

DEPARTMENT OF FACILITIES

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TRACY PARSLEY, MAINTENANCE SUPERVISOR
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MEMO

TO: Dr. Jesse Bacon, Superintendent *JB*

FROM: Danny Clemens, Director of Facilities

Date: March 8, 2024

RE: Phase 2 Athletics and Field House- Schematic Design Approval **DC**

Request for approval of the schematic design package for the Phase 2 Athletics and Field Houses. This project consists of a three high school sites (North Bullitt, Bullitt East and Bullitt Central) with multiple athletic fields of relocation/replacement and a 40,000 sf athletic field house at each site. Site upgrades to the baseball plazas will also be included at each respective school, including field lighting, relocation of press box concessions and restrooms.

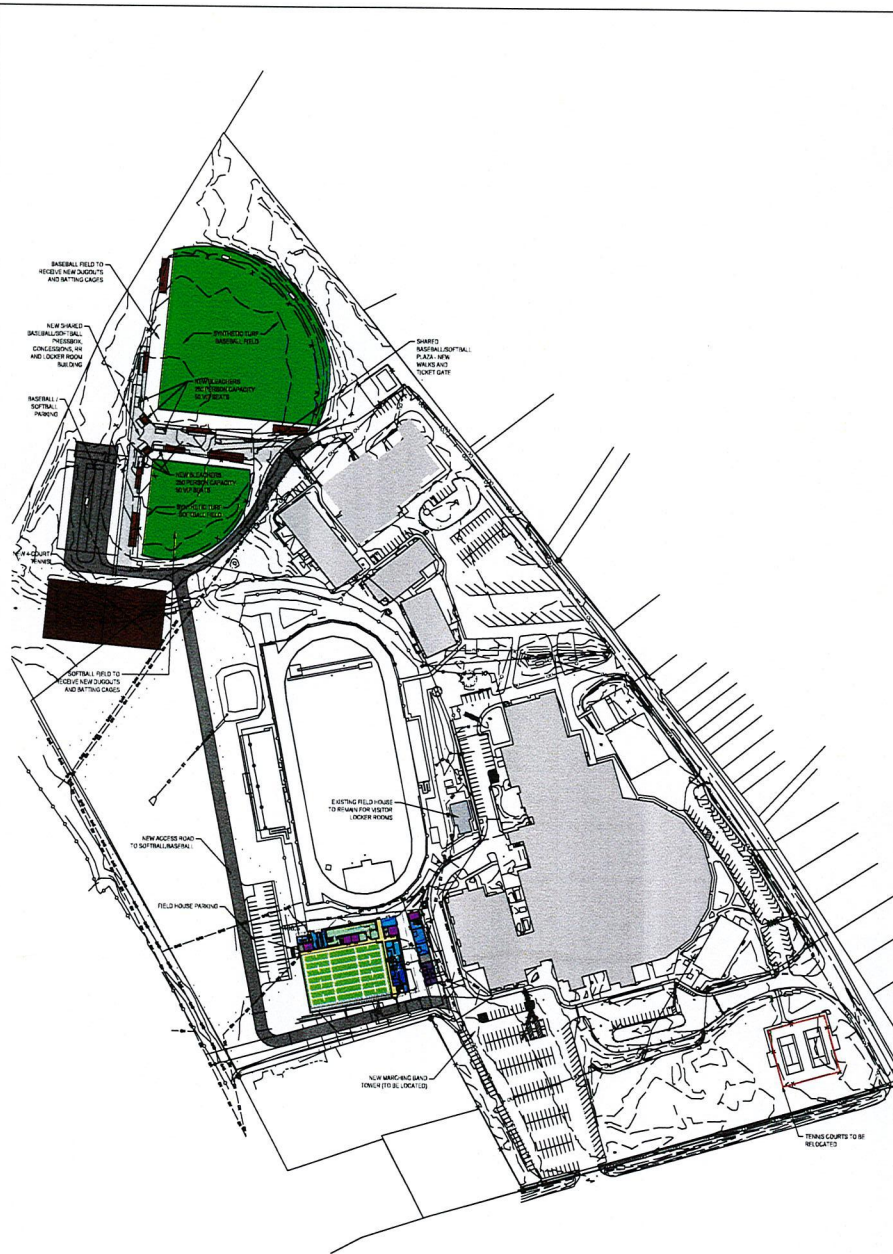
I recommend approval of this request.

Attachments:

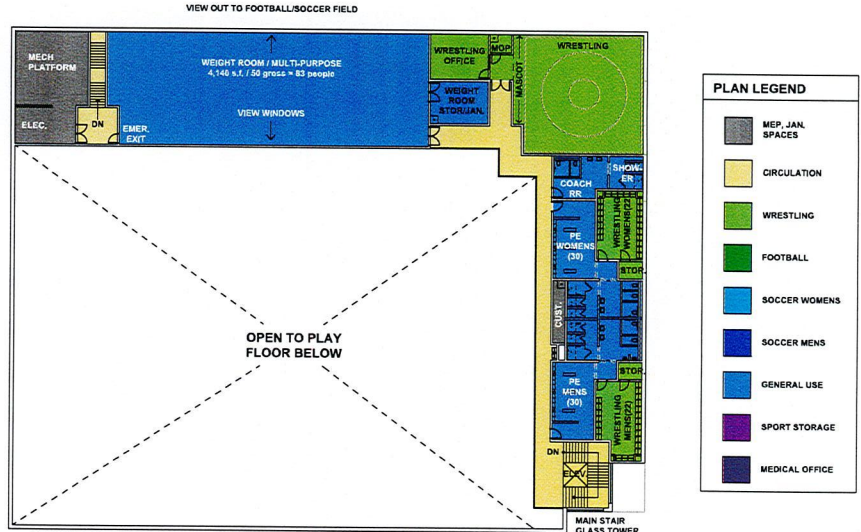
- Campus and Field House Floor plans for Bullitt Central, Bullitt East and North Bullitt High Schools
 - BC1.1 - Drawing - Bullitt Central SD Plans - Campus and Field House
 - BE1.1 - Drawing - Bullitt East SD Plans - Campus and Field House
 - NB1.1 - Drawing – North Bullitt SD Plans - Campus and Field House
- Phase 2 Athletics and Field House -SD MEP Narrative

OUR MISSION IS TO INSPIRE AND EQUIP OUR STUDENTS TO SUCCEED IN LIFE

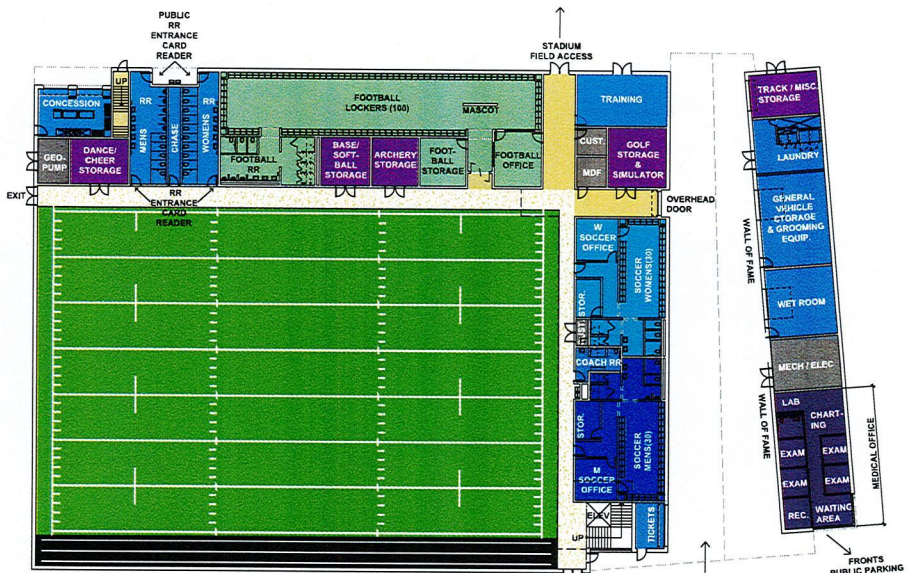
BULLITT COUNTY PUBLIC SCHOOLS IS AN EQUAL EDUCATION AND EMPLOYMENT INSTITUTION



1 SCHEMATIC DESIGN
BULLITT CENTRAL HIGH SCHOOL - CAMPUS SITE PLAN
Scale: 1" = 100'-0"



2 SCHEMATIC DESIGN
BULLITT CENTRAL HIGH SCHOOL - FIELD HOUSE PLAN - LEVEL 2
Scale: 1" = 16'-0"



3 SCHEMATIC DESIGN
BULLITT CENTRAL HIGH SCHOOL - FIELD HOUSE PLAN - LEVEL 1
Scale: 1" = 16'-0"


 kramer architects
 1215 S. 2nd Street, Suite 4000
 Louisville, KY 40203
 PH: 502.583.4444 FAX: 502.583.4444


 MOVING FORWARD

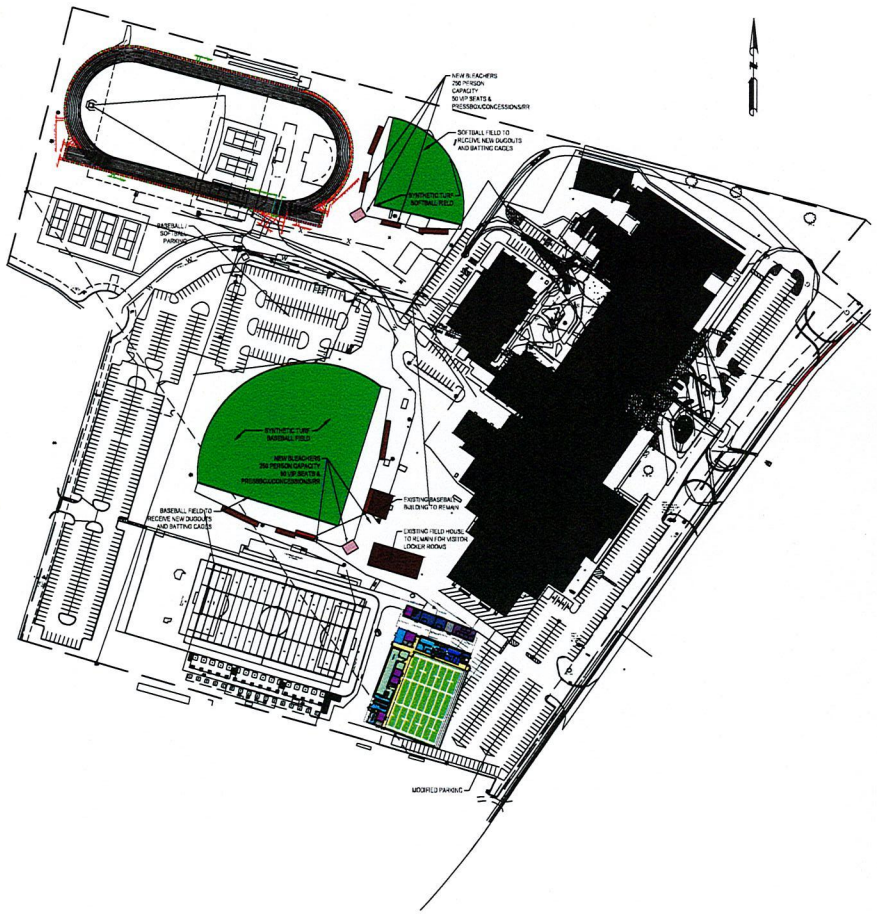
SCHEMATIC DESIGN SUBMISSION
 BULLITT CENTRAL - PHASE 2 ATHLETICS & FIELD HOUSE PLANS
 PHASE 2 ATHLETICS AND FIELD HOUSES
 BULLITT CENTRAL, NORTH BULLITT, BULLITT EAST HIGH SCHOOLS
 BULLITT COUNTY, KENTUCKY

BGN# 24-192
 DATE: 03-11-2024
 DRAWN BY: CNW
 CHECKED BY: SKA
 REVISIONS:

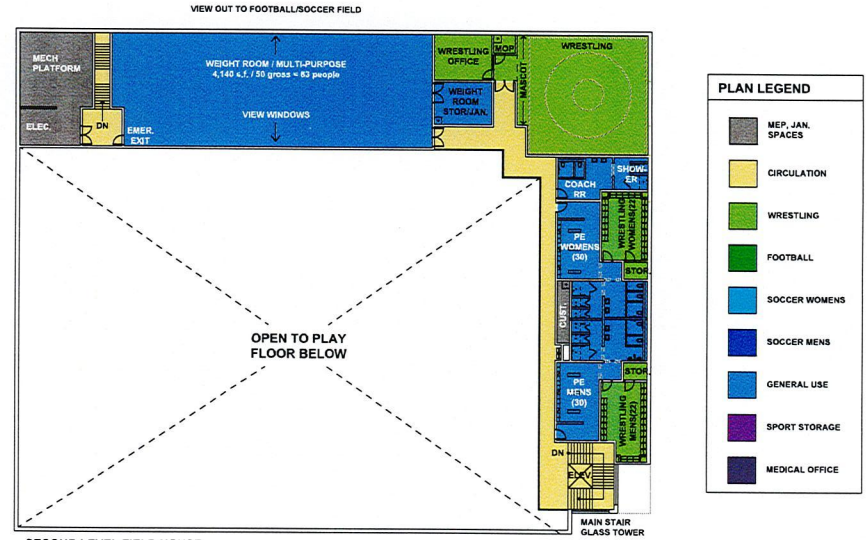
2023-50

BC.1.1

SCHEMATIC DESIGN SUBMISSION



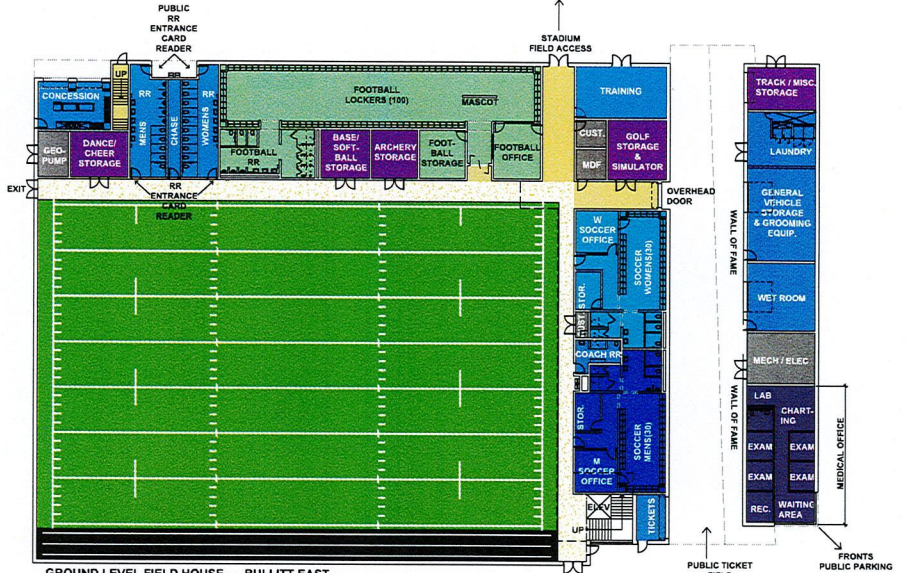
A SCHEMATIC DESIGN
BULLITT EAST HIGH SCHOOL - CAMPUS SITE PLAN
Scale: 1" = 100'-0"



PLAN LEGEND

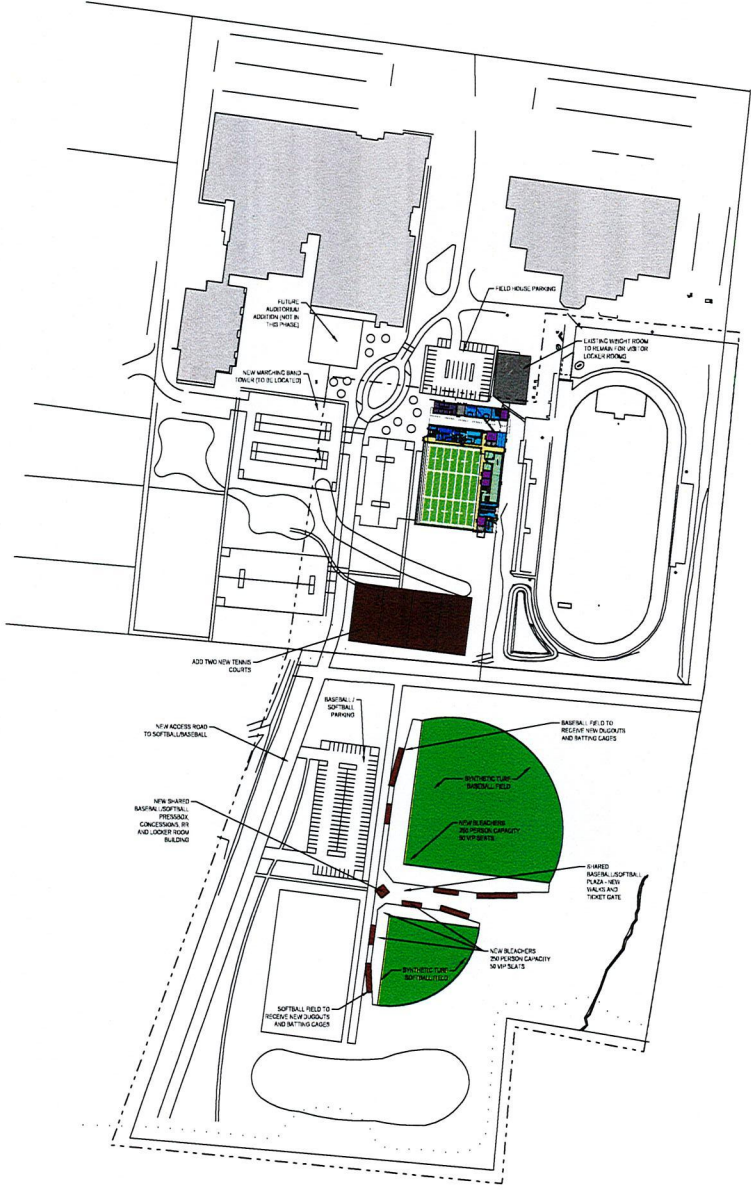
- MEP, JAN, SPACES
- CIRCULATION
- WRESTLING
- FOOTBALL
- SOCCER WOMENS
- SOCCER MENS
- GENERAL USE
- SPORT STORAGE
- MEDICAL OFFICE

2 SCHEMATIC DESIGN
BULLITT EAST HIGH SCHOOL - FIELD HOUSE PLAN - LEVEL 2
Scale: 1" = 16'-0"

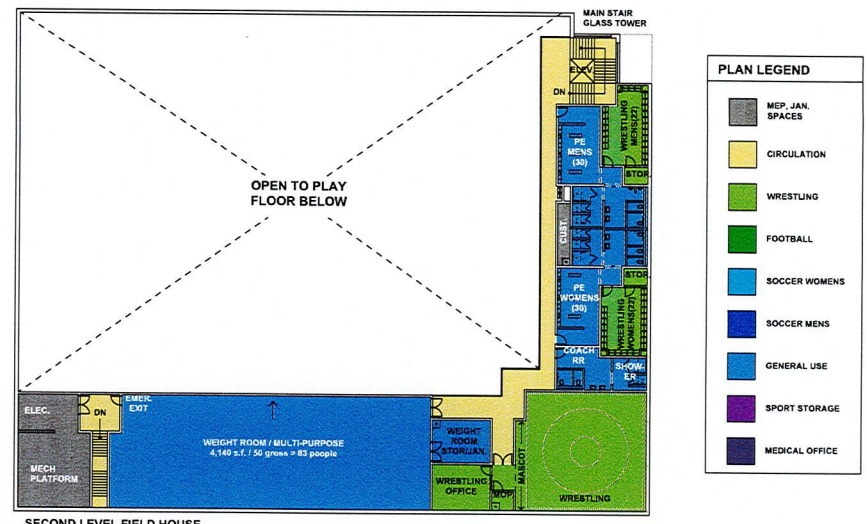


1 SCHEMATIC DESIGN
BULLITT EAST HIGH SCHOOL - FIELD HOUSE PLAN - LEVEL 1
Scale: 1" = 16'-0"

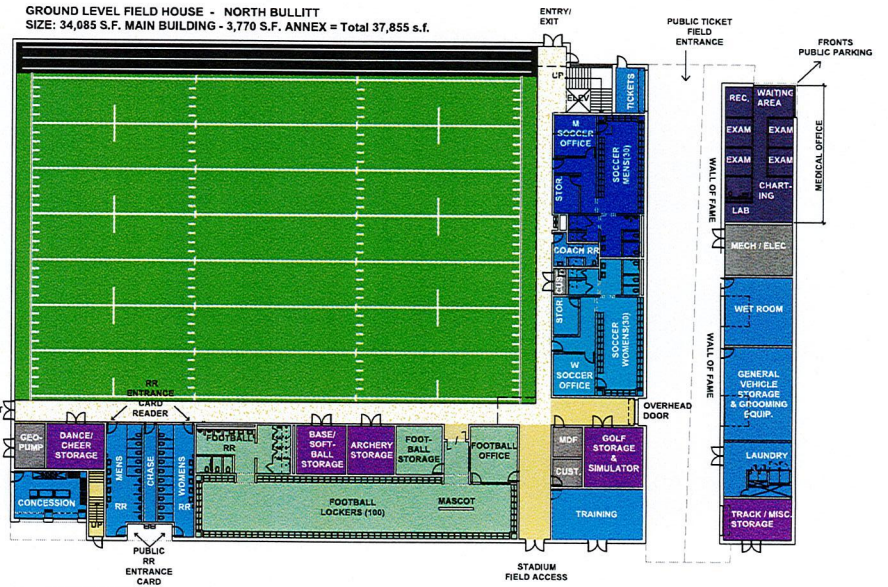
GROUND LEVEL FIELD HOUSE - BULLITT EAST
SIZE: 34,085 S.F. MAIN BUILDING - 3,770 S.F. ANNEX = Total 37,855 s.f.



A SCHEMATIC DESIGN
 NORTH BULLITT HIGH SCHOOL - CAMPUS SITE PLAN
 Scale: 1" = 100'-0"



2 SCHEMATIC DESIGN
 NORTH BULLITT HIGH SCHOOL - FIELD HOUSE PLAN - LEVEL 2
 Scale: 1" = 16'-0"



1 SCHEMATIC DESIGN
 NORTH BULLITT HIGH SCHOOL - FIELD HOUSE PLAN - LEVEL 1
 Scale: 1" = 16'-0"

**Mechanical, Electrical, Plumbing and Fire Protection Narrative
Bullitt County Public Schools – Phase 2 Athletics & Field Houses**

Background, Codes and Standards

This project consists of a three high school sites (Bullitt North, Bullitt East and Bullitt Central) with multiple athletic fields of relocation/replacement and a ~ 40,000 sf ft athletic field house at each site. Site upgrades to the baseball plazas will also be included at each respective school, including field lighting, relocation of pressbox, concessions and restrooms. The scope of work shall be designed to meet the requirements of the following:

- 2018 Kentucky State Building Code (IBC2015 with KY Amendments)
- IECC 2012 Energy Code
- 2017 National Electrical Code (NFPA 70)
- 2016 National Fire Alarm and Signaling Code (NFPA 72)
- 2012 Life Safety Code (NFPA 101)
- ASHRAE Guidelines 55 and 62.1

Division 21 – Fire Suppression

a) Codes and Standards

See above for requirements.

Each fieldhouse shall be provided with a new fully automatic fire suppression system designed in accordance with all applicable standards of NFPA (including but not limited to NFPA 13 & 20), state, and local codes.

b) Incoming Service

A new metered fire protection main to be ran to each fieldhouse via an underground supply from the local water company's existing water main infrastructure (Mt. Washington Sewer & Water). The incoming fire service shall include a post indicator valve (PIV), a fire department connection (FDC), and reduced pressure backflow prevention device.

c) Building Distribution:

The fieldhouse will be a single fire zone, and be provided with a control valve, tamper/flow switches, and drain assemblies (Floor Control Valve Assembly).

The incoming fire service entrance will be fully monitored via the building fire alarm system.

Piping infrastructure will be a combination of schedule 10/40 black steel pipe with grooved Victaulic type fittings. Utilize flexible sprinkler connections for all sprinklers with exception of areas where there are no ceiling present.

SPRINKLERS:

Sprinklers shall be recessed, quick response, pendant type sprinklers in areas containing ceilings. Upright sprinklers shall be used in areas containing no ceilings, such as mechanical rooms, practice areas, etc. Dry pendant/upright type sprinklers shall be utilized in the areas subject to freezing temperatures such as the loading dock and all freezer/cooler boxes. High temperature sprinkler will be required in areas similar to the kitchen, mechanical rooms, art kiln rooms, etc. Areas where sprinklers will be subject to damage, sprinkler will be provided with heavy duty wire cages.

SPRINKLER ACCESSORIES

Sprinkler drain risers will be provided to allow system to be fully drained. Sprinkler drain piping shall be routed and spilled to grade.

d) Fire Hydrant Flow Test:

A new fire hydrant flow test will need to be performed to determine available static pressure, residual pressure and flow. A new flow test shall also be conducted by the awarded project sprinkler contractor to utilize as part of their shop drawings and hydraulic calculations.

Division 22 – Plumbing

a) Codes and Standards

See above for requirements.

Public utilities will be provided to the job site for all major utilities.

b) Sanitary Sewer Service:

Each fieldhouse sanitary sewer will utilize a network of sanitary piping sized in accordance with the current Kentucky Plumbing Code and shall drain via gravity to an existing exterior manhole(s) and sanitary sewer system (Mt. Washington Sewer & Water).

All relocated pressboxes, restroom buildings, etc. within the renovated baseball plazas will receive sanitary piping sized in accordance with the current Kentucky Plumbing Code and shall drain via gravity to an existing exterior manhole(s) and sanitary sewer system (Mt. Washington Sewer & Water).

All grease production from concession equipment and associated plumbing fixtures will be drained via grease waste piping to an exterior grease trap(s) which will be sized and located adjacent to the kitchen.

Mandatory cleanouts every 100' (minimum) for all sanitary piping.

c) Domestic Water Service:

Each fieldhouse will receive a metered domestic water main via underground water main piping from the local water company (Mt. Washington Sewer & Water). The incoming water service will be provided with a backflow preventer in accordance with local water company standards.

Domestic Water Heating System:

Each fieldhouse will be provided with their own standalone water heating system. Each restroom building will also be provided with their own water heating system. Those systems will be provided as follows:

FIELDHOUSE - A high efficiency gas fired water heater, with separate storage tank will be provided for the kitchen and replace the existing water heater. The water heater will produce 120°F domestic hot water for distribution to the whole fieldhouse. Mixing valves will be provided as necessary to limit hot water to hand washing sinks or similar plumbing fixtures.

RESTROOM BUILDING – An electric water heater will be provided. The water heater will produce 120°F domestic hot water for distribution to the sinks.

Both water heating systems will be fully re-circulated to maintain a minimum of 10°F temperature loss throughout the respective hot water loops.

d) Natural Gas System

New metered natural gas service (LG&E) will be supplied to the fieldhouses to serve the domestic water heaters. All piping on the house side of the meter will be sized based on 7"-11"w.c.

e) Piping Materials

Plumbing Waste and Vent Piping Materials:

All above & below slab sanitary waste & vent piping shall be schedule 40 PVC piping and fittings with solvent cement joints will be utilized throughout the building with the exception of the kitchen related areas, where drainage temperatures may reach approx. 140°F, these areas will be provided with service weight, hubless, cast iron piping for above slab installation and service weight, hub & spigot piping for below slab installation.

Domestic Water Piping Materials:

Underground (MAIN WATER SERVICE) -Type L Hard Copper with lead free solder. 150 lb, flanged or screwed, gate or ball, bronze valves.

Underground (EQUIPMENT) - Pex piping manufactured by Zurn or Uponor. No joints will be allowed below slab.

Above ground – (Mechanical rooms & building water mains) - Type L Hard Copper with lead free solder. 150 lb, flanged or screwed, gate or ball, bronze valves.

Above ground (branch piping to plumbing fixtures) - Pex piping manufactured by Zurn or Uponor.

Natural Gas Piping Materials:

All piping on the house side of the meter shall be Schedule 40 black steel piping and fittings.

f) Plumbing Fixtures

New plumbing fixtures for this project shall be similar to the following:

WATER CLOSET – Floor mounted, manual flush valve (American Standard, Zurn, etc.)

LAVATORIES – Wall hung, vitreous china with Delta model 86T1153 metered faucet(s) or multiuser wash stations (Bradley)

URINALS – Wall mounted, manual flush valve (American Standard, Zurn, etc.). Must have integral strainer.

SINKS – Countertop, stainless steel, drop in (Elkay) with gooseneck faucet and wrist blade handles.

DRINKING FOUNTAINS – Bi-level, wall hung with bottle filling station (ELKAY)

MOP BASIN – Standard floor set, 24"x24" (MUSTEE)

Division 23 – Heating, Ventilating and Air-Conditioning (HVAC)**a) Codes and Standards**

See above for requirements.

b) Design Criteria

The design criteria to be utilized for HVAC design and Heating/Cooling Load Calculations is as follows:

Site Data:

- Building Locations:
 - Bullitt East High School - 11450 KY-44, Mt Washington, KY 40047 (Bullitt County)
 - Bullitt Central High School – 1330 KY-44, Shepherdsville, KY 40165 (Bullitt County)
 - Bullitt North High School – 3200 E Hebron Ln, Shepherdsville, KY 40165 (Bullitt County)
- Building Orientation:
 - Bullitt East - Long Axis is Northeast / Southwest
 - Bullitt Central – Long axis West / East
 - Bullitt North – Long Axis West / East
- ASHRAE 90.1 Climate Zone: 4A

Design Conditions:

- The HVAC design parameters have been determined per ASHRAE Handbook - Fundamentals for Louisville, Kentucky
- Summer Outdoor Air Dry Bulb: 95° F with Mean Coincident Outdoor Air Wet Bulb: 74° F (ASHRAE 1% Peak Design Condition).
- Summer Outdoor Air Wet Bulb: 79° F with Mean Coincident Outdoor Air Dry Bulb: 84° F (ASHRAE 0.4% Peak Design Condition).
- Winter Outdoor Air Dry Bulb: 5° F (ASHRAE 99.6% Peak Design Condition)
- Indoor space conditions, based on project requirements, space type and occupancy, as indicated.
- **Occupied Space Setpoints:** Equipment serving the offices, exam rooms and similar occupancy spaces shall be designed and sized to maintain the following setpoints within a 2.5-degree F deadband:

<i>Cooling Season:</i>	Occupied mode:	75°F
	Vacant mode:	78°F
	Un-Occupied mode:	80°F

<i>Heating Season:</i>	Occupied mode:	70°F
	Vacant mode:	68°F
	Un-Occupied mode:	65°F

- **Transient/Variable Occupancy Space Setpoints:** Equipment serving the locker room, weight room, wrestling, and similar variable occupancy spaces shall be designed and sized to maintain the following setpoints within a 2.5-degree F deadband:

<i>Cooling Season:</i>	Occupied mode:	74°F
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	Vacant mode:	78°F
	Un-Occupied mode:	80°F
<i>Heating Season:</i>	Occupied mode:	70°F
	Vacant mode:	68°F
	Un-Occupied mode:	65°F

- **Mechanical Space Setpoints:** Equipment serving mechanical and electrical spaces, IDF rooms, and similar spaces shall be designed with ventilation only and sized to maintain the following setpoints:

<i>Cooling Season:</i>	Occupied mode:	85°F
<i>Heating Season:</i>	Occupied mode:	60°F

- **MDF spaces:** Equipment serving Server room and MDF rooms shall be designed and sized with air condition systems to maintain the following setpoints:

<i>Cooling Season:</i>	Occupied mode:	78°F
<i>Heating Season:</i>	No added heat.	

- **Play Area Setpoint:** Equipment serving the play area (indoor field) area shall be designed to temper the space, based on following set points:

<i>Cooling Season:</i>	Occupied mode:	80°F
	Un-Occupied mode:	85°F
<i>Heating Season:</i>	Occupied mode:	68°F
	Un-Occupied mode:	60°F

- **Restrooms:** Ventilated/Exhausted – Restrooms with exterior walls will receive some supplemental heating.

Design Occupancy:

The HVAC will be designed based on occupancy density indicated in the ASHRAE and Mechanical code. In general, occupancy is as follows:

- Person heat load (250 Btu/Hr sensible/200 Btu/Hr latent)
- Person heat load in play area (275 Btu/Hr sensible/275 Btu/Hr latent)
- Design Building Occupancy: 350 students + 10 staff

Annual Schedule:

The building will be occupied year-round with some summer usage and typical holidays observed. A building schedule is included which indicates occupied and un-occupied operation, expected occupancy, and which extended schedule areas are in use.

- Typical annual schedule:
 - First Week of August to Third Week of May
- Extended scheduling
 - TBD
- Summer scheduling
 - TBD

Envelope:

- Roof: TBD
- Framed Walls: TBD
- ICF Walls: TBD
- Windows/Storefront: TBD
- Foundation Slab: 6" concrete with perimeter insulation.
- **Building Pressure Testing:** A building pressure test shall be performed to guarantee envelope performance at 0.20 cfm/ft². Blower door pressure test shall be performed after exterior envelope has been sealed but prior to interior and exterior finish application in order to maintain access to potential leakage points that need to be fixed.

Lighting:

- Building lighting includes full occupancy sensor coverage.
- Office Lighting Density: 0.4 W/sf (LED Troffers).
- Play Area Lighting Density: 0.65 W/sf (High-bay LED).
- Wrestling/Weight Room Lighting Density: 0.65 W/sf
- Corridor Lighting Density: 0.4 W/sf
- Exterior lighting with photocell/timeclock control. (LED poles and wallpacks).

Equipment/Plug Load Inputs:

- Exam Rooms = Assuming 1 laptop computer at 50W.
- Offices = Assuming 1 laptop + Printer/copier + TV at 300W.
- Concessions = 20 kW electric (heating only cooking equipment)
- MDF room = 2000 watts computer equipment (Conditioned).

Domestic Hot Water Generation:

- High efficient gas fired water heaters.
- 120°F Water Temperature delivered to the building.

Ventilation Rates:

- Compliant with ASHRAE 62 and LEED Requirements. Occupancy based ventilation control in classrooms, and demand control ventilation using CO2 sensors in the play area, weight room, and wrestling.
- 62.1 ventilation calculations for room-by-room ventilation data.

HVAC Equipment Operation:

- Controls to include programming and scheduling for occupied and un-occupied operation.
- Space temperature and outside air ventilation shall be interlocked to room occupancy sensors.
- Occupancy sensors controls occupied and vacant mode of operation:
 - Minimum ventilation rates

Occupied: ventilation at minimum 62.1 airflow rate (SF component).

Vacant: Ventilation at zero (terminal unit damper closed).
- Auditorium, Dining, and other large occupancy zones to include CO2 sensors to reduce ventilation rates during non-peak occupancy. CO2 controls from design airflow to minimum 62.1 requirement (SF component) during building occupied operation.

c) Heating and Air Conditioning Systems

The new system shall be a stand-alone geothermal system. Each building will have a geothermal wellfield with 400' vertical wells. Zoning and quantity will be determined as the floor plan progresses. The ventilation (outside) air is de-coupled from the HVAC heating and cooling within each space (or zone) receiving outside air separately utilizing demand control. The following options will be evaluated as viable HVAC options for the fieldhouses:

Option 1 – Geothermal Air Handler with Water-to-Water Cooling/Heat Generation

Fieldhouse to be served by (2) central variable volume air handlers. Field house to be zoned to have AHU-1 serve the play area/Indoor field, and AHU-2 serve the remainder of the building. Units will be located within a mechanical platform on the second floor.

Both air handling units shall have fully ducted supply and return sheet metal ductwork with flexible runouts to diffuser and grilles. FVAV and VAV boxes with hot water reheat coils will be utilized for local space temperature control. Each FVAV/VAV unit will have their own dedicated Thermostat. All supply air ductwork shall be insulated with 2.2" thick, $\frac{3}{4}$ pcf duct wrap with vapor barrier (installed R-value $R>6$). Return air ductwork will not be insulated. Fabric ductwork to be utilized within the play area (indoor field) for improved durability and look. Each heat pump unit will include a duct-mounted pre-filter rack. The pre-filters shall be 24"x24" Flanders/FFI PrePleat 40. Condensate for each unit will be disposed of through a floor drain into the sanitary system.

Units to receive cooling and preheat from a Water-to-Water heat pump. The Water-to-Water heat pump will be tied into the geothermal system, with a secondary heating/cooling loop that tie into the AHU's. The heating/cooling loop will have inline pumps to circulate water to/from the AHU's. This system will also require a reheat loop to supply hot water to the VAV reheats throughout the building. An additional heat pump chiller with associated floor set, end suction pumps will be required to circulate the water throughout the building.

HVLS fans will be provided within the play area (indoor field) and weight room for improved air circulation. Fan will be variable speed, and tied to the BAS.

Option 2 – Geothermal Heat Pump System

Each heat pump will be a high efficiency, two-stage or single stage heat pump unit with an ECM fan motor. Most of the units will be mounted in a closet or mechanical room. Each heat pump unit will utilize refrigerant R-410A and will have an ozone depleting potential (ODP) of 0.05 or less.

Each zone will have a heat pump with a thermostat (adjustable) and associated space temperature sensors. For demand control ventilation, appropriate spaces will also include CO2 and occupancy sensors. The thermostat/sensors, CO2 and occupancy sensors are to interface to the building automation system. The CO2 and occupancy sensor inputs will be utilized to control the space ventilation terminal unit and space temperature set points.

All heat pump units shall have fully ducted supply and return sheet metal ductwork with flexible runouts to diffuser and grilles. Existing ductwork for demolished heat pumps will remain and be re-used where applicable. All supply air ductwork shall be insulated with 2.2" thick, $\frac{3}{4}$ pcf duct wrap with vapor barrier (installed R-value $R>6$). Return air ductwork will not be insulated. Fabric ductwork to be utilized within the play area (indoor field) for improved durability and look. Each heat pump unit will include a duct-mounted pre-filter rack. The pre-filters shall be 24"x24" Flanders/FFI PrePleat 40. Each heat pump shall include integral disconnect. Condensate for each unit will be disposed of through a floor drain or open receptacle into the sanitary system.

The system will utilize a central pumping system. The system will consist of two (3) base-mounted end-suction variable speed pumps. Each pump will be sized at 50% of the building's block load (~80 to 100 gpm each). Flexible stainless steel braided hoses shall be used at the connection of each heat pump unit. The hose kits shall include shut-off valves on each the supply and return and a strainer on the supply hose. The return hose kit shall also contain a two-way, two-position control valve and flow control device. New piping will be laid throughout the fieldhouse to feed the new heat pumps and all other associated equipment.

HVLS fans will be provided within the play area (indoor field) and weight room for improved air circulation. Fan will be variable speed, and tied to the BAS.

d) Ventilation Systems

The outside air systems for the Fieldhouses shall be de-coupled. In general, outside air shall be provided directly to the occupied space. The dedicated outside air handling units will be indoor type and include supply/exhaust plenum fans. The units shall be variable volume air flow, energy recovery type units utilizing building exhaust and general exhaust air to precondition the outside air through a total energy recovery wheel. All conditioned outside air ductwork shall be insulated and building exhaust air ductwork will not be insulated – this applies to positive pressure outside air ductwork and negative pressure exhaust air ductwork. All un-conditioned air ducts shall be insulated with 3" thick, $\frac{3}{4}$ pcf duct wrap with vapor barrier – this applies to negative pressure outside air ductwork and positive pressure exhaust air ductwork.

The outside air units will consist of the following sections/components: stacked on top and in the direction of air flow will be an inlet filter, energy recovery wheel, and plenum type, exhaust air fan (sized at 100% airflow), on the bottom will be an inlet filter, energy recovery wheel, access, face and bypass damper, access, plenum type, supply air fan (each sized for 100% airflow). Each fan will be controlled by a VFD for varying airflow conditions. During low ventilation conditions, only one of the fans would be needed to meet the ventilation requirements. The exhaust fan is sized at 20% reduction in capacity (thus maintaining building pressurization). The supply air distribution system will supply outside air to VAV terminal units for distribution of outside air to each zone.

To control outside air, two strategies will be employed. In large, varying occupancy spaces (Play Area, Weight Room and others), a CO₂ sensor will be used for ventilation control. The VAV terminal serving these areas will modulate in accordance with the CO₂ measurements. In other locations, the VAV terminal will also be interlocked with room occupancy sensor. The ventilation rate will be modulated based on occupied and vacant spaces conditions. The total space by space occupancy count is expected to exceed actual building occupancy; however, the building occupancy is 350 students and 10 staff. Designing a variable ventilation system based on actual building occupancy reduces the central ventilation system by ~30 percent, thus reducing the HVAC load.

e) Geothermal Well Field and Piping System

Sizing of the well field is based on block/diversified internal loads and designed for 80-85°F geothermal supply water temperature. The well field will be preliminarily sized for 70 tons of capacity requiring ~40 to 50 wells (4 to 5 circuits with 10 wells each). While the well field isn't designed with spare or redundant capacity, the loss of one circuit would still allow building operation with geothermal supply water temperature rising approximately 5°F.

The geothermal well field will consist of 400' deep wells. The bores will be 6" in diameter and will include a factory-made DR-9, 1-1/4" U-tube, fully grouted well. An underground vault will be utilized to header the circuits together. The wells shall be installed on a 20' by 20' grid system in the field behind the new school building. All horizontal mains shall be a minimum of four feet below grade and the trenches shall be 100% back filled with rock or other suitable materials.

All geothermal piping exterior of the building shall be HDPE butt-fused joints and fittings. All geothermal piping mains interior of the building shall also be HDPE butt-fused joints and fittings so as to eliminate steel piping in this geothermal/hydronic loop. Heat pump run outs shall be copper or HDPE. The well field piping and building piping will be purged to remove dirt, debris and air. The system will include side stream filtration, air elimination equipment, isolation zone/valves, central chemical treatment and fill, and a purge pump.

With typical geothermal supply water temperatures operating higher than the space dew point, only concealed geothermal piping (HDPE) will be insulated with 1/2" thick fiberglass. Startup of the system shall be initiated and operated as required to prevent below dew point distribution water temperatures until steady state operating temperatures are achieved and maintained. However, concealed, non-accessible geothermal piping interior of the building and metallic branch piping may be insulated with 1" thick fiberglass insulation.

f) Temperature Control

The new fieldhouses will be added to the existing control system within each respective high school. Existing systems are currently Tracer SC. All new/replaced equipment will be tied into Tracer SC system. The controls system will also include a JACE panel to communicate (wired/wireless) over the web-based area network. The BAS shall also interface with the building lighting, exterior lighting, and switch gear / electric metering. BTUH metering shall be provided for the central geothermal system, kitchen systems, etc. The system shall be ASHRAE 135 BACnet compliant using BTL listed components (to the extent possible)

Division 26 – Electrical**a. Codes and Standards**

See above for requirements.

b. Demolition**Bullitt East**

Demolish existing softball field lighting, pressbox, sound system, scoreboard and overhead electrical service.

Demolish existing baseball field lighting, pressbox, scoreboard and sound system.

Demolish existing field house/concessions service disconnect (red cabinet at front of field) to allow for new field house location.

Bullitt Central

Demolish existing softball field lighting, pressbox, sound system and scoreboard.

Demolish existing baseball field lighting, pressbox, sound system, scoreboard.

Rework existing main overhead electric to site to underground for portion around new field house.

Relocate college and career center transformer and secondary service as required for new field house.

Demo main school primary lateral pole, replace with pull box and replace overhead to underground to new pull box.

Bullitt North

Demolish existing softball field lighting, pressbox, sound system and scoreboard.

Demolish existing baseball field lighting, pressbox and sound system (scoreboard to remain).

c. Power Distribution System**Bullitt East Site**

Provide new primary service conduits, utility transformer pad and secondary electrical service conductors to new main power branch panel for new softball pressbox and lighting.

Reuse existing electrical distribution for existing baseball field and refeed new lighting and pressbox.

Provide new primary service conduits, utility transformer pad and secondary electrical service conductors to main power distribution panel for new Field House. Provide feed from new fieldhouse to back feed old fieldhouse/concessions building fed from displaced red cabinet at front of field.

Bullitt Central Site

Demolish existing softball field lighting, pressbox, sound system and scoreboard.

Demolish existing baseball field lighting, pressbox, sound system, scoreboard.

Provide new primary service conduits and splice/pull boxes as required to route around new field house for primary electric feed to college and career center and main service lateral pole (to be replaced) for Bullitt East.

Existing college and career center transformer to be relocated to allow for new field house. Splice secondary at college and career center exterior and provide new secondary to new transformer location.

Bullitt North Site

Provide new primary service conduits, utility transformer pad and secondary electrical service conductors to main power distribution panel for new Field House.

Provide the following for all field house interiors.

Provide a new 1000A/3P 120/208V/3PH/4W service rated distribution panel with copper bussing for field house. Service entrance panels shall be provided with a UL-1449 SPD.

Provide a new grounding electrode system consisting of (3) 10'-0" copper ground rods, a ufer ground in the building foundation, a connection to a copper water line (where present) and building steel shall be provided. A dedicated systems interconnection ground bar will be provided.

Provide 120/208V electrical branch panels for receptacles, lighting and HVAC. Provide lighting and receptacle panelboards with SPD protection. The devices will be provided integral to the equipment its protecting. SPD devices shall be UL-1449, 3rd edition-listed devices, 200kA per phase for branch panels. Panelboards

shall be provided with copper bussing, neutral and ground bars, door-in-door arrangement and bolt on breakers.

All panels will have a minimum of 25% spare capacity and space based on connected loads at the completion of design.

All wiring shall be copper, minimum #12AWG THHN/THWN installed in conduit with compression fittings, minimum size 3/4". MC cable will not be acceptable for home runs, only in walls/room serving and no-where exposed. Exposed exterior conduit will be rigid steel with threaded fittings. Underground exterior conduit for service entrance, floor boxes, etc. will be PVC with rigid steel ells. Flexible metal conduit will be allowed in lengths no longer than 6' and only for lighting whips, motor connections, and final equipment connections. Under-slab/in-slab raceways will not be allowed unless specifically permitted on the drawings. Underslab raceways will be minimum of 24" below grade. Where technology raceways are provided underslab, they will be concrete encased, minimum of 12" deep. Raceways and boxes in ceiling for 120/208V will be standard factory EMT color, 277/480V will be orange.

Power connections and code required disconnecting means will be provided for all HVAC, plumbing and electrical equipment. Combination starter/fusible disconnects will be provided for selected equipment as required where 1HP and larger or without VFD control. All disconnects shall be heavy-duty type.

All wiring devices will be specification grade, 20A tamper resistant shutter type with nylon unbreakable coverplates. All back boxes will be 4-11/16" square x 2-1/8" deep, galvanized steel, with knockouts and appropriate mud ring for number of device gangs required.

All 125V and 250V non-locking receptacles will be tamper resistant, shutter type. GFCI protected, Weather Resistant (WR) receptacles will be used in wet locations and elsewhere as necessary and where required by code. All exterior receptacles will be provided with a diecast in-use, lockable covers.

All outlet covers will be provided with clear adhesive labels and black lettering indicating panel number and circuit number. The inside of the outlet box will also be labeled with panel and circuit.

Lamacoid labels will be provided for all electrical distribution equipment.

All Electrical equipment and components will have a full one-year parts and labor warranty from the date of substantial completion. All luminaire ballasts, drivers and lamps will have a manufacturer's five-year unconditional warranty. This will run concurrently with the one-year parts and labor warranty.

d. Lighting Systems

Field House Interior Lighting

Interior Lighting will be designed in accordance with IESNA guidelines including the Illuminating Engineering Society of North America (IESNA) Handbook, IESNA Recommended Practices and Kentucky Department of Education Facility Programming and Construction Criteria Planning Guide.

Interior artificial lighting will be largely accomplished with suspended high-performance LED direct/indirect fixtures and 2x4 recessed troffers throughout the facility with specialized LED lighting in selected spaces.

Lighting in the practice area will be LED high bays with wire guards.

Lighting in enclosed stairwell spaces will be LED wall mounted direct/indirect fixtures.

Lighting in the mechanical and electrical rooms will be 4' LED chain hung strips with acrylic diffusers and wireguards. These fixtures will be non-dimmed and switched.

Exit signage will be white, die-cast aluminum type with red lettering. Ceiling or wall mounted as necessary for the location.

Emergency lighting throughout the building will be handled via integral battery inverters.

Lighting Levels

Provide average maintained horizontal light levels, in foot-candles (fc), as noted below:

- Corridor/ Lobby 20 fc
- Offices 30 fc
- Meeting Rooms 50 fc
- Admin Support Spaces 30 fc
- Stairwell 20 fc
- Building Services 20 fc
- Mechanical Spaces 20 fc
- Electrical Spaces 20 fc
- Classrooms 50 fc
- Music 75fc
- Media Center 75fc
- Open Field House 50fc

Exterior Lighting

Dark sky compliant LED exterior lighting will be provided around the exit doors and to light the perimeter of the building. Parking lot lighting will be LED fixtures on aluminum poles with concrete pole bases.

Lighting Controls

100% occupancy/vacancy sensor coverage will be provided throughout except in electrical and mechanical rooms or areas where safety or security is a concern. Vacancy sensors will be manual on/automatic off.

Digital lighting controls will provide preset lighting levels in each classroom consisting of 25%, 50%, 75% and 100% output.

Spaces other than corridors, electrical/mechanical rooms, public lobbies, restrooms, stairways and storage rooms shall be provided with raise/lower dimming controls for lighting.

Automatic daylight control will be provided where required.

Ganged restrooms shall utilize fork key control for disabling automatic turn on.

Exterior lighting will be controlled through a local lighting contactor panel that will be BAS controlled. It will contain three zones of override lighting as follows:

- Parking lot lighting
- Building mounted lighting

Sports Lighting

New Baseball and softball fields will be provided with LED sports lighting and controls applicable for their use. Sports Lighting will be MUSCO.

e. Fire Alarm System

A new fully addressable fire alarm system shall be provided with mass notification voice evacuation and initiation devices per NFPA requirements. All peripheral devices shall be installed per ADA requirements. Connections will be provided to all fire suppression equipment, air handling units over 2,000CFM, door access controls, etc. CO detection will be provided at all gas fired appliances (typically one in the boiler room and one in the kitchen). Smoke detection will be provided at storage rooms, janitor closets, elevator rooms/lobbies and electrical/data rooms. Heat detectors will be provided in mechanical rooms and other dusty environments requiring early warning, kitchens and science classrooms.

The system will be activated by manual means at exits and as required by Code.

The system will be activated by automatic means on sprinkler water flow, control locations, smoke doors and air handling units as required by Code.

All fire alarm cabling will be routed in factory red raceways for main runs. Where concealed in walls and ceilings within rooms, RED MC cable is allowable for fire alarm.

Poly carbonate protective covers will be provided in all ganged restrooms.

Division 27 – Communications

Telecommunications Systems and Specialty Systems will be provided in the project. Intercom and clock system and intrusion will be provided as part of the contract. Contractor will provide a complete system (rough-in's, cabling paths, cabling, devices, etc.) for all of the above, unless otherwise noted. Access control, IP CCTV systems, data/voice and AV Systems will be rough-in and stub out only. Minimum stub-out conduit size will be 1" and cabling paths will consist of 12" and 18" cable tray paths. Multiple dedicated distribution frame rooms will be provided for the facility.

New fiber utilities will be demarcated in a new service entrance MDF IT room.

Fiber will be intercepted from pull point provided on phase 1 of project.

A telecommunications main grounding system will be provided consisting of copper grounding interconnection between each MDF/IDF closet and the grounding electrode system.

The intercom system will consist of expansion of the building wide interior and exterior paging and two-way communications systems at instructional spaces. Basis of design for the intercom system to be determined.

The security system will consist of monitoring exterior door access locations and general corridors. The system basis of design will be Bosch.

CCTV equipment will be POE and OFOI. The contractor will provide a CAT6 connections to all camera locations with a 10'-0" service loop located on a j-hook for future installation by BCPS.

Access Control head end equipment will be OFOI. Select doors will be provided with card reader functionality utilizing electric strike/latch retraction systems. Access control door will be provided with an IP POE camera, OFOI. All cabling and door hardware will be CFCI.

All IP cabling will be bid and provided by a separate telecom bidder through a separate telecom package coordinate by the architect.

Audio Visual Systems

Baseball and Softball fields will be provided with new standalone sound systems for announcements and music. Speakers to be pole or press box mounted.

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