negative relative to adjacent spaces for odor control. The hood exhaust/kitchen supply system may incorporate a variable volume control strategy.

The facility will be provided with a microprocessor-based, direct digital control (DDC), building management system (BMS). The BMS will consist of equipment and building level controllers that communicate via a local area network (LAN) to an operator workstation. Each controller will be capable of full, stand-alone operation and have integral permanent memory to maintain control and set points in case of network or power failure.

## ELECTRICAL SYSTEMS

### Reference Standards

- Massachusetts Electrical Code, 527 CMR, 2008 Edition
- Life Safety Code NFPA 101
- National Fire Alarm Code, NFPA-72 2007
- Massachusetts Building Code, 780 CMR Seventh Edition
- Electrical systems will be designed in compliance with the guidelines for “high performance” schools established by the Massachusetts Collaborative for High Performing Schools (MA-CHPS).

### Electrical Service and Distribution

National Grid 13.8 kV primary power feeder for new and existing Grafton School services will originate at the existing utility line at Providence Road and will extend underground to the location of the new pad-mounted transformer. Same primary service will be extended to the existing pad mounted transformer currently serving future middle school. The primary service routing and location of the manholes will be coordinated with National Grid.

The new pad-mounted transformer will be furnished, installed and maintained by National Grid. The transformer voltage – 13.8 kV 3-phase primary, 277/480 volt 3-phase secondary, and it will be sized by National Grid based on the load data that will be provided by SMMA.

The transformer primary conduit installation, manhole construction, the secondary conduit installation, the transformer pad construction, and the secondary feeder installation shall be the responsibility of the Electrical Contractor.

The transformer will be located adjacent to the building in close proximity to the building main electric room. The recommended distance from the transformer to the building is at least 10 feet.

One electrical energy meter will be provided by National Grid for the entire building.

### Estimated Electrical Loads

Electrical service and building power distribution systems will be designed to provide sufficient power for the school building of approximately 180,000sq.ft.

The building loads include exterior and interior lighting, sport court lighting, irrigation pumps, building heating, ventilation, air conditioning and plumbing systems, computers and receptacles in the classrooms/labs/library/offices, miscellaneous power and receptacles in the shops, gymnasium, auditorium, kitchen, and building equipment such as the elevators. It is assumed that air conditioning will be provided for the library, auditorium and administration areas.

• Site Lighting	20 kVA
• Field Lighting	20 kVA
• Irrigation pumps	5 kVA
• Chiller plant with pumps	500 kVA
• Boiler plant with pumps	35 kVA
• Ventilation, split units, heat pumps, exhaust	250 kVA
• Interior Lighting	185 kVA
• Computer and Small Power	370 kVA
• Convenience Power	70 kVA
• Kitchen (full service)	80 kVA
• Elevator	70 kVA
• Auditorium theatrical lighting	70 kVA
• Total Building Load	1,675 kVA

The connected load is 1,595 Amps at 277/480 volt, 3- phase, 4-wire system.

### Secondary Service Power Distribution

The transformer secondary feeder will be terminated at the building's main electrical switchboard. The switchboard will be dead front, front assessable, NEMA 1 indoor type assembly rated at 277/480 volt 3-phase, 4-wire, 2,500 amp rating (estimated; final size to be determined during subsequent design phase), and will include a main protective device, distribution sections with the feeder circuit breakers, service entrance rated TVSS device, and a customer digital metering unit to monitor voltage, current, power factor, and demand kW. Decision on the fire pump service section necessity will be addressed during the design phase and will depend on the street service flow test results.

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The main protective device will be an insulated case circuit breaker, 100% rated, with phase protection and solid state trip unit capable of adjusting long time, short time, and ground fault protection characteristics. Feeder devices in the distribution section will be group mounted molded case type circuit breakers.

A sub-metering system will be installed to allow recording and analyzing electrical energy kWh consumption separate for the building lighting, HVAC and kitchen loads. Sub-metering system will use the current transformers (CTs) that allow an interface with a building management system (BMS) via a data twisted pair line. Quantity of the required power metering points will be reviewed and defined during subsequent design phase.

Electrical power distribution equipment will be located in the electrical closets. It is estimated that three (3) electrical closets will be required on the ground floor, and two (2) closets on each floor above. Electrical panels in each electrical room or closet will support lighting, power, and HVAC loads in the associated areas.

A typical closet will house a 225 Amp 277/480 volt power panel as a power source for HVAC circuits, 100 Amp 277/480 volt lighting panel, dry-type transformer sized from 45 to 75kVA and two 150 to 250 Amp, 120/208 volt, 3-phase panelboards. Dry-type transformers will reduce 480 volt interior distribution voltage to 208Y/120 volts for receptacles and miscellaneous power loads. Transformers will be energy efficient and low noise type.

Major HVAC equipment such as the air handling units, make-up units, energy recovery units, and exhaust fans will be power-fed from the dedicated panels located in the upper floor electrical closets.

The power panel in the mechanical room will be a power source for boiler plant equipment.

Dedicated dry-type 75 kVA transformers and 225 Amp, 120/208 volt panels will be provided for the Kitchen/ Cafeteria and for the Auditorium. These transformers will be power-fed directly from the main electrical switchboard.

The building elevators will be power-fed directly from the main electrical switchboard.

Electrical panels will be dead-front type, equipped with the thermal-magnetic bolt-on type molded case circuit breakers. Panels' phase and neutral buses will be aluminum, and an equipment ground bus will be copper. The panels will be fully rated; AIC rating will be coordinated with the available fault current value provided by the utility company at the service demarcation point for this project. Where required for computer and electronic equipment protection, the panels will be provided with TVSS devices. All panels will be Underwriters Laboratories (UL) listed and labeled, and comply with NEMA standard PB1.

Electrical branch wiring will consist of insulated copper conductors in the steel conduits, electrical metallic tubing (EMT), or metal clad (MC) cables as required for the installation condition. Conductors will be copper with type XHHW or THHN/THWN, 600 volt insulation. Minimum wire size for power and lighting circuits will be # 12 AWG. Control wiring conductors for 120 volt circuits will be # 14 AWG.

Feeder conductors (panelboards and specific equipment) and all exposed branch circuit wiring in unfinished spaces (electrical and mechanical rooms, etc.) will be installed in conduit.

Branch circuit wiring may utilize metal clad (MC) cable where it is allowed by NEC. Metal clad (MC) cable typically may be used for branch circuit wiring above suspended ceiling and in dry wall partitions. MC type cable will not be acceptable for the branch circuit homeruns (from panel to the first junction or pull box on circuit).

Underground conduits, concrete encased conduits and conduits installed under concrete slabs will be PVC Schedule 40 with rigid steel sweeps rising out of floor slab or grade. Conduits exposed to weather will be rigid steel.

### **Building Lighting**

The overall intent of the lighting design is to provide a visual environment for the students and faculty that is supportive of educational activities within the building.

In general, building interior lighting fixtures will be furnished with fluorescent lamps and electronic ballasts. Fluorescent lamps will be of the energy-efficient high performance T5 or Super T8 type. Incandescent and HID lighting will be limited to only special applications which cannot be satisfied with fluorescent type fixtures.

In order to reduce power consumption, Energy star qualified Commercial LED down lights will be used in common area.

Lighting systems will comply with energy use limitations of Massachusetts Building Code and the MA-CHPS requirements.

- Proposed Illumination Levels:
  - Classrooms: 45 - 50 FC
  - Offices: 40 - 50 FC
  - Circulation Corridors: 20 - 25 FC
  - Gymnasium: 40 - 50 FC

- Cafeteria: 30 - 40 FC
- Kitchen: 50 FC
- Utility and Storage Rooms: 20 FC
- Classroom lighting will be direct /indirect pendant mounted fluorescent fixtures.
- Corridor lighting will consist of fluorescent, ceiling recessed fixtures. Some common spaces will utilize LED fixtures.
- Dining and common areas will have fluorescent fixtures that will afford a more pleasant appearance, appropriate for the function of the respective spaces.
- The gymnasium will have fluorescent fixtures with the high output lamps that will be switched to provide multi-level illumination levels.
- If the cafeteria is planned as a multi- functional space, the lighting system will be designed to accomplish the different tasks. Recessed downlights and decorative direct/indirect pendant fixtures should be wired for multi-level lighting controls and provide proper lighting quality and lighting levels appropriate for the all programmed space functions.
- Building interior lighting will have some form of automatic lighting controls to meet Massachusetts Building Code.
- Classrooms, offices, and conference rooms will have dual technology occupancy sensors for automatic control as well as local toggle bi-level switches for manual control. The same sensors will provide a signal (via a dry contact) to the BMS for a shutdown of the HVAC equipment serving the same space.
- Daylight sensor system will be used in classrooms, library, as well in the spaces with skylights. The rest of the building will be controlled by a programmable low voltage relay system. Low-voltage control panels will be programmed to shut lighting off during non-use hours and shall provide warnings (blinking lights off & on) to allow occupants to override a planned shutdown in their area.
- The low-voltage lighting control system will be tied into the building DDC system for monitoring and overrides.
- Exit signs and egress lighting will be connected to the emergency power distribution system to provide illumination levels required by Code for emergency egress in a case of normal power failure. The generator power will eliminate any need in the emergency battery lighting units.

- Lighting control will be designed to have a “dark” school at night time including a shutdown of the emergency egress lights in the corridors, lobby, stairs, etc. These emergency lights will be switched ON either automatically by low-voltage control panel, upon building fire alarm, security breach, or manually by Fire Department, police, or a Custodian.
- Exterior building lighting will consist of building mounted shielded fluorescent fixtures (at egress doors) and pole-mounted LED full cut-off fixtures (for parking lot, roadways, and walkways). Lighting design will incorporate product selection that will reduce light pollution to abutters. Lighting design will be based on providing illumination 0.5 FC minimum maintained. Exterior building mounted fixtures at immediate discharge areas will be supported from emergency power system. Exterior lighting will be time switch and photo-cell controlled via low voltage lighting control system.

### **Engine Generator Power System**

A packaged engine-generator system will be provided to supply power to the building life safety and standby loads upon loss of the normal utility power. The unit shall start automatically on loss of normal utility power source and transfer to the generator power system within 10 seconds.

The generator power system design will include an outdoor 150 kW (estimated) diesel-generator set in the weather- and sound-proof enclosure with a skid-based fuel tank sized for at least 24 hours of generator operation without re-fueling. Fuel tank shall be of double-wall construction and will be furnished with a leak detection system. The exact generator set kW rating will be determined during a subsequent design phase. The generator set will be located in proximity (20 ft. spacing is required) to the utility pad-mounted transformer.

The emergency power distribution system will be designed to serve the emergency (life safety) loads: emergency exit and egress lighting (interior and exterior), fire alarm system, and a fire pump (if required). Emergency (life safety) automatic transfer switch (ATS) and 100 Amp 277/480 volt distribution panel, dry-type 15 kVA transformer and 120/208 volt panelboard will be located in the emergency electrical room adjacent to the main electrical room. Additionally, five (5) 100 Amp 277/480 volt panels will be located on the ground floor (3) and the upper floor (2).

Emergency panels and feeders shall be installed in 2-hour fire-rated closets and shafts in compliance with the requirements of the Massachusetts Electrical Code or MI cable may be used for the installation of emergency feeders.

Automatic transfer switch(ATS)225 Amp and the associated power distribution panels, dry-type transformers and branch panelboards will be provided to serve the standby loads: heating system boilers with the associated pumps, boiler

control panel and DDC panels, kitchen walk-in refrigerator/freezer, security system equipment, and communication systems (telephone and public address systems).

### **Fire Alarm System**

New addressable-type fire detection and alarm system with voice capabilities will be provided to meet the requirements of the Massachusetts Building Code, NFPA-72, and local fire department requirements.

The fire alarm system will consist of a fire alarm control panel (FACP), remote annunciator, addressable area and duct type smoke detectors, manual pull stations, speaker/strobe signaling units, and connections to the automatic fire suppression systems. Leased telephone line will be used for a system connection to the central monitoring station.

FACP will provide an alarm and annunciation capability in case of activation of any manual fire alarm station, smoke detector, heat detector, duct smoke detector, sprinkler water flow switch, or fire suppression system. The fire alarm control panel will be located in the main lobby area as directed by the Fire Department. Audible and visual high intensity strobes alarm devices will be installed in all classrooms.

Smoke detectors will be provided in compliance with applicable Codes. System type smoke detectors will be installed in the main electrical room, electrical closets, data/telephone rooms, school corridors, storage rooms, elevator machine room, elevator lobbies, and at the top of the stairways. Addressable type duct smoke detectors will be installed in supply and return air ducts as required by NFPA-90A.

## **COMMUNICATION SYSTEMS**

### **Voice and Data Distribution System**

A voice and data distribution system will be provided for a complete backbone and horizontal cabling infrastructure to support communications. The overall infrastructure will be designed in a star topology. The backbone will consist of fiber optic and multi-pair copper cables that extend from the building's main Equipment Room (ER) to the satellite Telecommunications Rooms (TRs). A Category 6 unshielded twisted pair (UTP) horizontal cabling system that provides local area network (LAN) and voice connectivity will be extended from the ER/TERs to the work area outlets. Voice and data outlets will be provided in all classrooms, offices, library, computer lab, auditorium, and as additionally required by the program.

### **Telephone System**

A telephone system will be designed to provide voice communications within the school, other schools in the district, and to locations outside the school voice network. The system will include a PBX, digital and analog handsets, interface with Public Address System, E911 capability, and additional features as developed during the programming stages.

### **Local Sound System**

A local sound system will be provided in the Auditorium, Gymnasium and other spaces where large groups gather. The systems will provide speech and performance reinforcement and reproduction of audio sources from CD and DVD players, AM/FM radio, and other devices.

### **Video Distribution System**

A video cabling system will be provided for the distribution of CATV service provider and/or central media system signals, to outlets located throughout the building. The system will consist of a head end equipment rack, backbone and horizontal coaxial cabling, taps, splitters and outlets. Outlets will be provided in all classrooms, library, computer lab, cafeteria, gymnasium, and as additionally required by the program.

### **Clock and Program System**

A clock and program system will be provided for originating and distributing time and time correction signals, and for programming and initiating audible program signals. The system will consist of a master control unit, indicating clocks, and connections to the public address and music system.

### **Public Address System**

A public address, music, and intercommunication system will be provided consisting of a main console, microphones, amplifiers, AM/FM tuner, audio CD player, speakers, wiring, telephone paging adapter, clock/program system interface, room call switches, and classroom telephone handsets. The system will allow broadcasting of program tone signals for classroom changes, radio and CD program material, and telephone and microphone originated announcements to all areas throughout the building by individual area or on an all-call basis.

### **Electronic Safety and Security System**

A hard-wired building security system will be provided to protect the building and its occupants from unauthorized entry. At minimum, this security system will consist of a main control panel, proximity readers/keypads installed at

specified doors, door contact switches, CCTV cameras installed at the front entry, corridors, key student congregating areas, parking lot and dumpsters. AA video intercom system will be provided at the main entry with electrified lock control in the door operation, and motion detectors.

7.2 PROJECT DESCRIPTION (OUTLINE SPECIFICATIONS)



## 7.3 ROOM DATA SHEETS

**CLASSROOMS****General Classrooms***(SPED Classrooms have similar criteria)***Functional Criteria**

Area: 950 SF  
 Quantity: 29 General Classrooms  
 5 SPED Learning Centers

**Room Surfaces**

Floor: Resilient flooring  
 Walls: Painted gypsum wallboard  
 Wainscot/Paneling: none  
 Ceiling: Acoustic ceiling panels  
 Acoustical: None  
 Doors: Wood  
 Interior Windows: Sidelight at door

**Building Services**

Mechanical: Heated and ventilated  
 Plumbing: none  
 Fire Protection: A/V fire alarm and sprinkler (per NFPA code).  
 Lighting: Suspended fluorescent direct / indirect; accent lighting at teaching wall  
 Electrical: Duplex wall outlets

**Furnishings, Fixtures & Equipment**

Marker Board: (3) 8' marker board on adjacent walls  
 Tack Board: 2-4' tack boards at Teaching Wall (1" tack strip above).  
 Casework: (1) tall storage units, wall cabinets, counter  
 Wardrobe: 30" wide with 2 double hooks, 2 cubbies above

**Communication & Technology**

Telephone: 1 per room (wall mounted)  
 Clock: 1 per room  
 Speaker: 1 per room  
 TV Monitor/Projector/Screen: Ceiling mounted projection screen; Ceiling mounted video projector  
 Smart Board: Yes  
 Cable TV Outlet: 1 per room  
 Computer Drops: At teachers desk and 2 additional

## Science Classrooms

### Functional Criteria

Area: 1200 SF  
Quantity: 8

### Room Surfaces

Floor: Resilient flooring  
Walls: Painted gypsum wallboard  
Wainscot/Paneling: none  
Ceiling: Acoustic ceiling panels  
Acoustical: None  
Doors: Wood  
Interior Windows: Sidelight at door

### Building Services

Mechanical: Heated and ventilated  
Plumbing: Lab sinks at all lab stations in biology and chemistry, (2) student sinks in all other science rooms, at demonstration tables in all rooms  
Fire Protection: A/V fire alarm and sprinkler (per NFPA code).  
Lighting: Suspended fluorescent direct / indirect; accent lighting at teaching wall  
Electrical: Duplex wall outlets including at all lab stations

### Furnishings, Fixtures & Equipment

Marker Board: 8' sliding marker board and 8' marker board at adjacent wall  
Tack Board: 2-4' tack boards at Teaching Wall (1" tack strip above).  
Casework: Epoxy resin countertops and doors with science casework - wood veneer base cabinets and glass front wall cabinets.  
Wardrobe: 30" wide with 2 double hooks, 2 cubbies above

### Communication & Technology

Telephone: 1 per room (wall mounted)  
Clock: 1 per room  
Speaker: 1 per room  
TV Monitor/Projector/Screen: Ceiling mounted projection screen; Ceiling mounted video projector  
Smart Board: Yes  
Cable TV Outlet: 1 per room  
Computer Drops: Teachers desk and at all lab stations

## Vocations / Technology

### Functional Criteria

Architecture, Engin' g CAD Lab:	1 @ 1,200 SF
Early Childhood:	1 @ 950 SF
Clothing, Textiles, Foods:	1@ 1,200 SF
Manufacturing / Robotics:	1 @1,200 SF
Business Classrooms:	2 @ 950 SF
Business Computer Lab:	2 @1,200 SF
TV Video Production:	1 @ 2,0000 SF

### Room Surfaces

Floor:	Resilient flooring
Walls:	Painted gypsum wallboard
Wainscot/Paneling:	none
Ceiling:	Acoustic ceiling panels
Acoustical:	None
Doors:	Wood
Interior Windows:	Sidelight at door

### Building Services

Mechanical:	Heated and ventilated, Air Conditioning in computer labs, TV
Plumbing:	Wash up sinks where appropriate
Fire Protection:	A/V fire alarm and sprinkler (per NFPA code).
Lighting:	Suspended fluorescent direct / indirect; accent lighting at teaching wall
Electrical:	Duplex wall outlets including at all lab stations

### Furnishings, Fixtures & Equipment

Marker Board:	8' marker board on main teaching wall and 8' marker board at adjacent wall
Tack Board:	2-4' tack boards at Teaching Wall (1" tack strip above).
Casework:	TBD
Wardrobe:	30" wide with 2 double hooks, 2 cubbies above

### Communication & Technology

Telephone:	1 per room (wall mounted)
Clock:	1 per room
Speaker:	1 per room
TV Monitor/Projector/Screen:	Ceiling mounted projection screen; Ceiling mounted video projector
Smart Board:	Yes
Cable TV Outlet:	1 per room
Computer Drops:	Teachers desk and at all lab stations

**ART & MUSIC****Art Classroom (2D, 3D)****Functional Criteria**

Area: 1,200 SF  
 Quantity: 2

**Room Surfaces**

Floor: VCT  
 Walls: Painted gypsum wallboard  
 Wainscot/Paneling: none  
 Ceiling: Acoustic ceiling panels  
 Acoustical: None  
 Doors: Wood  
 Interior Windows: Sidelight at door

**Building Services**

Mechanical: Heated and ventilated  
 Plumbing: 2 sinks with plaster trap  
 Fire Protection: A/V fire alarm and sprinkler (per NFPA code).  
 Lighting: Suspended fluorescent direct / indirect; accent lighting at teaching wall  
 Electrical: Duplex wall outlets

**Furnishings, Fixtures & Equipment**

Marker Board: 12' marker board and 8' marker board at adjacent wall  
 Tack Board: 2-4' tack boards at Teaching Wall (1" tack strip above).  
 Casework: Stainless steel countertops on work tables, plastic laminate countertops w/ wood veneer base cabinets and wall cabinets.  
 Wardrobe: 30" wide with 2 double hooks, 2 cubbies above

**Communication & Technology**

Telephone: 1 per room (wall mounted)  
 Clock: 1 per room  
 Speaker: 1 per room  
 TV Monitor/Projector/Screen: Ceiling mounted projection screen; Ceiling mounted video projector  
 Smart Board: Yes  
 Cable TV Outlet: 1 per room  
 Computer Drops: At teachers desk and 2 additional

## Music Classroom

### Functional Criteria

Quantity / Area: 1 Band @ 1,500 SF  
 Quantity / Area: 1 Chorus @ 1,200 SF

### Room Surfaces

Floor: Resilient flooring  
 Walls: Painted gypsum wallboard  
 Wainscot/Paneling: none  
 Ceiling: Acoustic ceiling panels (50% reflective)  
 Acoustical: Wall Panels on 2 Walls  
 Doors: Wood  
 Interior Windows: Sidelight at entry door

### Building Services

Mechanical: Heated, ventilated  
 Plumbing: Sink  
 Fire Protection: A/V fire alarm and sprinkler (per NFPA code).  
 Lighting: Suspended fluorescent direct / indirect; accent lighting at teaching wall  
 Electrical: Duplex wall outlets

### Furnishings, Fixtures & Equipment

Marker Board: 12' marker board and 8' marker board at adjacent wall  
 Tack Board: 2-4' tack boards at Teaching Wall (1" tack strip above).  
 Casework: (2) tall storage units; instrument storage  
 Wardrobe: 30" wide with 2 double hooks, 2 cubbies above

### Communication & Technology

Telephone: 1 per room (wall mounted)  
 Clock: 1 per room  
 Speaker: 1 per room  
 TV Monitor/Projector/Screen: Ceiling mounted projection screen; Ceiling mounted video projector  
 Smart Board: Yes  
 Cable TV Outlet: 1 per room

**HEALTH & PHYSICAL EDUCATION****Gymnasium****Functional Criteria**

Gym Area: 12,800 SF  
 Quantity: 1  
 Alternative PE: 2,000 SF

**Room Surfaces**

Floor: Wood Strip Flooring, sports markings  
 Walls: Painted block, Gypsum wallboard above  
 Wainscot/Paneling: None  
 Ceiling: Exposed structure, Acoustical deck  
 Acoustical: Tectum panels high on walls  
 Doors: Wood  
 Interior Windows: TBD

**Building Services**

Mechanical: Heating and Ventilation Rooftop Unit, radiant heating along wall under windows at exterior walls  
 Plumbing: Drinking fountain and cuspidor, outside gymnasium  
 Fire Protection: A/V fire alarm and sprinklers (per NFPA code)  
 Lighting: HID or Hi-Bay fluorescent  
 Electrical: Duplex wall outlets

**Furnishings, Fixtures & Equipment**

Marker Board: None  
 Tack Board: None  
 Casework: None  
 Wardrobe: None  
 Equipment: Operable bleachers, backstops and divider curtain

**Communication & Technology**

Telephone: 1 per teacher station  
 Clock: 1 per teacher station  
 Speaker: 1 per teacher station  
 TV Monitor/Projector/Screen: Large screen  
 Smart Board: None  
 Cable TV Outlet: 1 per teacher station

**MEDIA CENTER****Media Center / Reading Room****Functional Criteria**

Area: 7,000 SF  
 Quantity: 1

**Room Surfaces**

Floor: Carpet  
 Walls: Gypsum Wallboard  
 Wainscot/Paneling: None  
 Ceiling: Acoustical Ceiling Panels  
 Acoustical: Acoustical Wall Panels  
 Doors: Wood  
 Interior Windows: Sidelights

**Building Services**

Mechanical: Air system fully air conditioned, radiant heating at exterior walls  
 Plumbing: Sink in Workroom  
 Fire Protection: A/V fire alarm and sprinklers (Per NFPA Code)  
 Lighting: Lighting at reading area, suspended fluorescent direct / indirect; accent lighting TBD  
 Electrical: Duplex wall outlets, outlets for 20+ computers and printers

**Furnishings, Fixtures & Equipment**

Marker Board: Markerboard; layout to be determined  
 Tack Board: Tackboards; layout to be determined  
 Casework: Wood ad plastic laminate-clad information desk, plastic laminate countertops, doors with wood veneer base cabinets and wall cabinets in workroom  
 Wardrobe: None  
 Equipment: None  
 Shelving: Fixed shelving along perimeter, loose FFE shelving in center

**Communication & Technology**

Telephone: 1 per room  
 Clock: 1 per room  
 Speaker: 1 per room  
 TV Monitor/Projector/Screen: Ceiling mounted projection screen, ceiling mounted projector  
 Smart Board: TBD  
 Cable TV Outlet: 1 per room

## PERFORMANCE SPACES

### Auditorium / Stage

#### Functional Criteria

Area: 8,860 SF  
Quantity: 1

#### Room Surfaces

Floor: Painted floors under seating, carpeted aisles, wood strip flooring on stage  
Walls: Gypsum wallboard  
Wainscot/Paneling: Wood  
Ceiling: Acoustic ceiling panels, GWB clouds  
Acoustical: Acoustical panels on walls  
Doors: Wood  
Interior Windows: None

#### Building Services

Mechanical: Heated, ventilated and air conditioned  
Plumbing: None  
Fire Protection: A/V fire alarm and sprinklers (per NFPA code)  
Lighting: Suspended fluorescent work lights on stage; theatrical lighting; dimmable house lights; aisle lighting on seating  
Electrical: Duplex wall outlets, additional power at lighting and sound system controls; sound system

#### Furnishings, Fixtures & Equipment

Marker Board: None  
Tack Board: None  
Casework: None  
Wardrobe: None  
Furnishings: Fixed auditorium seating

#### Communication & Technology

Telephone: 1 per room  
Clock: 1 per room  
Speaker: Performance sound system  
TV Monitor/Projector/Screen: Ceiling mounted projection screen on stage  
Smart Board: None  
Cable TV Outlet: 1 on stage, 1 in control room  
Stage Communication: Communication system between stage and control room

## DINING & FOOD SERVICE

### Cafeteria / Dining

#### Functional Criteria

Area: 5,500 SF  
Quantity: 1

#### Room Surfaces

Floor: Porcelain paver tile  
Walls: Panel walls  
Wainscot/Paneling: Panel walls  
Ceiling: Acoustic ceiling panels / acoustical deck  
Acoustical: Acoustical panels high on walls  
Doors: Wood  
Interior Windows: To be determined

#### Building Services

Mechanical: Heated, ventilated and air conditioned  
Plumbing: Electric water cooler  
Fire Protection: A/V fire alarm and sprinklers (per NFPA code)  
Lighting: Suspended fluorescent; accent lighting  
Electrical: Duplex wall outlets

#### Furnishings, Fixtures & Equipment

Marker Board: None  
Tack Board: Tackboards and tack strips as needed; layout to be determined.  
Casework: Stainless steel tray return and trash receptacle/recycling area  
Wardrobe: None  
Furnishings: Tables and seats under FFE

#### Communication & Technology

Telephone: 1 per room  
Clock: 1 per room  
Speaker: Local sound system  
TV Monitor/Projector/Screen: Ceiling mounted projection screen  
Smart Board: None  
Cable TV Outlet: 1 per room

## Kitchen & Servery

### Functional Criteria

Area: 3,100 SF  
Quantity: 1

### Room Surfaces

Floor: Epoxy resin  
Walls: FRP Panels  
Wainscot/Paneling: None  
Ceiling: Mylar acoustical tile  
Acoustical: None  
Doors: Painted metal  
Interior Windows: None

### Building Services

Mechanical: Heated and ventilated  
Plumbing: As required to support equipment and hand sinks  
Fire Protection: A/V fire alarm and sprinklers (per NFPA code)  
Lighting: Lensed recessed fluorescent fixtures  
Electrical: As required to support equipment

### Furnishings, Fixtures & Equipment

Marker Board: None  
  
Tack Board: None  
Casework: None  
  
Wardrobe: None  
Furnishings: Lockers for staff, food service equipment

### Communication & Technology

Telephone: 1 per room  
Clock: 1 per room  
Speaker: 1 per room  
TV Monitor/Projector/Screen: None  
Smart Board: None  
Cable TV Outlet: None

## MEDICAL SUITE

### Suite Area: 910 sf

Nurses' Office: 1@ 250 SF

Interview: 2@ 100 SF

Exam Room: 4@ 100 SF | Toilet: 1@ 60 SF

### Functional Criteria

Area: 910 SF (suite)  
Quantity: 1

### Room Surfaces

Floor: Resilient flooring  
Walls: Painted gypsum wallboard  
Wainscot/Paneling: None  
Ceiling: Acoustical ceiling panel  
Acoustical: None  
Doors: Wood  
Interior Windows: Sidelights

### Building Services

Mechanical: Air System, Fully Air Conditioned; Radiant heating at Exterior walls  
Plumbing: Sink, Toilet Rooms, Eyewash  
Fire Protection: A/V fire alarm and sprinklers (per NFPA code)  
Lighting: Recessed fluorescent with parabolic lens  
Electrical: Duplex wall outlets

### Furnishings, Fixtures & Equipment

Marker Board: At exam room and waiting area  
Tack Board: At exam room and waiting area  
Casework: Plastic laminate clad countertops and doors with wood veneer base cabinets and wall cabinets  
Wardrobe: 30" wide storage and wardrobe units (2)  
Furnishings: Under FF&E

### Communication & Technology

Telephone: 1 per room  
Clock: 1 per room  
Speaker: 1 per room  
TV Monitor/Projector/Screen: None  
Smart Board: None  
Cable TV Outlet: 1 per room

## ADMINISTRATION SUITE

Office/Waiting Room/Toilet:	1@ 550 SF	Teachers' Mail & Time Room:	100 SF
Duplicating Room:	1@ 200 SF	Records Room:	1@ 200 SF
Principal's Office w/ Conf. Area:	1@ 375 SF	Principal's Secretary/Waiting:	1@ 568 SF
Conference Room:	1@ 450 SF	Supervisory/Spare Office:	1@ 150 SF
Guidance Office:	5@ 150 SF	Guidance Storeroom:	1@ 135 SF
Teachers' Work Room:	3@ 400 SF	Assistant Principal	2@ 125 SF

### Functional Criteria

Area: 5,170 SF (Administration / Guidance Suite)  
Quantity: 20

### Room Surfaces

Floor: Carpet  
Walls: Gypsum wallboard  
Wainscot/Paneling: None  
Ceiling: Acoustical ceiling panel  
Acoustical: None  
Doors: Wood  
Interior Windows: Sidelight at doors

### Building Services

Mechanical: Air System, Fully Air Conditioned; Radiant heating at Exterior walls  
Plumbing: Sink in General Office, Two Unisex Toilets  
Fire Protection: A/V fire alarm and sprinklers (per NFPA code)  
Lighting: Recessed fluorescent (indirect type)  
Electrical: Duplex wall outlets

### Furnishings, Fixtures & Equipment

Marker Board: Markerboard; (1) 4' unit, each per room.  
Tack Board: 4' unit each room  
Casework: Plastic laminate clad countertops and doors with wood veneer base cabinets and wall cabinets in General Office  
Wardrobe: None  
Furnishings: Under FF&E

### Communication & Technology

Telephone: 1 per room  
Clock: 1 per room  
Speaker: 1 per room  
TV Monitor/Projector/Screen: Ceiling mounted projection screen at conference room  
Smart Board: None  
Cable TV Outlet: 1 at conference room

## OTHER

### Computer Lab

#### Functional Criteria

Quantity / Area: 2 @ 1,000 SF

#### Room Surfaces

Floor: Resilient flooring  
Walls: Gypsum Wallboard Painted  
Wainscot/Paneling: none  
Ceiling: Acoustic Ceiling Panels  
Acoustical: None  
Doors: Wood  
Interior Windows: Sidelights at door

#### Building Services

Mechanical: Air System (Air Conditioned); radiant heating at exterior walls  
Plumbing: None  
Fire Protection: A/V fire alarm and sprinklers (per NFPA code)  
Lighting: Suspended fluorescent with up and down component; accent lighting at teaching wall  
Electrical: Duplex wall outlets to support 24 computers and peripherals

#### Furnishings, Fixtures & Equipment

Marker Board: 16' marker board

Tack Board: (2) 4' tack boards  
Casework: (2) tall storage units  
Wardrobe: None

#### Communication & Technology

Telephone: 1 per room (wall mounted)  
Clock: 1 per room  
Speaker: 1 per room  
TV Monitor/Projector/Screen: Ceiling mounted projector and projection screen  
Smart Board: Yes  
Cable TV Outlet: 1 per room

## Large Group Instruction

### Functional Criteria

Area / Quantity: 1 @ 2,000 SF

### Room Surfaces

Floor: Carpet  
Walls: Gypsum Wallboard Painted  
Wainscot/Paneling: Wood  
Ceiling: Acoustic Ceiling Panels  
Acoustical: Wall Panels  
Doors: Wood  
Interior Windows: Sidelights at doors

### Building Services

Mechanical: Heated and ventilated and air conditioned  
Plumbing: None  
Fire Protection: A/V fire alarm and sprinkler (per NFPA code).  
Lighting: Suspended fluorescent – direct / indirect; accent lighting at teaching wall  
Electrical: Duplex wall outlets

### Furnishings, Fixtures & Equipment

Marker Board: 12' marker board  
Tack Board: 12' tack board  
Casework: None  
Wardrobe: None

### Communication & Technology

Telephone: 1 per room (wall mounted)  
Clock: 1 per room  
Speaker: 1 per room  
TV Monitor/Projector/Screen: Ceiling mounted projection screen; Ceiling mounted video projector  
Smart Board: Yes  
Cable TV Outlet: 1 per room

## 7.4 SCHEMATIC DESIGN DRAWINGS

Schematic Design drawings consistent with the requirements of 7.4.4 Contract for Designer Services are included in this submission. The illustrative site plan and architectural floor plans are included in this bound report. All other drawings are being submitted full size and in electron format. Below is a list of the SD drawings included in the submission.

### COVER SHEET

#### CIVIL:

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C0.01	SHEET INDEX PLAN
C1.01	EXISTING CONDITIONS PLAN
C1.02	EXISTING CONDITIONS PLAN
C2.01	SITE PREPARATION PLAN
C2.02	SITE PREPARATION PLAN
C3.01	LAYOUT & MATERIALS PLAN
C3.02	LAYOUT & MATERIALS PLAN
C3.03	LAYOUT & MATERIALS PLAN
C4.01	GRADING & UTILITIES PLAN
C4.02	GRADING & UTILITIES PLAN
C5.01	PLANTING PLAN
C5.02	PLANTING PLAN

#### ARCHITECTURAL:

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A1.01	FIRST FLOOR PLAN
A1.02	SECOND FLOOR PLAN
A1.03	THIRD FLOOR PLAN
A1.04	ROOF PLAN
A1.11	FIRST FLOOR PROGRAM COLOR PLAN
A1.12	SECOND FLOOR PROGRAM COLOR PLAN
A1.13	THIRD FLOOR PROGRAM COLOR PLAN
A2.01	EXTERIOR ELEVATIONS
A2.02	BUILDING PERSPECTIVES

#### PLUMBING / FIRE PROTECTION:

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PF2.01	SPRINKLER AND STANDPIPE RISER DIAGRAM
P1.00	FIRST FLOOR PLAN
P3.01	WATER FLOW DIAGRAM

#### MECHANICAL:

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M1.01	FIRST FLOOR PLAN
M1.02	SECOND FLOOR PLAN
M1.03	THIRD FLOOR PLAN

**NEW GRAFTON HIGH SCHOOL  
SCHEMATIC DESIGN REPORT**

M3.01 HVAC FLOW DIAGRAMS

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ELECTRICAL:

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E0.01 SITE UTILITY PART A

E0.02 SITE UTILITY PART B

E5.01 POWER RISER DIAGRAM

E9.01 COMMUNICATIONS ONE-LINE RISER DIAGRAM

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FOOD SERVICE:

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K1.01 FOOD SERVICE EQUIPMENT PLAN

## 7.5 FF&E SUMMARY

The following list of furnishings fixtures and equipment is a result of a meeting with the design team and an examination of the project design. The costs associated with this list is included within.



## 7.6 TECHNOLOGY SUMMARY

The standard classroom and other teaching spaces will be equipped with one teacher's computer (laptop or desktop TBD), three to five student computers, and an interactive white board with an associated projector and local sound re-enforcement. Up to four mobile laptop computer carts with 24 -laptop computers are planned for shared use among the classrooms throughout the building.

The Special Education spaces will be equipped with one teacher's computer (laptop or desktop TBD), and a variable quantity of student computers, and interactive white boards with an associated projector and local sound re-enforcement. The Library Media Center will be equipped with 12 general use computers plus 25 computers in the computer lab. The remaining Administrators and Staff in the School will each have a desktop computer.

The school will be equipped with a managed wireless access network to enable connectivity within the building and at selected areas outside of the building.

A Voice over IP (VoIP) telephone system is preferred over a PBX system. Network switches will be a mix of standard Ethernet switches and Power Over Ethernet (PoE) devices to support telephone and wireless access point equipment.

Laser printers will be network capable with the intention to distribut centrally located printers within departments rather than install a printer in each classroom. An LCD projector is planned for the Conference Room and the Auditorium.

The auditorium, cafeteria, large group instruction spaces and gym will each have a local sound re-enforcement system. The auditorium will also include an assisted listening system as part of the local sound system.

