Montgomery County Public Schools

A Proposal for Architectural and Engineering Services

New Blacksburg High School
New Auburn High School
Auburn Middle School Renovations

March 21, 2011

Volume II

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2.a Provide a description of the project, including the conceptual design. Describe the proposed project in sufficient detail so that type and intent of the project, the location, and the communities that may be affected are clearly identified.

Educational Facility Improvements – Blacksburg High School General Project Description

In response to the need to replace the recently closed Blacksburg High School, our team has prepared solutions developed through extensive discussions with building level and central office administrators from Montgomery County Public Schools, representatives from the Town of Blacksburg, and members of the greater community at large. These solutions include, among other things, a new high school and significant improvements to the campus on Prices Fork Road shared with Blacksburg Middle School and Kipps Elementary School.

The general goal of the MCPS staff is to build a new Blacksburg High School to accommodate 1400 grades 9-12 students with core facilities (dining, administration, media center, and auditorium) designed to accommodate up to 1600 students to allow for future expansion. It is intended that the solutions proposed herein will follow the MCPS Planning Standards that were adopted by the School Board in 2000.

Since the funding provisions for these improvements (as well as those for the Auburn strand projects) have not been precisely identified, our team has provided multiple design and pricing options for your consideration. These options are described under the building descriptions narratives that follow.

A Carefully Conceived Site Plan

At the edge of the town, the Blacksburg High School is just south of the existing Blacksburg Middle School and Kipps Elementary School. It is adjacent to the recently constructed competition field and stadium as well as a variety of community use fields. The site is bordered on the east by the Stroubles Mill neighborhood and to the west by a future private development. A large parking area was constructed on the site to support the stadium facility. A low ridge cuts diagonally across the site offering broad views to the south. After several iterations that included reviewing numerous options with key stakeholders, a strong functional diagram was developed that

- is organized for safety and ease of use,
- is sensitive to topography and climate,
- Is sensitive to neighbors and to plans for future development, and
- maximizes opportunities for community use.

blacksburg hs project description

Starting from the approach to the school from Prices Fork Road and then working into the heart of the campus, consider the following features of the design:

Prices Fork Road improvements. Road-widening, turn lanes, and a new traffic signal at the intersection of Prices Fork Road and Old Mill Road will provide safe and functional automobile access to the site. Once on site, a curving, tree-lined entry drive leads past playfields and ponds toward the new school.

Separated Access. Cars and buses sharing roads - even for short distances - is needlessly risky - so at no point do we propose that they do so. Bus and service traffic is completely separated from the automobile traffic of staff, students, visitors and parents dropping off or picking up their children. The long entry drive allows for generous on-site vehicular queuing for the student drop-off at the front of the school.

Well-organized Parking. The plan takes advantage of the existing parking lot as the main student parking area and event parking for the completion field/stadium complex. Additional parking is provided near the school for staff, visitor, and handicap parking. Where necessary, parking is provided for other competition and community use fields.

Efficient Bus Staging. One of the major benefits of a multi-school campus is operational efficiency. Since busses will deliver both middle and high school students, the bus staging for the new high school is designed as an extension of the existing middle school bus loop. Separated from automobiles and service, this allows for an efficient drop-off and pick-up sequence and improves safety by concentrating bus movement on the site. From the bus drop-off, students enter the school through the events lobby. A swinging security gate (or similar method) placed on the access road can readily allow the bus area to be utilized for after-hours car parking.

Efficient and Discreet Service. Similar to the bus access, the new service drive to the high school is an extension of the service to the middle school. The service area is tucked between the gyms and the existing hill to obscure this area from view,

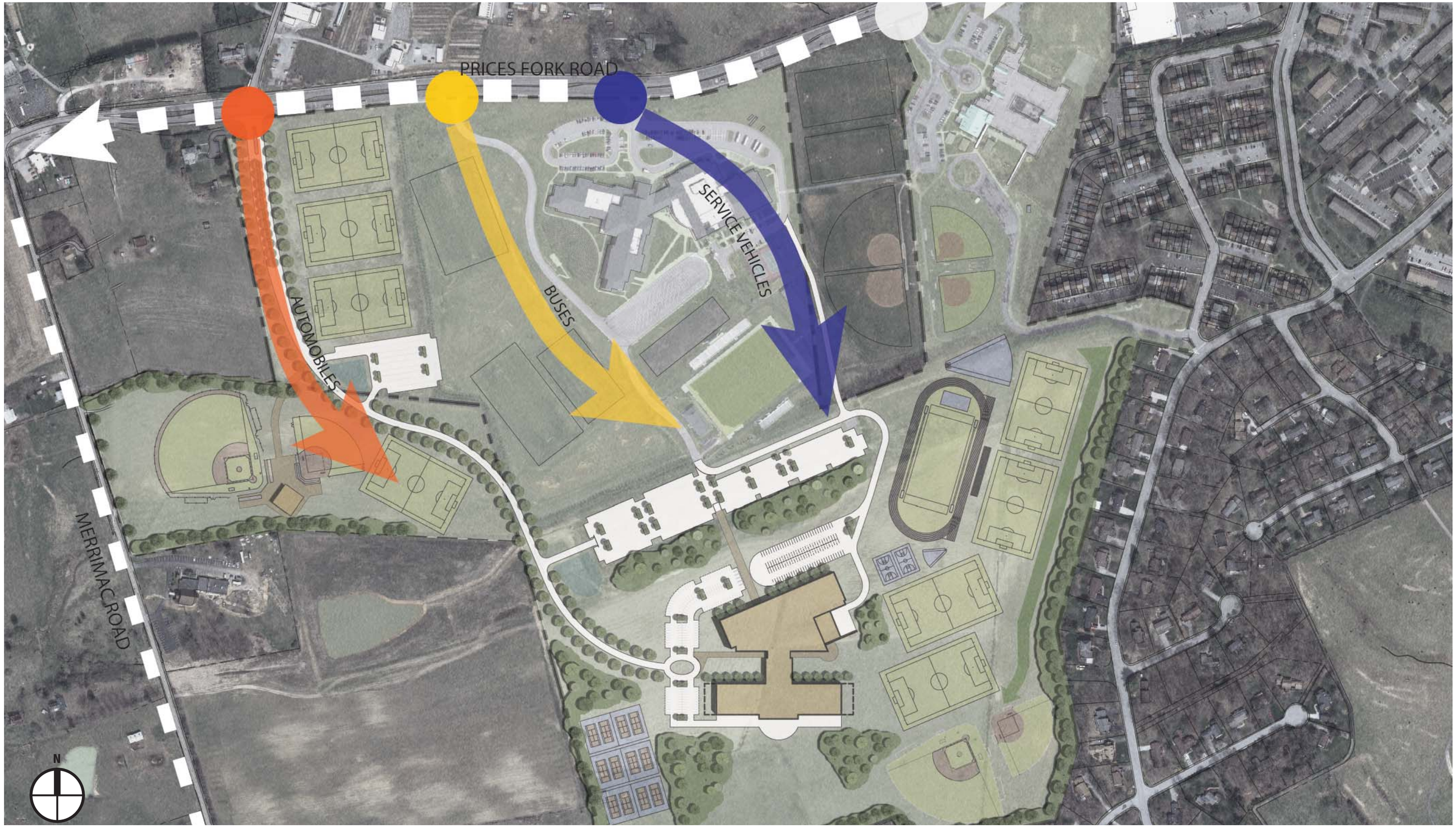
Landscaped Buffers: Substantial landscape buffers are proposed at the perimeter of the site to buffer neighbors. Further, the existing topography (the ridge) is used to screen the new building from adjacent parcels. In addition, more active site programs (parking, busses, service, competition fields etc.) are concentrated on the north and west of the site, toward the existing schools and Prices Fork Road. No lighted activity areas are proposed along the eastern or southern edges.

Athletic Fields and Community Use Facilities. We have attempted to maximize the value both the school and the community. One of the major benefits of the proposed site plan is that it maximizes the potential for school and community use fields and facilities on this site. In this proposal, all existing school and community use fields are maintained. To the east of the school, a variety of non-lit practice fields are proposed as an additional buffer to the adjacent neighborhood. A cross-country track beginning in the northeast corner can

also serve as an after-hours walking path around the site. A new track and new tennis courts are located near parking to facilitate after-hours community use. A new competition baseball and softball complex is located near dedicated parking to the northwest. Further, the site is planned to accommodate as many as four additional full-size soccer fields adjacent to existing community use fields.

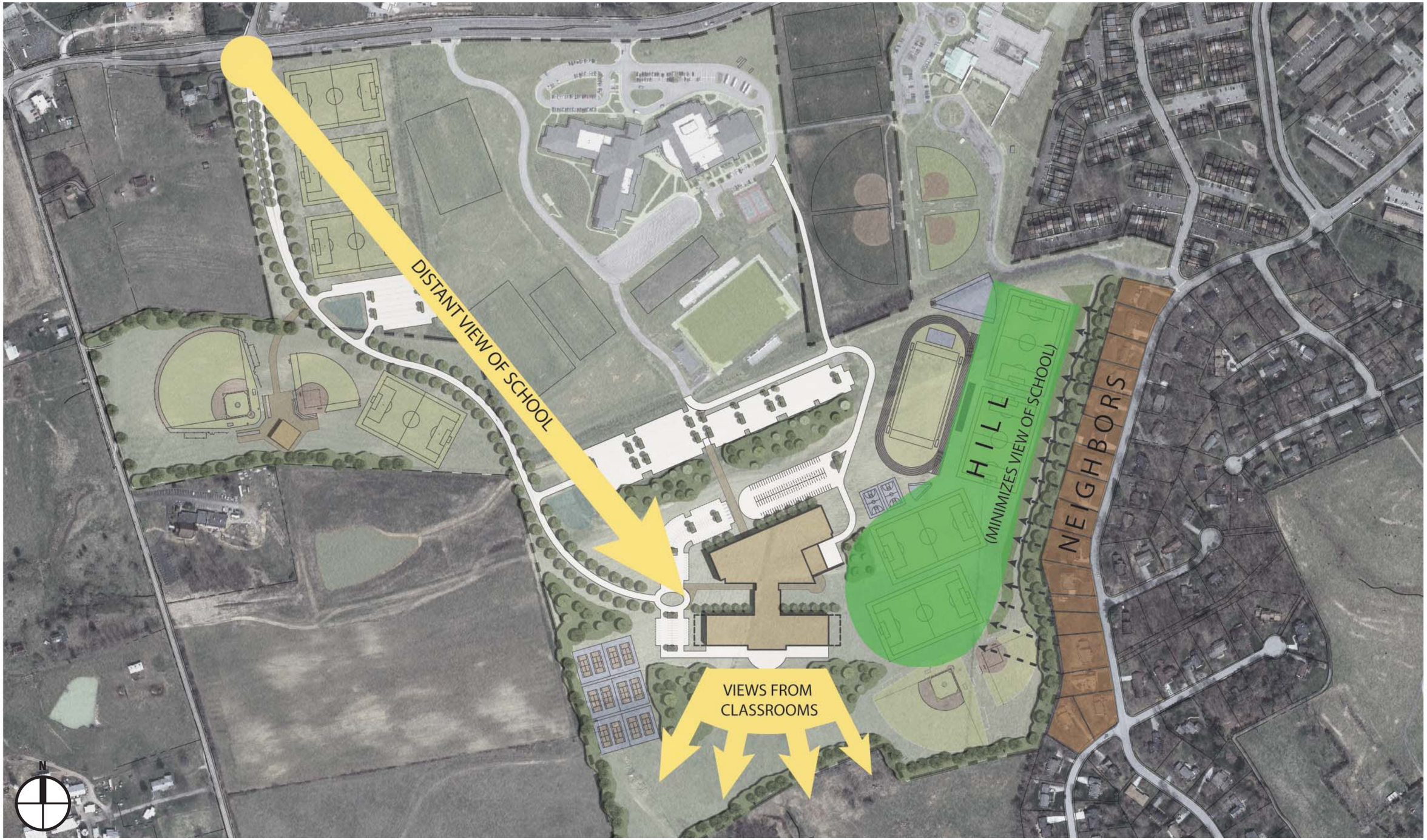
Effective Relationship between Site Features and the Building Plans. The site plan and building layout are designed to work in harmony and support one another. The building is positioned to work within the existing topography and to minimize costs associated with extensions and/or needless grading. Further, it is configured to provide excellent solar orientation, which allows the building to incorporate exceptional daylight harvesting strategies throughout, thereby helping to offset operational expenses both by capturing natural light and by minimizing the mechanical loads. After hours parking is located strategically adjacent to public building spaces such as the auditorium, gymnasium, media center, health/community classrooms, and fitness rooms. Note also the effective relationship between indoor athletic areas and outdoor athletic fields. Team locker rooms are located for easy access to practice and competition fields. The paved bus loop makes an excellent all-weather play surface and practice space for the marching band.

Other Features of the Site Plan. Approximately 768 parking spaces are provided for the high school and approximately 120 spaces are provided for the middle school. The bus staging area is designed to accommodate a total of 20 buses and can be double-striped to provide supplemental after-hours parking. The plan provides for four large multi-purpose fields, six tennis courts, and new competition fields for softball, baseball, and tracka new track complex. Options could provide practice baseball and softball fields, 6 additional tennis courts, and 4 additional rectangular fields.



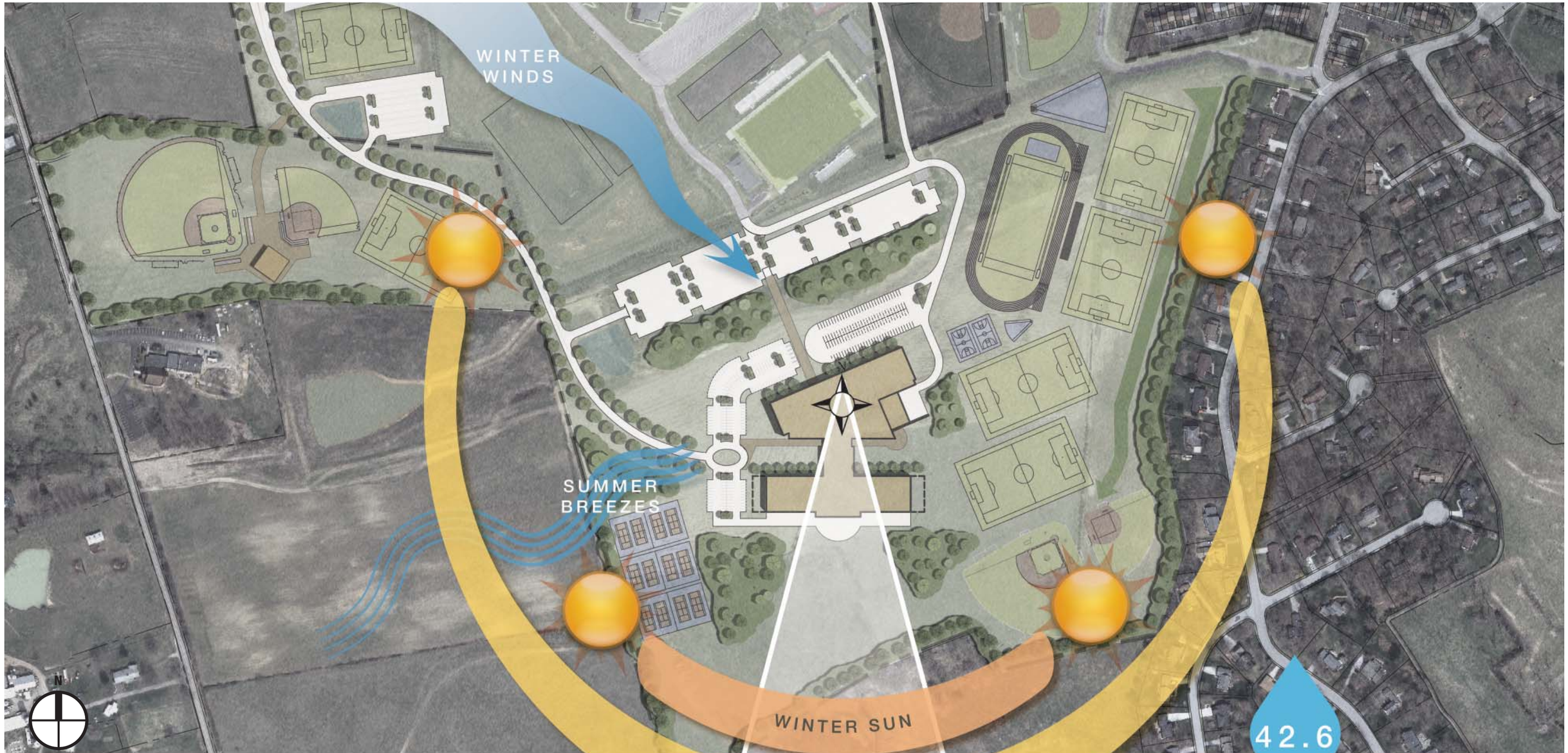
*site plan depicts a range of field *options*

blacksburg high school traffic flow diagram



*site plan depicts a range of field *options*

blacksburg high school site diagram - views



*site plan depicts a range of field *options*

blacksburg high school climate diagram

Characteristics Unique to the Blacksburg High School Scenarios

We have worked carefully to incorporate best practices into the layouts of the New Blacksburg High School. In addition to the application of best practices for school design, we have had a number of meetings and workshops with the MCPS staff to understand and apply their priorities in regard to the physical configuration of the school. As a recognized "Top Public High School", we understand that there are high expectations for this high school in the Blacksburg community. The features described below are illustrated in the drawings found in pages that follow.

1. There is a direct and clear connection between the main parking areas, parent drop-off, and the main entrance of the school. The administration area is placed at the main entry with clear supervision of those entering both the site and the building. Vestibule entry doors can be set (locked) to require all visitors to enter directly into the administrative waiting area as opposed to entering directly into the lobby should an extra layer of security be deemed necessary.

2. Students arriving or departing by bus enter the events lobby on the north side of the facility and are directed past the administration on their way to the classroom area.

3. The organization of the building on three stories addresses the significant topography of the site, allows for a large school to remain relatively compact, and creates the potential for a strong connection between CTE programs and the rest of the academic program.

4. The corridor configuration for each school is straightforward and simple, promoting ease of supervision.

5. Public areas are easily secured from the academic wing for after-hours use. Health classrooms are located on the "public" portion for proximity to athletic areas, and to provide after-hours classroom spaces for the community.

6. Generous main corridors and the location of open dining areas and courtyards provide space to manage heavy attendance at sporting events, performances, and other events drawing the community in large numbers.

7. Areas of the school needing vehicular access by trucks, vans, or buses have convenient access to service drives or bus staging areas.

8. The design allows significant flexibility for a variety of instructional models. For instance, the school can be organized as grade houses, as departments, or as small learning communities. Further, CTE programs are integrated throughout the school. With the more hands-on programs located on the lower levels with walk-out - or drive-out, as the case may be - access to the site on the south side.

9. The center of each classroom grouping is designed to provide a wide variety of learning environments – flexible and technology-rich spaces for student centered-learning.

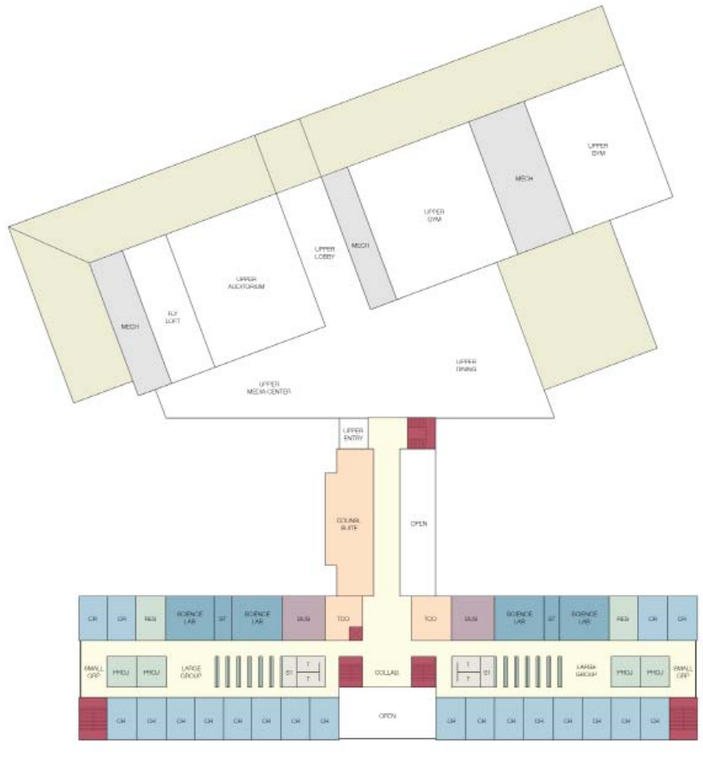
10. With close scrutiny of the proposed plans, one can see that the academic wings are placed in a nearly ideal orientation for daylight harvesting. With the application of sophisticated energy modeling software, the use of fully dimmable lighting controlled by light sensors, and the careful specification of light shelves, sloped ceilings, and advanced glazing products, we can create efficiently daylit classrooms. This proven approach yields first-cost savings of mechanical systems, significant energy savings, glare-free lighting, and a healthy environment. The orientation of the classrooms also celebrates views to landscaped courtyards and the mountains south of the site.

    These characteristics apply to both the Maximum Savings Plan and the Maximum Value Plan. The enclosed program charts reveal that the primary difference between these plans is the number and size of instructional spaces that are provided.

    In terms of exterior building character, the building massing promotes the use of the type of sloped metal roofs preferred by MCPS. The prevalent use of brick in a varied pattern and the use of roof overhangs provide an architecture that is contemporary yet compatible with the existing Blacksburg Middle School and Kipps Elementary School.

1st floor

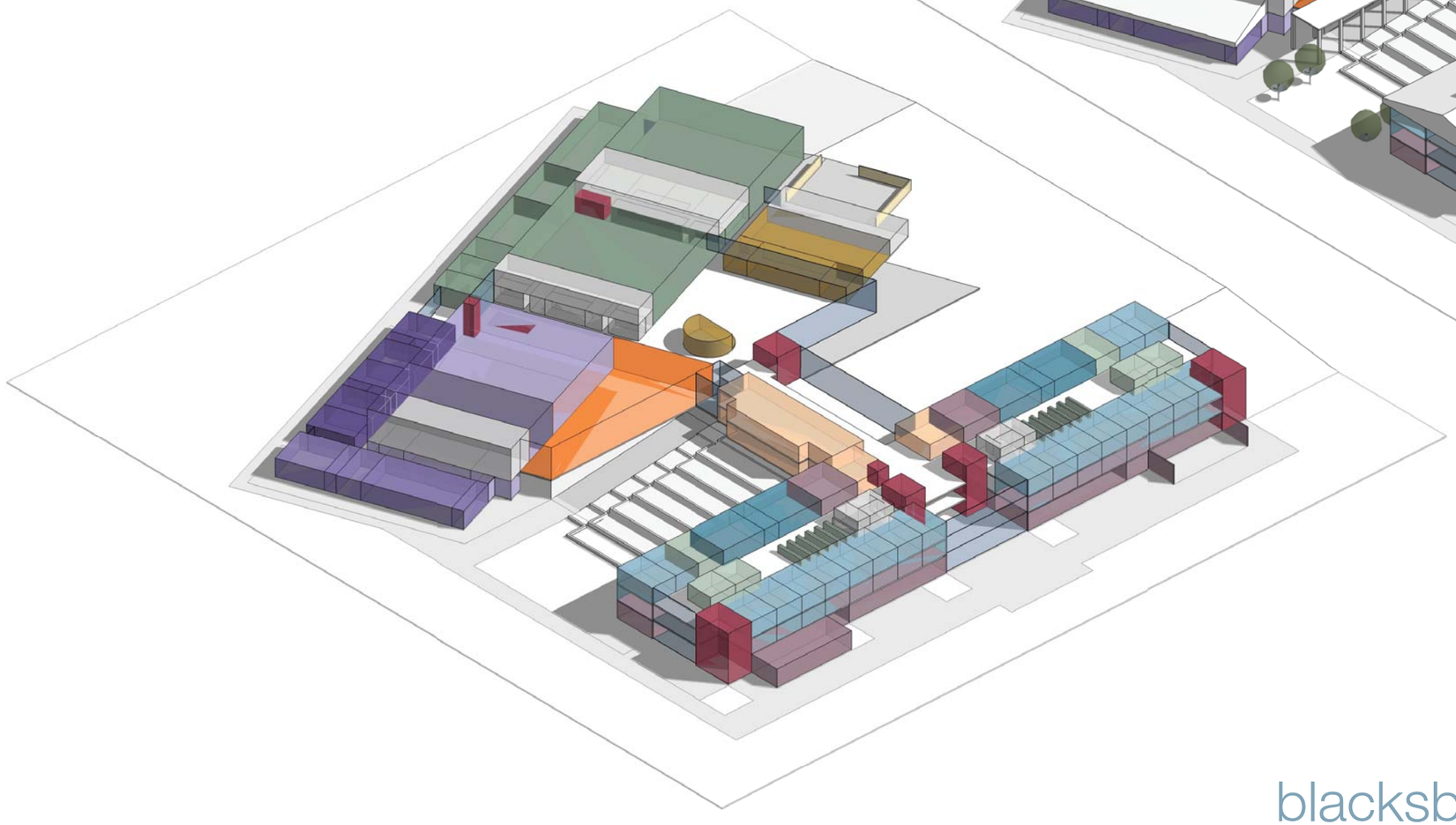
2nd floor



3rd floor

blacksburg high school - floor plans

*depicts one option



blacksburg high school axonometrics

*depicts one option

Educational Facility Improvements – Auburn Strand General Project Description

In response to the need to improve and expand the educational facilities at the Auburn Strand, our team has prepared designs that have been developed through extensive discussions with MCPS staff and with input from numerous meetings with the community and Auburn teaching staff. These designs provide for a new high school, the renovation and expansion of the existing high school to become a middle school, and significant site improvements to the campus. The elementary school is not addressed in this proposal.

The general goal of the MCPS staff is to build a new Auburn High School to accommodate 600 grades 9-12 students with a design of core facilities (dining, administration, media center, and auditorium) to accommodate an expansion capability of up to 800 students. For the new Auburn Middle School, the goal is to design for 480 students with an expansion capability to accommodate 600 grades 6-8 students. It is intended that the quantitative space programs for each school will follow the MCPS Planning Standards that were adopted by the School Board in 2000.

Since the funding provisions for these Auburn Improvements (as well as those for Blacksburg High School) have not been precisely identified, our team has provided multiple design and pricing options for MCPS consideration. These options are described under the building descriptions narratives that follow.

A Carefully Conceived Site Plan

With such limited land area and numerous constraints from the presence of existing facilities, the Auburn Strand site presents a challenge to satisfy all of the program requirements. Yet, through the study of numerous site schemes and the process of listening carefully to the concerns and priorities of the MCPS staff and the community, we found a way to meet all of the site program requirements and produce a strong functional site diagram.

Starting from the approach to the school along Route 8 and then working into the heart of the campus, consider the following features of the design:

Route 8 improvements. Road-widening, turn lanes, and the reduction in the number of site entrances from Route 8 will improve safety and functionality. Once on site, bus and service traffic is completely separated from the automobile traffic of staff, students, visitors and parents dropping off or picking up their children. For student drop-off areas, on-site vehicular queuing is generous and easily managed for both the new high school and middle school.

Well-organized Parking. Parking areas for the two schools are appropriately sized and separated to promote the community desired separation of middle and high school students. The larger high school parking areas are well positioned to serve the track/stadium complex and provide the opportunity to provide an improved entry and internal operation of the stadium complex. For both schools, staff, visitors, and students come

into each school's singular main entry area that is clearly supervised by each school's main office. Only bus-riding students for the middle school enter into an area separate from the main entrance.

Efficient Bus Staging Area. Notice how the two, linear bus staging drives will efficiently provide separate bus areas for each school. A swinging security gate (or similar method) placed between the middle school bus parking area and the middle school parking can readily allow the bus area to be utilized for after-hours car parking.

Prudent Demolition, Athletic Fields and a Campus Green: One of the major benefits of our proposed site plan is the way it addresses the need for numerous athletic fields in combination with the demolition of existing structures that are the best candidates for demolition. It was a community priority that all athletic fields be located on site. Athletic fields obviously require large rectangular open areas. Given the limited land area, these fields would need to fit like a puzzle. The proposal to demolish the existing middle school, several outbuildings of the existing high school, the tennis courts, and high school parking facilitate the solution to the puzzle. The buildings and site features that have been proposed for demolition are not only a hindrance to an efficient site layout, they are facilities that provide little opportunity for effective continued service. The existing tennis courts and parking areas are in poor condition and awkwardly graded. The existing middle school is a one-story facility whose configuration does not lend itself to the efficient adaptation of new program requirements (it was designed as an elementary school). The location and elevation, as well as the poor condition, of the other outbuildings make them poor candidates for re-use in an integrated middle school floor plan. Finally, as an added bonus, the location of the new athletic fields creates an internal campus green in the heart of the campus and moves most of the parking outboard. Safety is improved, the relationship between athletic fields and parking is improved, and the plan is more ordered and attractive.

Effective Relationship between Site Features and the Building Plans. The site plan and building layouts are designed to work in harmony for a strong simple diagram. Both schools are configured to provide excellent solar orientation, which allows the building to incorporate exceptional daylight harvesting strategies throughout the schools. Note the relationship between parking and public building spaces such as auditoriums and gymnasiums for both schools. Note also the effective relationship between athletic areas and outdoor athletic fields. For example, a football team room can be part of the new high school making it more cost effective than a separate, stand-alone building located at the stadium.

Other Features of the Site Plan. Approximately 515 parking spaces are provided for the high school, and approximately 120 spaces are provided for the middle school. The bus parking staging areas are designed to accommodate a total of 20 buses and can also be double-striped to provide supplemental after-hours parking. The plan provides for four large multi-purpose fields, six tennis courts, and competition fields for softball, baseball, track, and soccer / football. At an option, the stadium seating will be expanded to provide 1200 home seats and 800 visitor seats. Due to conflicts generated by the school system's program requirement, the cabin and cannery building must be demolished.

*site plan depicts a range of field *options*

auburn strand site plan

auburn strand climate diagram

Building Descriptions – Several Options to Consider

Our team is aware that the logistical and economic stress precipitated by the Blacksburg High School Gymnasium collapse has prevented the logical and careful development of programmatic criteria and a total project budget. We are further aware that there has not been the opportunity to carefully balance the programs and budgets between the three schools in order to create instructional parity while recognizing the unique needs of each campus. With this in mind, our team has developed an approach to the building designs that give the school board options to consider. We have developed two primary scenarios for each school and then itemized a list of optional features that can be applied to any scenario.

Maximum Savings Plan. Our first scenario for all three projects, termed "Maximum Savings Plan," endeavors to meet only the customary program requirements of a middle school and high schools at their individual targeted student capacity. With the Maximum Savings Plan, the MCPS standards are followed only at their minimal level, and the quality of building systems and finishes are kept at a conventional level. The goal of our Maximum Savings Plan is to provide a very workable end product yet one where first cost is placed at a high priority. It should be noted that, for the Maximum Savings Plan for Auburn Middle School, the primary goal is to accommodate the program while re-using as much as the existing structures as reasonably feasible. This approach does produce cost savings, but it does so at the expense of a layout that does not effectively support the team teaching methods typically desired for middle schools.

Maximum Value Plan. Our second scenario for each school, termed "Maximum Value Plan," recognizes that lowest cost will not necessarily provide the best long-term value for Montgomery County Public Schools. Our Maximum Value Plan provides the full program of spaces that the MCPS staff believes is necessary for an optimum instructional environment. Within this section of the proposal, we offer a detailed program listing that outlines the provisions of each scenario. Cost information and other value-added options are described in Section 3 of this proposal.

Features common to Auburn High School and Auburn Middle School

- Our design team has worked carefully to incorporate best practices into the layouts of the New Auburn High School and New Auburn Middle School. In addition to the application of best practices for school design, we have had extensive meetings with the Auburn Strand Building Committee to understand and apply their priorities in regard to the physical configuration of each school. Please note the following features as demonstrated in the enclosed drawings found within this section.

- There is a direct and clear connection between the main parking areas, parent drop-off, and the main entrance for each school. The administration area is placed at these main entries with clear supervision of those entering the site and the building. Vestibule entry doors can be set (locked) to require all visitors to enter directly into the administrative waiting area as opposed to entering without proper check in.

- Students arriving or departing by bus also enter or depart at an area near the administrative office.

- The corridor configuration for each school is straightforward and simple, promoting ease of supervision.

- Public areas of each school are easily secured from the primary classroom areas for after-hours use. Health classrooms are located on the "public" portion of each school, not only for proximity to athletic areas, but also to provide after-hours classroom type space for the community.

- Generous main corridors and the location of open dining areas provide space to manage heavy attendance at sporting events, performances, and other events drawing the community in large numbers.

- Areas of the school needing vehicular access by trucks, vans, or buses have convenient access to service drives or bus staging areas. Note, for example, the relationship of the Kitchens, Fine Arts, and Exploratory / Career and Technical Education Programs to the vehicular roadways.

Characteristics Unique to the Auburn Middle School Scenario

For the two Auburn Middle school scenarios, a key feature is the preservation and enhancement of the original 1938 Auburn High School, its primary façade, and its 1953 addition. All of these historic components are good candidates for renovation and such will preserve this community treasure and icon. These oldest portions of the complex have good floor-to-floor height to accommodate modern building systems, and the structures are in good condition. Another key feature of both scenarios is the renovation and re-use of the existing auditorium, gymnasium, and vocational building. These portions of the existing complex (most built in 1972) are well placed for re-use, fit well with programmatic requirements, and thus provide a great way to capture the investment already made in these facilities. From an architectural standpoint, bit schemes are respectful of the original high school. Building massing, roof shapes, brick colors, and fenestration follow a pattern reminiscent of the original. However, the foregoing is where the similarities end.

Maximum Savings Plan for Auburn Middle School. As mentioned earlier the primary goal of the Maximum Savings Plan is to accommodate the program yet do this while re-using as much as the existing structures as reasonably feasible. With this plan, the program requirements are met from a space allocation standpoint and the plan can function reasonably well. However its layout is more reminiscent to an older junior high school model.

Maximum Value Plan for Auburn Middle School. When Compared to the Maximum Savings Plan, it is easy to understand why the Auburn Building Committee demonstrated a high degree of enthusiasm for our Maximum Value Plan. With an increase in project costs of less than 10%, the Maximum Savings Plan produces a fundamentally different design which is much more akin to a modern middle school. The Maximum Value Plan not only accommodates the program, but also provides a layout that effectively supports a team teaching strategy and a "home" for each grade level. Each grade level home can operate somewhat independently from the others, and students from one grade level have no need to travel into the home of another grade level to accommodate daily class changes. The homes are also interchangeable; allowing the administrators to decide which grade configuration is preferred in a given year.

Characteristics Unique to the Auburn High School Scenarios

For the two Auburn High School scenarios, we have already described the strength and clarity of the building and site diagrams that apply to both the Maximum Savings Plans and the Maximum Value Plan. The enclosed program charts reveal that the primary difference between these plans is the number and size of instructional spaces that are provided. Yet there are other distinguishing features and organizational options worth noting.

With close scrutiny of the proposed plans, one can see that the academic wings are placed in a nearly ideal orientation for daylight harvesting. With the application of sophisticated energy modeling software, the use of fully dimmable lighting controlled by light sensors, and the careful specification of light shelves, sloped ceilings, and advanced glazing products, we can create beautifully daylit classrooms. This proven approach yields first cost savings of mechanical systems, significant energy savings, glare free lighting, and a healthy environment.

We have shown in each scenario a different option of the organization of the 4 classroom wings. One approach places the grade-level student commons area at the entrance to each individual wing essentially articulating the arrival to that grade level home. The other approach moves the commons area deeper into the central part of the wing, creating a stronger association with more general classrooms. This approach also allows the science classrooms to move closer to the central core of the entire academic wing allowing the science function to operate with a more departmental approach, if desired.

In terms of exterior building character, the building massing promotes the use of the type of sloped metal roofs preferred by MCPS. The prevalent use of brick in a varied pattern and the use of roof overhangs provide an architecture that is contemporary yet compatible with the new Auburn Middle School.

1st floor

2nd floor

auburn high school floor plan

*depicts one option

auburn high school main entry

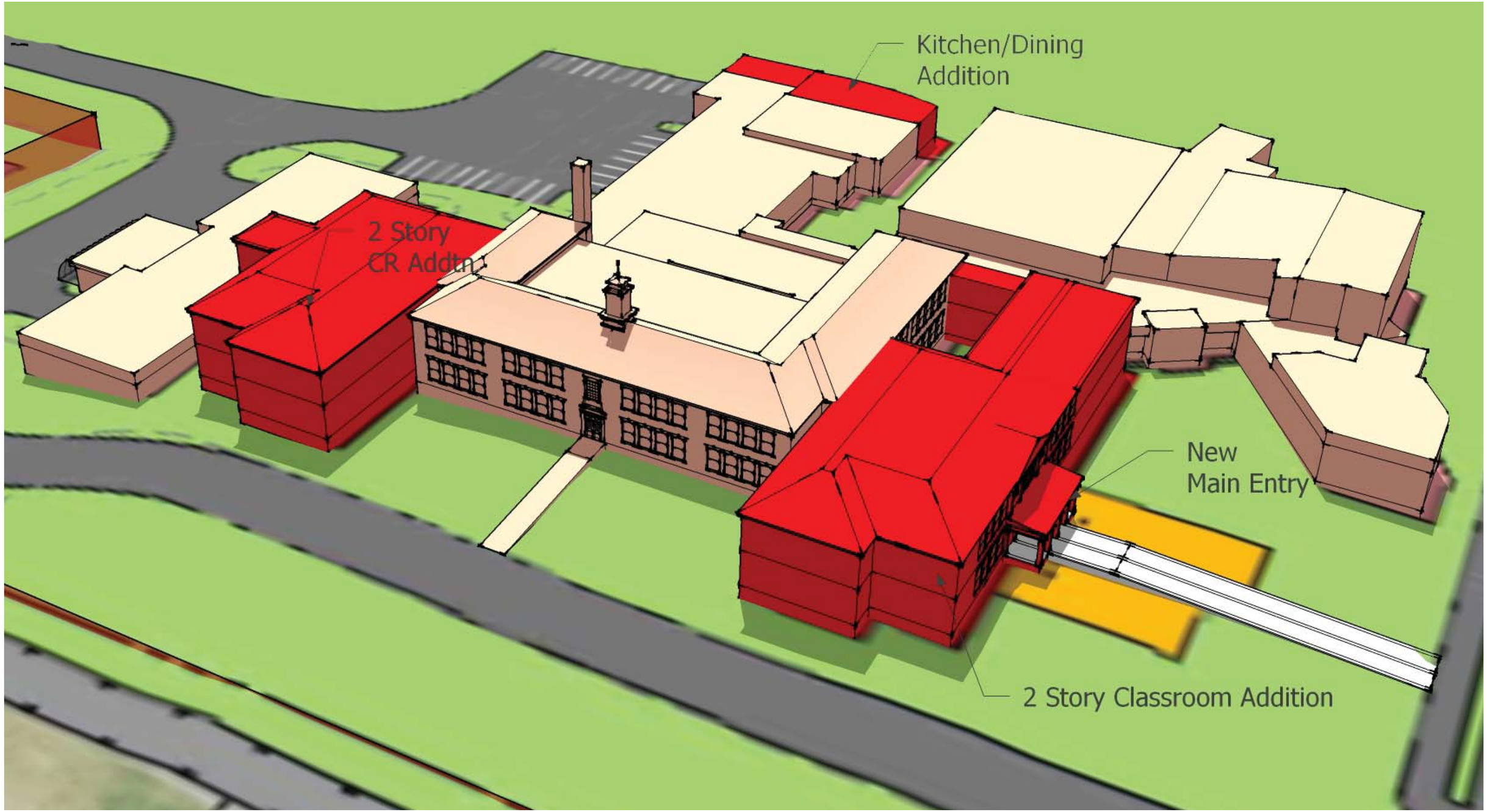
auburn high school classroom wing

1st floor

2nd floor

auburn middle schoolplans

*depicts one option



auburn middle school proposed changes

1st floor

2nd floor

auburn middle school plans

*depicts one option

auburn middle school bird’s eye view

auburn middle school entry view

Description of Mechanical, Electrical and Plumbing Systems

Even though all the various building systems of any project are important, many of the components of the architectural and structural systems are readily visible, code-driven, or easy to verify. "Hidden Systems" such as the mechanical and electrical systems, are often the target for removing quality from a project, so we will expound on those systems in more detail.

Heating, ventilating, and air conditioning. The Heating, Ventilating and Air Conditioning will be provided by variable volume rooftop units (with gas-fired heat – propane at Auburn Strand, natural gas at Blacksburg) with energy recovery wheels. Terminal boxes for each space will be VAV boxes with electric heat. High pressure ductwork, round or flat oval, will convey air to the individual VAV boxes. Low pressure ductwork will convey air to the individual spaces.

Constant volume rooftop units (with gas-fired heat – propane at Auburn Strand, natural gas at Blacksburg) with energy recovery wheels will be used for large spaces; such as, Auditorium, Gymnasium, Library, Cafeteria, etc. Low pressure ductwork will convey air to the individual spaces.

Air Distribution. The systems will be designed to meet ASHRAE Standard 62 Ventilation for Acceptable Indoor Air Quality and the International Mechanical Code 2009.
Exhaust Systems: Exhaust systems for toilet rooms, showers, locker rooms, kitchens and hoods, custodial closets, shop areas, art rooms, kilns, family studies, science rooms, data closets and electric rooms will be designed to meet the requirements of the VUSBC.

Electric heaters will be provided at entrances and various locations such as storage, etc.

Smoke Detectors. HVAC unit's return ductwork to the unit will be provided with duct smoke detectors as required by the International Mechanical Code 2009 and the NFPA 90A.

Fire Dampers. UL 155 fire dampers will be provided as required per code.

Facility Management and Control System. The entire Facility Management and Control System (FMCS) will be comprised of a network of interoperable, stand-alone digital controllers communicating on an open protocol communication network to a host computer within the facility. The FMCS will communicate to third party systems such as rooftop units, energy metering systems, other energy management systems, access control systems, fire-life safety systems, and other building management related devices with open, interoperable communication capabilities.

Direct Digital Control (DDS) System. The rooftop units will be provided with built-up controls for complete control of the fans, compressors, outside air dampers, etc. This will enable the building engineer to have complete control of the units, which will allow energy saving strategies to be implemented for each zone. The system will automatically control ventilation to meet indoor air quality standards, and will allow individual tem-

perature control in each zone (classroom). The system will trend indoor temperature and humidity, air handler run time, and building energy consumption. This will allow Montgomery County Public Schools to optimize system performance over time and will save energy and operating cost for the school system.

The system will have the following features:

1. Operator workstation in building maintenance office for after hours system override.

2. The DDC Control System will be provided with graphics of the building and each individual HVAC system. Graphical monitoring and control will be provided for all important sensors and set points and offsite monitoring control and alarm.

3. Custom programming design for strategic energy conservation and reduction of greenhouse emissions, including night setback (winter), night setup (summer) and summer school ventilation control (fan speed setback where applicable).

4. Indoor Air Quality (CO2) monitoring and regulation of the ventilation system to improve student performance, and effectively manage energy consumption.

HVAC TAB: Testing, Adjusting and Balancing will be provided.

HVAC Training: Training of the Owner's maintenance personnel will be provided.

Mechanical Systems Efficiencies:

1. Design loads will be determined in accordance with the ASHRAE Handbook of Fundamentals.
2. HVAC equipment will meet the minimum efficiency requirements as follows:
    a. Rooftop Units:
        1) 5 tons or less Cooling 13.0 SEER
        2) 5 tons to 10 tons Cooling 11.0 EER
        3) 10 tons to 20 tons Cooling 10.0 EER
        4) Greater than 20 tons Cooling 9.7 EER
    b. Outside Air Heat Exchanger 80% nominal efficiency
    c. All other equipment International Energy Conservation Code
3. All supply and outdoor air ducts and outdoor air plenums will be insulated with a minimum of R-5 insulation.
4. Energy Conservation Features:
    a. Insulation of heat transfer media.
    b. High efficiency equipment.
    c. Heat recovery from exhaust air to incoming outside air.
    d. Controls:
        1) Occupied B Unoccupied times.
        2) Set back of temperature settings.
        3) Economic cycles.

5. Domestic Water Heating:

a. Water Heating Temperature Controls	110□F maximum
b. Domestic Hot Water Pipe Insulation	1 inch
c. Water Heating Energy Factor	ANSI Z21.10.3

Total Building Performance. The total building performance for the proposed building design will comply with the International Energy Conservation Code. The annual energy costs of the proposed design will be less than the costs of the Standard Design Set by the IECC.
Items/Systems included will be as follows:

Refrigerant Piping
Fin Tube Radiation (Electric)
Unit Heaters (Electric)
Rooftop Units (Propane Gas-Fired) with energy recovery wheel
Kitchen Hood Make-Up Air Unit (Propane Gas-Fired)
Air-to-Air Heat Exchanger (Rooftop)
Fans
Ductwork, high pressure
Ductwork, low pressure
Ductwork, stainless steel
Duct Liner
Diffusers, Registers, Grilles
Louvers
Fire Dampers, Smoke Dampers
Lab Hood Exhaust System
Controls, DDC
Testing, Adjusting, Balancing

Warranties: 1 Year

Optional Upgrade to the Heating, Ventilating and Air Conditioning System

Based our familiarity with MCPS preferences, we are offering in our proposal a cost option for the following HVAC upgrade:

Heating, Ventilating and Air Conditioning will be provided by a 4-pipe system utilizing two centrifugal chillers with associated cooling towers; and two heating water boilers (steel fire tube) with fuel oil-fired burners. Primary chilled water pumps (active and standby) will be constant speed for individual chiller flow. Secondary chilled water pumps (active and standby) and heating water pumps (active and standby) will be variable speed (2-way control valves). Indoor and rooftop VAV air handling units with chilled water and heating water coils will be used to serve classroom and office areas within the building. Terminal units for each space will be VAV

boxes with heating water coils. High pressure ductwork, round or flat oval, will convey air to the individual VAV boxes. Low pressure ductwork will convey air to the individual spaces.

Constant volume air handling units will be used for large spaces; such as, Auditorium, Gymnasium, Library, Cafeteria, etc. Low pressure ductwork will convey air to the individual spaces.

HVAC equipment for this upgrade option will meet the minimum efficiency requirements as follows:

a. Chillers 6.40 IPLV
b. Outside Air Heat Exchanger 80% nominal efficiency
c. All other equipment International Energy Conservation Code

Items/Systems unique to this upgrade include:

2 Chillers, Centrifugal Cooling Towers (250 Tons each)
2 Boilers, Fire Tube
Chemical Feeders
Breeching
Fan Coil Units (4-pipe)
Hot Water Fin Tube Radiation
Unit Heaters
Air Handling Units with energy recovery wheel
Kitchen Hood Make-Up Air Unit (Electric)

All other systems are essentially the same as described in the lower first-cost rooftop system

Plumbing

General. The plumbing system will be designed around new utility connections for water, sewer, and storm. Sanitary Waste & Vent System: Gravity sanitary waste and vent systems will be designed as required for plumbing fixture and equipment locations. Acid resistant piping and an exterior acid dilution tank will be provided for Science Lab areas. The piping mains will be extended outside for extension to the exterior sanitary sewer system. Kitchen equipment waste piping (cast iron) will extend to an exterior grease interceptor (rated for H-20 loading if required) before connecting to the exterior sanitary sewer system. (Piping and fittings: Cast Iron – ASTM A74, CISPI 301; Plastic – ASTM D 2665).

Roof Drainage & Storm Drain Systems. Storm drainage system using roof drains and interior rain conductors will be designed for the low-slope roof areas. Piping will be extended outside for connection to a rainwater collection system. All sloped roof areas will use gutters and downspouts as per the Architectural design. Downspout boots will be extended to the exterior rainwater collection system. A secondary storm drainage system for the flat roof areas will utilize scuppers as per the Architectural design and secondary pipe drainage systems only where scuppers cannot be utilized. (Piping and Fittings: Cast Iron – ASTM A888; Steel ASTM A53; Plastic – ASTM D2466).

Domestic Water. The domestic hot and cold water system will be designed as required for fixture and equipment locations. Cutoff valves will be provided in each branch main at each group of fixtures. (Piping: Copper Tube, Type L, ASTM B88; Fittings: Wrought copper, ASME B16.22 or copper alloy ASTM B16.18.

Plumbing Fixtures. Plumbing fixtures shall be vitreous china, water saving type flush valves and faucets. Standard and handicapped type fixtures will be provided for adults and children. Handicapped fixtures will meet CABO/ANSI A117.1-1992 and Americans with Disabilities Act (ADA) Codes. Kitchen fixtures will be included as part of the kitchen equipment contract, with plumbing connections by the Plumbing Contractor. Water Closets: Vitreous china, floor mounted, exposed auto -sensing 1.6 GPF flush valves.

Urinals. Vitreous china, wall mounted, exposed auto-sensing 1.0 GPF flush valve.

Lavatories. Vitreous china, wall hung or counter-top type, water saving sensor faucet to meet code consumption requirement.

Sinks. Stainless steel counter-top type with faucet, floor-mounted molded-stone mop sinks in Janitor Closets. Art room sinks will be provided with solids interceptors.

Showers. Pressure balancing mixing valve shower control with adjustable stop screw to limit handle turn, integral service stops, vacuum breaker. ADA showers shall have wall/hand shower with flexible metal hose and 30 inch slide bar for hand shower mounting.

Electric Water Coolers. Handicapped accessible (ADA), bi-level.

LP Gas System. An LP gas piping system will be designed to provide service for the rooftop HVAC units, domestic water heaters and the lab equipment outlets located in Science Classrooms. LP gas storage tank and pressure regulators will be provided and installed by LP gas supplier. (Piping - Black Steel ASTM A 53 grade B or A 106, sch. 40; Fittings - ASME B16.9; welded).

Hot Water Distribution. Domestic hot water (120 Deg. F) for this building will serve toilet rooms, classroom sinks and custodian closets, and locker rooms. Domestic hot water (140 Deg. F) will serve the kitchen. Multiple LP gas-fired storage water heaters will be located in the Boiler Room and will serve the facility and the kitchen. Hot water circulating loops with circulating pumps will be used to deliver hot water to faucets quickly.

Items/Systems included will be as follows:

Hot Water Circulating Pumps
Domestic Water System
Storm Sewer System
Sanitary Sewer System

Condensate Drain Piping
Acid-Resistant Drain Piping/Acid Neutralization Basin
Grease Interceptor
Water Heaters, LP Gas Fired
Plumbing Fixtures
LP Gas Piping

Connections to Equipment. Utility services and piping connections will be provided to equipment specified in other sections of the specifications or provided by Owner.

Design Criteria. The plumbing system design will be in accordance with the Virginia Uniform Statewide Building Code and applicable NFPA Standards.

Warranties. All: 1 Year

Fire Suppresion

General. The building will be provided with a complete 100 percent automatic wet sprinkler system.

Fire Service. The building fire service will not be less than six-inch diameter. The service entrance arrangement will include test connections, double check backflow preventer, alarm valve, Siamese connection, alarms and all related appurtenances and will be tied into the building fire alarm system. Piping will be the Contractor's option of ferrous piping indicated in NFPA 13. This system will be complete with all necessary alarms, controls and related appurtenances. The entire fire protection and suppression system will be designed to meet all requirements of NFPA 13 and NFPA 24.

Sprinkler System. Sprinkler zones will be provided for each floor as a minimum. Zone alarm check valves shall be located in mechanical room. System shall be light hazard and hydraulically designed to produce 0.10 GPM per square foot in the most remote 1500 S.F., and will use ordinary hazard design for certain spaces such as Mechanical Rooms, Storage Rooms, etc.

Standpipe System. Not required.

Tamper Valves. Fire protection valves shall be of the supervisory type and shall be integrated with the new fire alarm system.

The system will be complete with fire pump, jockey pump, controllers and storage tank if necessary.

Electrical - Service Entrance and Distribution

A new electrical service will be installed consisting of a new 480/277 volt main switchboard, amp rating sized as required. The switchboard will serve new distribution panels and step-down transformers to feed lighting, receptacle and mechanical systems panels. The switchboard and distribution panels will have surge protective devices (SPD) integrally installed. A digital meter will be provided in the switchboard to monitor amps, voltage and power consumption. Step-down transformers will be harmonic mitigating type with 200% rated neutrals. Receptacle panels serving computer loads will also have 200% neutrals. All panel and switchboard bus bars and all transformer windings will be copper.

Emergency Power

A diesel standby emergency generator will be provided, kW rating sized as required. The generator will back up life safety systems including egress lighting and fire alarm system. The generator will also supply backup power to server/computer and telephone head end and distribution equipment. Kitchen refrigeration equipment will be supplied with backup power fed from a separate automatic transfer switch as well. The generator will be provided with a 24-hour run time sub-base fuel tank.

Fire Alarm

A new digitally addressable fire alarm system will be provided. The system shall include manual pull stations, notification appliances, smoke and heat detectors where required, and connections to the elevator controller and sprinkler system.

Wiring

New general wiring shall be in EMT up to equipment connections. Install all wiring according to NEC 2008. All conductors shall be copper. MC cable will not be permitted.

Low Voltage Wiring

All new low voltage/communications systems wiring will be provided. Center hung wire basket cable tray will be provided in corridors with conduit sleeves above ceilings providing pathways into classrooms and offices for cabling. Faceplates, terminations and jacks will be provided with labels. Plenum rated cable will be provided where required.

Lighting

New lighting fixtures will use T5, T5HO and compact fluorescent lamps and LEDs where practical. Daylight harvesting controls will be provided in classrooms, offices and other spaces where substantial energy savings can be realized. Daylight harvesting controls specifications will be based on Lutron Ecosystem. Oc-

cupancy sensors will also be installed in most spaces to save additional energy. Classroom lighting fixtures will be suspended direct/indirect as ceiling heights allow. A manual override control switch will be provided near teacher desks in all classrooms in addition to an entry switch located at the door.

Intercommunication

A new building-wide public address system will be provided with speakers in corridors, other public spaces, offices and classrooms. Classrooms will have talk-back speakers with a call-in switch for direct communication with the main office. The PA system will interface with the phone system allowing for paging via handsets. Each office and classroom will be provided with a phone. All speakers shall have individual volume adjustment control. Wall mounted volume control knobs will be provided in offices and conference rooms.

Computer/Data

New computer/data cabling will be Category6 type. Classrooms and resource rooms shall have 5 drops each, computer labs 40 drops and offices 2 drops. Cables will be routed from Intermediate Distribution Frames (IDF) located throughout the school. The IDFs will be linked to the Main Distribution Frame (MDF) by fiber optic cable. Instructional spaces will be provided with means to connect an overhead projector. A television distribution network will be provided over a coaxial cable network with RG11 backbone and RG6 runs to each drop. As an alternate, a digital video delivery system would be provided with media stored on servers located in the Media Center and streamed to classrooms on demand.

Auxiliary Sound Systems

New stand-alone sound systems will be provided for gymnasiums, auditorium, cafeteria and band rooms. The systems will be linked to the PA system so that if an announcement is made over the PA the auxiliary sound systems will mute. All systems will include amplification, speakers, CD/DVD players, microphones and ADA required assisted listening systems.

A personal sound system will be provided in each classroom. Each system will consist of four speakers, two wireless microphones, amplifier, and headend; provided with a minimum of two RF receivers to eliminate interference. Bogen's Enhancer or equal. The system will integrate with local media delivery stem to enhance the audio performance of television and overhead projector.

Lighting Protection

A risk assessment study will be performed to determine if a lightning protection system is required.

3d. Identify the proposed risk factors and methods for dealing with these factors.

All construction projects bring inherit risks to their owners. We believe the PPEA is one of the best project delivery methods to shift owner's risk to the PPEA team. The most successful way that risk is mitigated is through recognition of problems before they occur. To that end, we have assembled a team that is vastly knowledgeable of the sites, jurisdictional approvals and processes, design expectations of MCPS, and the local construction market. The owner's risk in construction is never eliminated, but our team is built to understand issues critical to these projects and protect the owner.