ACTION

BOARD OF EDUCATION OF HOWARD COUNTY
MEETING AGENDA ITEM

TITLE: New High School #13 Schematic Design Report **DATE:** September 20, 2018

PRESENTER(S): Scott W. Washington, Director, Capital Planning and Construction

Robyn Toth, Principal, TCA Architects

OVERVIEW:
The New High School #13 supports the Strategic Call to Action (SCTA) by enlisting community support and engagement, as well as providing healthy environments. The school which will be located on the Mission Road site, will be an adaptation of the current prototype high school design. This prototype high school plan, which is based on the General Educational Specifications for High Schools, dated October 1999/March 2002, is designed to accommodate a population of 1,650 students in Grades 9 – 12 and will be the fourth iteration of this model.

The design team has worked collaboratively with the planning committee and the Howard County Public School System staff to ensure an appropriately updated building that captures both programmatic and systemic changes which will serve the current needs of the high school.

A continuing emphasis on energy efficient systems and sustainability will be incorporated into the design. It is the intent that the design and construction of the building achieve another LEED (Leadership in Energy and Environmental Design) 'Silver' designation.

RECOMMENDATION/FUTURE DIRECTION:
It is recommended that the schematic design report for New High School #13 be approved as submitted.

SUBMITTED BY:
Scott W. Washington
Director, Capital Planning
and Construction

APPROVAL/CONCURRENCE:
Michael J. Martirano, Ed.D.
Superintendent

Karalee Turner-Little
Deputy Superintendent

Anissa Brown Dennis
Chief Operating Officer

tca architects

Specializing in the design of educational facilities

High School #13

Schematic Design Report

Howard County Public School System

Board of Education

20 September 2018

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Schematic Design Report

for

High School #13

FOR THE BOARD OF EDUCATION OF HOWARD COUNTY:

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Superintendent of Schools	Michael J. Martirano, Ed. D.
Chief Operating Officer	Anissa K. Brown Dennis
Director Capital Planning and Construction	Scott W. Washington

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20 September 2018

Table of Contents

Appendix
Floor plans of last high school prototype design are provided for reference:

Planning Advisory Committee

HOWARD COUNTY PUBLIC SCHOOL SYSTEM

Elizabeth Banyas	Student Representative
Eric Bishop	Coordinator of Health and Physical Education
Kevin Burnett	Coordinator of Security
Cece Clement	Manager of Purchasing
Bob Cole	Coordinator of Digital Education
Greg Connors	Assistant Manager of Ground Services
Melissa Daggett	Coordinator of Library Media
John Davis	Coordinator of Athletics
Steve Dolney	Manager of IT Partnership
Bruce Gist	Executive Director of Capital Planning and Operations
Dan Hagan	Project Manager of School Construction
Laura Johnson	Parent Representative
Laurel Johnson	Area Field Representative of Food and Nutrition Services
Dan Keiser	Program Manager of School Construction
Sharon Kramer	Coordinator of Career and Technology Education
Dan Lubeley	Manager of Design and Pre-construction Services
Jason McCoy	Officer of Performance Equity and Community Response
Thomas McNeal	Director of Security, Emergency Preparedness & Response
Gino Molfino	Coordinator of Fine Arts
Nick Novak	Principal of Howard High School
Larry Phillips	Manager of Custodial Services
Doug Pindell	Director of Purchasing
Keith Richardson	Manager of Ground Services
Herb Savje	Director of School Facilities
Bill Stolis	Area Manager of Transportation
Scott W. Washington	Director of School Construction
Mary Weller	Curriculum Coordinator of Secondary Science
Julie Wray	Coordinator of Instructional Technology
Janice Yetter	Instructional Facilitator of Special Ed. for High Schools
Betsy Zentz	Interagency Specialist of School Construction

MARYLAND STATE DEPARTMENT OF EDUCATION

Jillian Storms	MSDE, Architect of School Facilities

HOWARD COUNTY GOVERNMENT

Nicola Morgal	Superintendent of RLCCCS
Laura Wetherald	Bureau Chief of Howard County Recreation and Parks

DESIGN TEAM

Matt Lurz	Construction Manager, Oak Constracting
Stephanie Tuite	Civil Engineer, Fisher, Collins & Carter
Robyn Toth	Project Architect, TCA Architects
Tasheria Shorts	Associate, TCA Architects
Mike Gerding	Associate, TCA Architects

Design Team

ARCHITECT	TCA Architects,	Annapolis, MD
CIVIL ENGINEER	Fisher, Collins & Carter	Ellicott City, MD
STRUCTURAL ENGINEER	Morabito Consultants	Sparks Glencoe, MD
M/E/P ENGINEER	James Posey Associates	Baltimore, MD
IT CONSULTANT	Educational Systems Planning	Annapolis, MD
DAYLIGHTING ENGINEER	EMO Energy Solutions	Falls Church, VA
ROOFING CONSULTANT	Restoration Engineering	Fairfax, VA
ACOUSTICAL ENGINEER	Acoustical Design Collaborative	Reston, VA
FOOD SERVICE DESIGN	Nyikos Associates	Gaithersburg, MD
CONSTRUCTION MANAGER	Oak Contracting	Towson, MD

Project Description

The High School #13 design is an adaptation of the Howard County Public School System's (HCPSS) high school prototype design. High School #13 will be the fourth iteration of the the prototype design. The three previous versions of the prototype design are Marriotts Ridge High School which opened in 2005, Reservoir High School which opened in 2002 and Long Reach High School which opened in 1996. Modifications have been as a result of input from the Planning Advisory Committee, current HCPSS standards for all building systems (i.e. heating, cooling, telecommunications, electrical, etc.), current codes and modern sustainable requirements, which dictate that this building be a high performance school.

The new 262,851 square-foot school will be designed to a local capacity of 1,650 students on a site that is being purchased by Howard County and master planned for High School #13, a future elementary school and future Recreation and Parks space. All plan revisions are illustrated in this report.

The 'Space Analysis' section of this report on page 22 contains a complete listing, program size, and actual size of every space included in this new high school.

It is the intent that the design and construction of this new high school achieve a Leadership in Energy and Environmental Design (LEED)'Silver' designation making this facility yet another 'Green' school for the HCPSS. The 'LEED for Schools version 4.0' released by the U.S. Green Building Council (USGBC) will provide the necessary goals and requirements to obtain LEED Certification. See page 7 for Sustainable 'Green' Design Goals for this project.

Planning Process

The architect and construction manager toured all three of the prototype schools with HCPSS staff for a post-occupancy evaluation of the schools with the staff that has been operating these school and for lessons learned, before starting design of the fourth version of this high school design. In addition, the architect met with several executive academic staff to understand the needs of future education. Meetings were also attended with the Recreation and Parks to address their needs for the site.

Starting In June of 2018, the Planning Advisory Committee attended four meetings with the project architect, HCPSS school construction staff to review the proposed site design and possible floor plan modifications to the latest three-story prototype high school design. Planning meetings were held at the most current version of the prototype design, Marriotts Ridge High School. During the course of these meetings, the committee participated in a thorough discussion of the building layout, and contributed helpful input leading to a refined building design for the current needs of HCPSS. Refer to pages 16, 18 and 20 for a summary of significant modifications to the prototype floor plans.

Revisions to the original Marriotts Ride High School plans have occurred in response to five factors:

1. Post-occupancy comments by the users of Long Reach High School, Reservoir High School, and Marriotts Ridge High School.
2. Input from Planning Advisory Committee in response to curriculum changes and HCPSS standards since the last prototype opened in 2005.
3. New standards for all building systems (HVAC, telecommunications, electrical, etc.).
4. Changes in building codes.
5. Current LEED and State requirements.

Project Facts

Total size of HCPSS site: Note: HCPSS site is to accommodate High School #13, future elementary school and public road.	77 acres		
Zoning:	R-12 and R-SC-MXD-3		
Car parking spaces provided:	582 cars		
Bus parking spaces provided:	22 busses		
Building Square Footage:	First Floor	=	142,242 gsf
	Second Floor	=	62,431 gsf
	Third Floor	=	58,177 gsf
	Total Building	=	262,851 gsf
Local Student Capacity:	1,650 Students		

Project Schedule

Site for HS#13 was approved by the Board of Education	March 2018
Planning Advisory Committee Meetings Completed	July 2018
Schematic Design presentation to Board of Education for Review and Approval	September 2018
Design Development presentation to Board of Education for Review and Approval	February 2019
Construction Documents presentation to Board of Education for Review and Approval	September 2019
Project out for Bids:	November 2019
Bids Received	December 2019
Construction Starts	May 2020
Construction Completed	April 2023
School Opens	September 2023

Sustainable 'Green' Design Goals

The school's design and construction is intended to achieve a LEED Silver certification, making the facility a 'Green' school.

Simply stated, a 'Green' school is a building designed to conserve energy, water, and materials, thus reducing negative impacts on human health and the environment. A 'Green' learning environment provides natural daylight, improved indoor air quality, thermal comfort, and opportunities to integrate green features into the school's curriculum.

This project will be required to use the new LEED 4.0 rating system for schools. An 'in progress' LEED scorecard is shown below which summarizes the credits and the amount of associated points that are most likely obtainable at this time. As the project continues to evolve, new credits may be possible while others may become increasingly difficult to engineer or too costly to provide. At this time we have identified 57 likely points (with an additional '21 possible points') allowing for the loss of some and still complying with the goal of a LEED 'Silver' Building.

LEED LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

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LEED for SCHOOLS (v4) Sept 2018

LEED Scorecard
High School #13
Howard County Public School System

IP Integrative Process — Possible Points: 1

1	Credit	**Integrative Process**

LT Location & Transportation — Possible Points: 15

	Credit	LEED for Neighborhood Development Location (15 points)
1	Credit	**Sensitive Land Protection**
	Credit	High Priority Site (2 points)
	Credit	Surrounding Density and Diverse Uses (5 points)
	Credit	Access to Quality Transit (4 points)
1	Credit	**Bicycle Facilities**
	Credit	Reduced Parking Footprint
1	Credit	**Green Vehicles**
2 1		Total Location & Transportation Points

SS Sustainable Sites — Possible Points: 12

R	Prereq	**Construction Activity Pollution Prevention**
R	Prereq	**Environmental Site Assessment**
1	Credit	**Site Assessment**
	Credit	Site Development - Protect or Restore Habitat (2 points)
1	Credit	**Open Space**
3	Credit	**Rainwater Management** (3 points)
2	Credit	**Heat Island Reduction** (2 points)
1	Credit	**Light Pollution Reduction**
1	Credit	**Site Master Plan**
1	Credit	**Joint use of Facilities**
5 5		Total Sustainable Sites Points

WE Water Efficiency — Possible Points: 12

R	Prereq	**Outdoor Water Use Reduction**
R	Prereq	**Indoor Water Use Reduction**
R	Prereq	**Building-level Water Metering**
2	Credit	**Outdoor Water Use Reduction** (2 points)
2 1	Credit	**Indoor Water Use Reduction** (7 points)
2	Credit	**Cooling Tower Water Use** (2 points)
1	Credit	**Water Metering**
7 1		Total Water Efficiency Points

EA Energy and Atmosphere — Possible Points: 31

R	Prereq	**Fundamental Commissioning and Verification**
R	Prereq	**Minimum Energy Performance**
R	Prereq	**Building-Level Energy Metering**
R	Prereq	**Fundamental Refrigerant Management**
6	Credit	**Enhanced Commissioning** (6 points)
8 6	Credit	**Optimize Energy Performance** (16 points)
1	Credit	**Advanced Energy Metering**
	Credit	Demand Response (2 points)
3	Credit	**Renewable Energy Production** (3 points)
1	Credit	**Enhanced Refrigerant Management**
2	Credit	**Green Power and Carbon Offsets** (2 points)
19 8		Total Energy and Atmosphere Points

MR Materials and Resources — Possible Points: 13

R	Prereq	**Storage & Collection of Recyclables**
R	Prereq	**Construction and Demolition Waste Management Planning**
	Credit	Building Life-Cycle Impact Reduction (5 points)
1	Credit	**Building Product - Environmental Declarations** (2 points)
1	Credit	**Building Product - Raw Materials** (2 points)
1	Credit	**Building Product - Material Ingredients** (2 points)
2	Credit	**Construction and Demolition Waste Management** (2 points)
5 3		Total Materials and Resources Points

EQ Indoor Environment Quality — Possible Points: 16

R	Prereq	**Minimum IAQ Performance**
R	Prereq	**Environmental Tobacco Smoke (ETS) Control**
R	Prereq	**Minimum Acoustical Performance**
1 1	Credit	**Enhanced IAQ Strategies** (2 points)
3	Credit	**Low-Emitting Materials** (3 points)
1	Credit	**Construction IAQ Management Plan**
2	Credit	**IAQ Assessment** (2 points)
1	Credit	**Thermal Comfort**
2	Credit	**Interior Lighting** (2 points)
1 1	Credit	**Daylight** (3 points)
1	Credit	**Quality Views**
	Credit	Acoustic Performance
11 3		Total Indoor Environment Quality Points

IN Innovation — Possible Points: 6

1	Credit	**Purchasing - Lamps**
1	Credit	**Occupancy Comfort Survey**
1	Credit	**Green Building Education**
1	Credit	**Design for Active Occupants**
1	Credit	**LEED O+M Starter Kit**
1	Credit	**LEED Accredited Professional**
3 3		Total Innovation Points

RP Regional Priority — Possible Points: 4

	Credit	Demand Response (2 points)
1	Credit	**Enhanced Refrigerant Management**
	Credit	Sensitive Land Protection
	Credit	Reduced Parking Footprint
1	Credit	**Rainwater Management** (3 points)
	Credit	Indoor Water Use Reduction (7 points)
2 0		Total Regional Priority Points

57 Total Points (21 'Maybe' Points) — Possible Points: 110

Key to Possibility of Earning Credit: R = Required # = Yes #= Maybe = No

Project Credit Totals: Certified 40–49 Silver 50–59 Gold 60–79 Platinum 80+

Vicinity Map

The new High School #13 will be located between Route 1 and Mission Road in Jessup, Maryland, 20794. Main access to the site will be from Route 1, approximately 0.8 miles north of the Route 1 and Route 32 intersection.

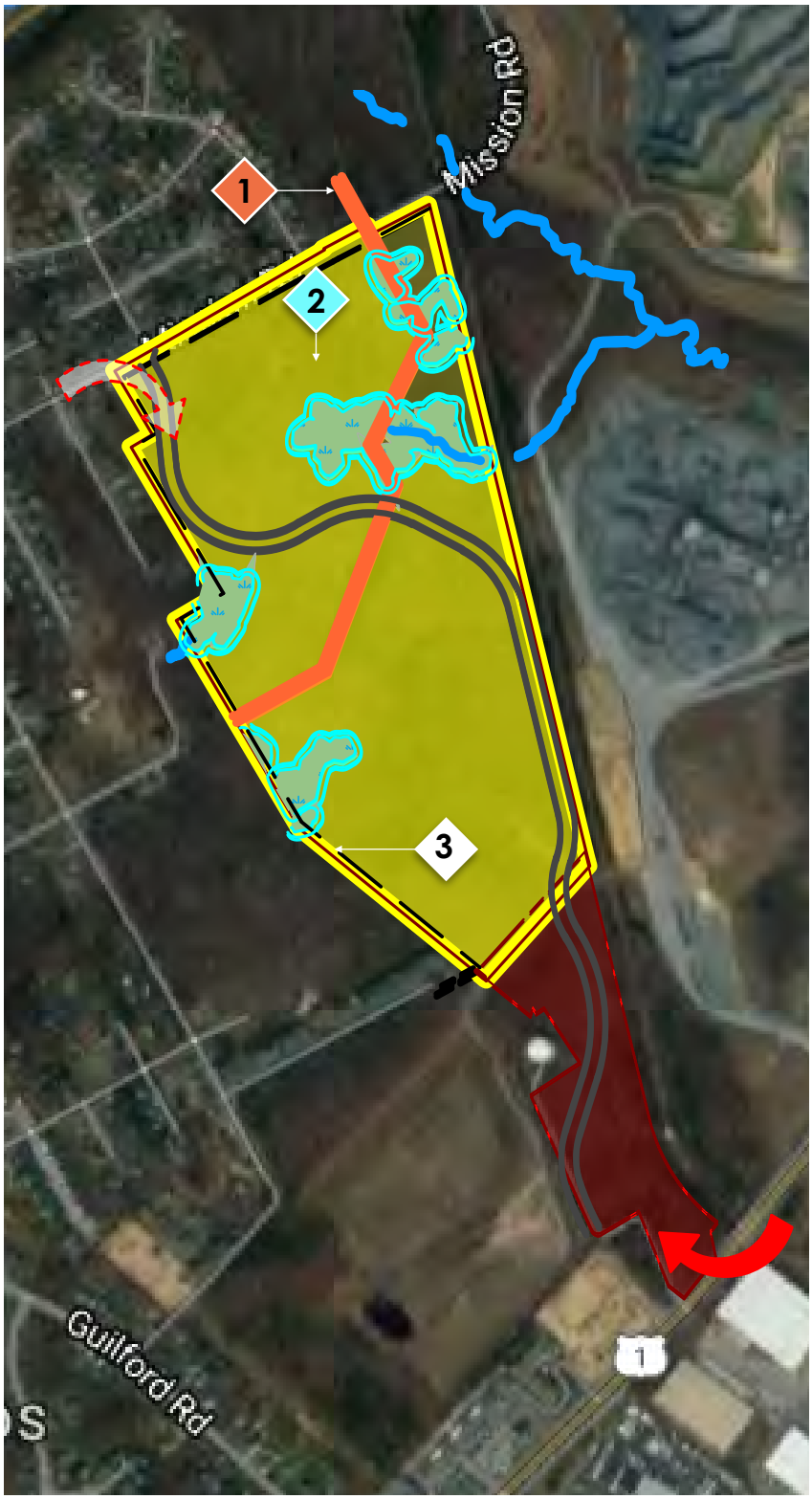
Public water, sewer and natural gas will serve the site.

Map data: Google

Existing Site Constraints

Key features of the existing site which impact how the site can be developed are listed below and identified by numbers in diamonds.

1. A 30' wide public sewer utility easement cuts through the north side of the site and redirects toward the west side of the site.
2. A 50' wide buffer must be maintained around all existing wetlands.
3. A 20' wide use setback is required along the west side of the site adjacent to the residential properties.



Summary of Acreage:

Existing site = 91 Acres

HCPSS portion of site (shaded yellow) = 77 acres

Area of HCPSS site that can be developed = 64 acres

Area of HCPSS left for school development once public road has been built = 58 acres

Overall Site Plan

Overall view of existing site that is to be purchased by Howard County is shown to the right.

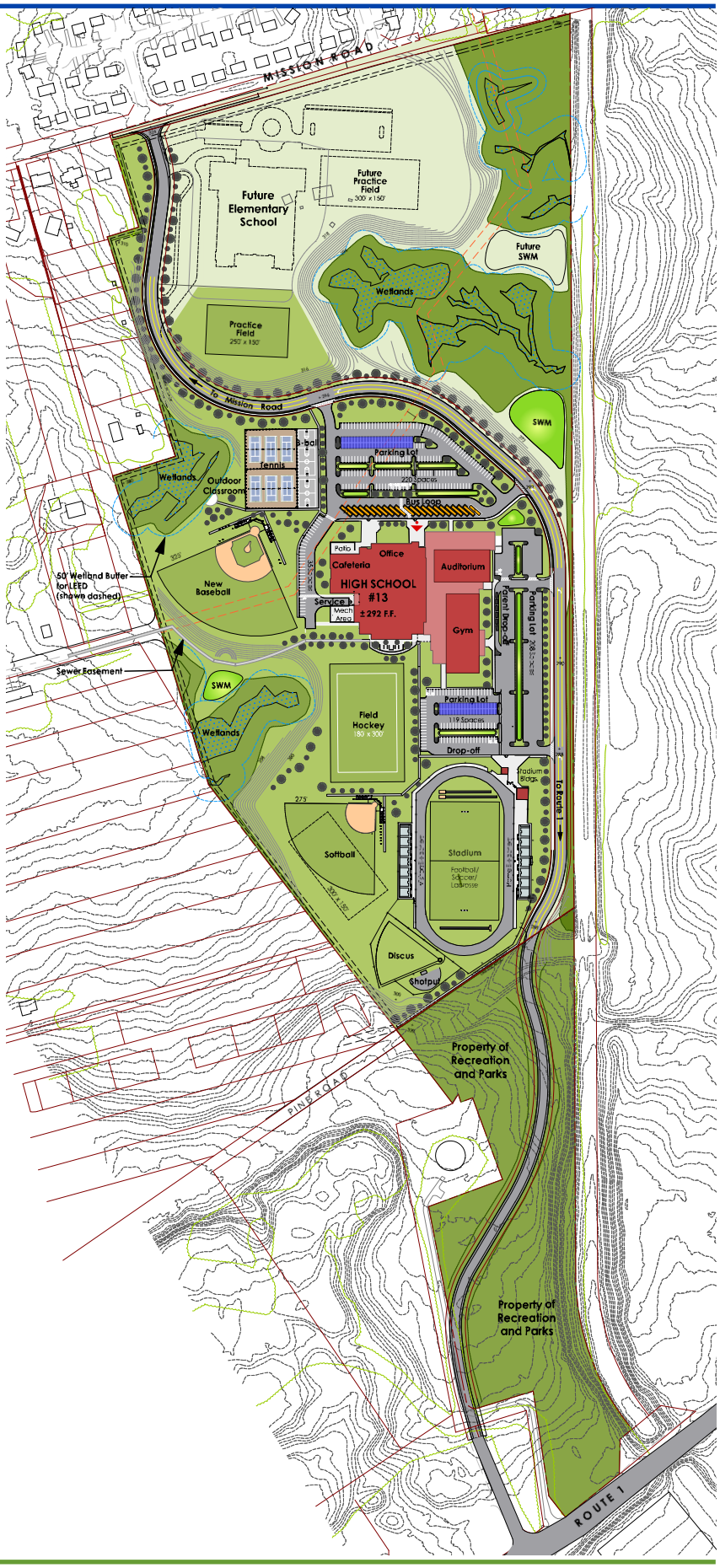
Access to the high school site will be from Route 1.

A traffic study will be performed and an application for a traffic light at the new intersection of Route 1 and the new public road leading to the high school will be submitted.

The southern portion of the public road and public utilities will be constructed as part of a separate Howard County capital project.

This project will continue both the public road and utilities to the new high school site and to the future elementary school site.

The portion of the public road from the high school to Mission Road will be master-planned as part of this project, but may not be constructed until the elementary school site is developed.



Rendering of Site

Image above is an aerial view of the proposed site from Mission Road, facing the main entrance of the building. Dashed lines in the foreground represent the site elements for the future elementary school. Beyond the stadium the road is shown continuing onto the Recreation and Parks site.

Proposed Site Plan Notes

Key features of the proposed site plan are listed below and identified by circled letters on the site plan shown on the following page.

A. A new public road will be constructed to connect the high school site to Route 1. A center turning lane will be provided along the high school site's property line. A traffic light application will be submitted to the State Highway Administration for this intersection.

B. Howard County Parks and Recreation will own the property to the south of the high school site. The new public road that will be used to access the high school will be constructed.

C. 220 parking spaces will be provided near the main entrance for visitors, staff and students.

D. Parking for 22 school busses is provided as requested by the HCPSS department of transportation. The bus drop-off and pick-up area is separate from car traffic and parking to reduce vehicular congestion on site and to avoid the possibility of accidents caused by cars backing into the bus circulation area.

E. Service Area will be developed next to the custodial area and the kitchen. 35 parking spaces will be provided for staff along the service drive. A paved path will be provided to connect the exterior storage room to the paved parking lots and paved sidewalks, for easier upkeep during inclement weather as requested the custodial staff.

F. An outdoor teaching area will be constructed adjacent to the existing wetlands and the new stormwater management facilities to provide access to hands-on experiences for the science curriculum. Area will be designated adjacent to this area for a future garden to be established by the school.

G. 327 parking spaces will be provided in a large parking lot along the side of the school for staff, and students. This parking lot has direct access to auditorium, gymnasium and stadium for after-hours events.

H. Parent drop-off and pick-up lane is located adjacent to the entrance between the gymnasium and auditorium. This entrance leads directly to the looped circulation route at the core of the building. A separate lane will be provided for drop-off and pick-up to allow for queuing space to minimize interference with the traffic along the public road.

I. A ten foot wide paved path for both pedestrians and walkers will be constructed along the public road connecting Route 1 to Mission Road along with paved paths to connect the high school to the adjacent neighborhoods to accommodate students walking to the school.

J. Accessible pathways will be provided from the school to all of the all athletic fields.

K. Home and visitor bleachers at the stadium will be equal in size for community use.

L. Trees will be provided around the site to provide shade to the students during outdoor education and socializing.

M. Solar canopies in the parking areas will be designed and bid as an add-alternate to provide shade, renewable energy, and an environmental teaching tool for students.

N. A six foot high fence from Mission Road to Route 1 will be built to deter student access to the adjacent quarry property.

O. Practice field adjacent to the future elementary school will be developed as part of this project.

Proposed High School Site Plan

Floor Plan Features

Administrative Spaces - The administrative suite is located adjacent to the main entrance with a view of the bus loop and front parking lot. Assistant principal offices are dispersed on all three floors for more adequate coverage during the day. Conference rooms are also located on each floor.

Staff Support Spaces - Staff lounges, toilet rooms, storage rooms and planning spaces are distributed throughout the school and on all three floors to make conveniently accessible to all staff.

Student Services - The majority of the student services are located in a central location on the first floor that are easy to access from the main entrance corridor and the commons area. The health suite is also near an elevator. The career connections room is located on the second floor adjacent to both the special education classroom and the gifted and talented classroom as requested by the educational specifications. The BSAP office is located on the third floor near the stairwell, for easy access from other floors.

ESOL - The ESOL classroom is located on the third floor with the world language department.

Gifted & Talented - The gifted and talented classroom is located on the second floor adjacent to stairwell and in close proximity to career connections room.

General Instruction - General instruction classrooms are located both on the second floor and third floors. Seminar rooms are located at the corners of the floors adjacent to both the planning space for the department and the associated classrooms. In lieu of multiple computer labs a large space will be created on the third floor which will serve multiple purposes including functioning as a mini-auditorium for guest speakers and a testing room

Physical Education - The physical education spaces are located on the first floor close to the stadium. Doors will be carefully placed to zone off the physical education spaces from the rest of the building during after-hours use.

Student Toilet Rooms - Student toilet rooms are conveniently located throughout all three floors typically in a cluster near the intersection of corridors and consisting of one men's room, one women's room, and one unisex room. Stacking these spaces provides an economical plumbing system.

Media Center - The media center is located on the second floor and is fully enclosed. Its clerestory windows allow the media center interior to be viewed from some of the third floor classrooms and corridors. A large skylight provides natural daylight to brighten this two-story space and the surrounding rooms on both floors which, otherwise, would be windowless interior spaces. The media center is surrounded by its support spaces which can be fully secured from the media center with lockable doors during after-hours school use.

Floor Plan Features continued...

Science - Classrooms and support spaces are located on the second and third floors on the west side of the building in a science wing. Stacking these spaces provides economy in plumbing and ventilation systems.

Technology Education- The technology education labs are located on the first floor in between the commons and the art suite. This location allows for easy access of supplies from the service area.

Career Academy & Computer Science - The career academy and computer science suite are larger than a typical classroom so have been located over the larger art studios on the first floor.

Special Education - Special education spaces are located only on the first floor and second floor for easier access from the building entrances and exits. In addition, spaces have been located as close to the elevators as possible. Accessible toilet rooms with floor space for hydraulic cot will be placed on all three floors.

Family and Consumer Sciences - The pre-school is located on the first floor with direct access to the outside of the building for parent drop-off and pick-up outside of the school hours. The family and consumer science space is also on the first floor close to the pre-school.

Cafeteria - The student dining is located on the first floor directly adjacent to the kitchen and the central hub of the school, the commons area. An outdoor patio area is provided for student use.

Auditorium - The high volume of the auditorium is on the first floor away from the three-story educational spaces. The auditorium is easily accessible from the music, drama and dance spaces during performances. Doors will be carefully placed to zone off the fine arts spaces from the rest of the building during after-hours use.

Music - The music suite is separated from the quieter spaces found in the the three-story portion of the building which houses instructional spaces and offices. Music rooms have direct access to the outside for moving equipment to off-site performances and are near the auditorium for easy transition of instruments during performances on the school's stage.

Art - The visual arts suite is located on the first floor along an exterior wall to provide natural daylight, proper ventilation and access to its outdoor patio.

Custodial Area - The custodial office is placed near the service area, near the center core of the building, the three-story open commons area. Custodial closets and storage rooms are distributed throughout the school and near restrooms for economy in plumbing design.

Building Service Areas - The main mechanical and electrical rooms are near the service area and the outdoor equipment area. Telecommunications rooms and electrical rooms are dispersed on all three floors of the school as required by code.

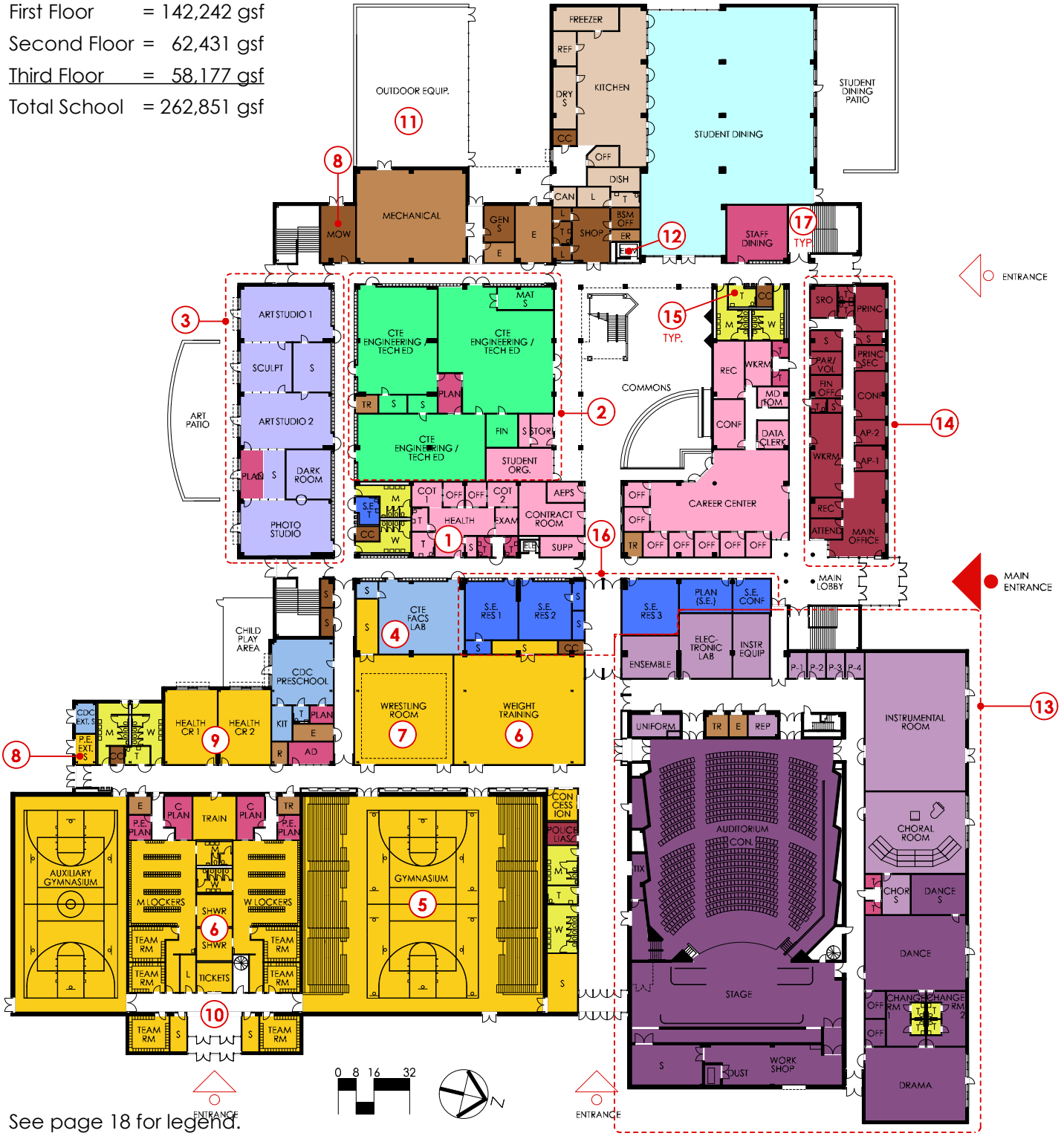
Food Services - The kitchen and its supporting spaces are located on the first floor and are accessed from both the cafeteria for students and the service area for receiving supplies and for the removal of trash.

Modifications to First Floor Prototype Plan

1. Health Suite has been enlarged to meet current COMAR requirements.
2. Tech Ed spaces have been renamed to use current nomenclature and reconfigured to provide three teaching stations, sized similar to most recent HCPSS high school renovation projects.
3. Art suite has been reconfigured to provide to create three comparable studios and a teacher planning room has been added per HCPSS request.
4. In lieu of a separate classroom and lab space for the family and consumer science (FACS) program, one larger space has been provided to accommodate this curriculum.
5. Main gym has been widened to allow more room for spectators to access the bleachers during basketball games when the basketball players chairs and score table are set up.
6. Locker rooms moved so that students can have can have direct access to the exterior and be closer to the athletics fields, thus moving the weight room to the interior of the building.
7. Wrestling has moved to the interior of the building to allow space along exterior wall for outdoor storage rooms and P.E. toilet rooms with exterior access.
8. Mower storage moved to a location near the service area and therefore, the exterior P.E. storage room was relocated closer to the P.E. spaces.
9. Health classroom moved closer to the other P.E. spaces and an additional health classroom was added to the first floor per curriculum requirements.
10. A vestibule was added outside the ticket area between the two gyms to eliminate cold air blowing into ticketing area, so that space can be used as intended. Two additional team rooms were added outside of the locker rooms for visiting teams to access. Team storage rooms were moved to be adjacent to the new team rooms.
11. Outdoor mechanical equipment area has been enlarged to meet new space requirement for modern building systems.
12. Elevator near service area which leads to the roof has been enlarged to function as a freight elevator.
13. Auditorium spaces and music suite have been reconfigured to accommodate a separate drama instructional space from the dance studio. New layout allows for flexibility in design development phase to create spaces that meet the needs of the current curriculum and to provide natural daylight and views to all of the larger instructional spaces in this area.
14. An office for the security resource officer has been added in the administrative suite near the front entrances; the attendance office moved closer to the main lobby and an office for an assistant principal has been added on both the second and third floors with conference room as a result of post-occupancy comments received during tours of the prototype high schools.
15. A single unisex toilet room has been added to each pair of men's and women's toilet rooms. One unisex toilet rooms on each floor has been sized to accommodate a hydraulic cot.
16. S.E. planning room and conference room have moved to the first floor closer to the administrative suite to improve collaboration between staff and access to these spaces for visitors attending meetings. Three S.E. resource rooms have moved to the first floor near elevator to provide easier access to students with mobility issues. There are no S.E. instructional areas located on the third floor. A S.E. toilet room will be located on each floor that can accommodate an hydraulic cot.
17. All four stairwells have been reconfigured to provide daylight and views at the end of the corridors.

Proposed First Floor Plan

First Floor = 142,242 gsf
Second Floor = 62,431 gsf
Third Floor = 58,177 gsf
Total School = 262,851 gsf



See page 18 for legend.
See page 20 for list of Abbreviations.

Modifications to Second Floor Prototype Plan

14. An office for the security resource officer has been added in the administrative suite near the front entrances; the attendance office moved closer to the main lobby and **an office for an assistant principal has been added on both the second and third floors with conference room as a result of post-occupancy comments received during tours of the prototype high schools.**
15. A single unisex toilet room has been added to each pair of men's and women's toilet rooms. One unisex toilet rooms on each floor has been sized to accommodate a hydraulic cot.
16. S.E. planning room and conference room have moved to the first floor closer to the administrative suite to improve collaboration between staff and access to these spaces for visitors attending meetings. Three S.E. resource rooms have moved to the first floor near elevator to provide easier access to students with mobility issues. T**here are no S.E. instructional areas located on the third floor. A S.E. toilet room will be located on each floor that can accommodate an hydraulic cot.**
17. All four stairwells have been reconfigured to provide daylight and views at the end of the corridors.
18. Science wing has been enlarged to accommodate twelve generic teaching stations. Shared lab spaces with two separate classrooms adjacent to the lab have been eliminated and larger labs have been provided that can accommodate both lab space and space at peninsulas for instruction per new curriculum requirements.
19. Ninth grade cluster has been removed and all the typical classrooms have been numbered consecutively, to show 34 classrooms. Classrooms have been grouped by department causing adjacent spaces to be relocated to accommodate this change.
20. Career academy and computer science classrooms are larger and have been moved from the third floor to the second floor over the larger art studio spaces, therefore reducing the footprint of the building.
21. Media center spaces have been renamed as follows: technology resource room is called innovation lab and media production room is called small group area and will provide a space for small groups to meet and for individual study.
22. Career connections room has been relocated, but it is still in close proximity to gifted and talented classroom as required by the Educational Specifications.

LEGEND

- ADMINISTRATIVE SPACES
- STAFF SUPPORT SPACES
- STUDENT SERVICES
- ESOL
- GIFTED & TALENTED
- GENERAL INSTRUCTION
- PHYSICAL EDUCATION
- STUDENT TOILET ROOMS
- MEDIA CENTER
- SCIENCE
- CTE - TECHNOLOGY EDUCATION
- CTE - CAREER ACADEMY AND COMPUTER SCIENCE
- SPECIAL EDUCATION
- CTE - FAMILY AND CONSUMER SCIENCES
- CAFETERIA
- AUDITORIUM SPACES
- MUSIC SUITE
- ART SUITE
- CUSTODIAL AREAS
- BUILDING SERVICE AREAS
- FOOD SERVICES

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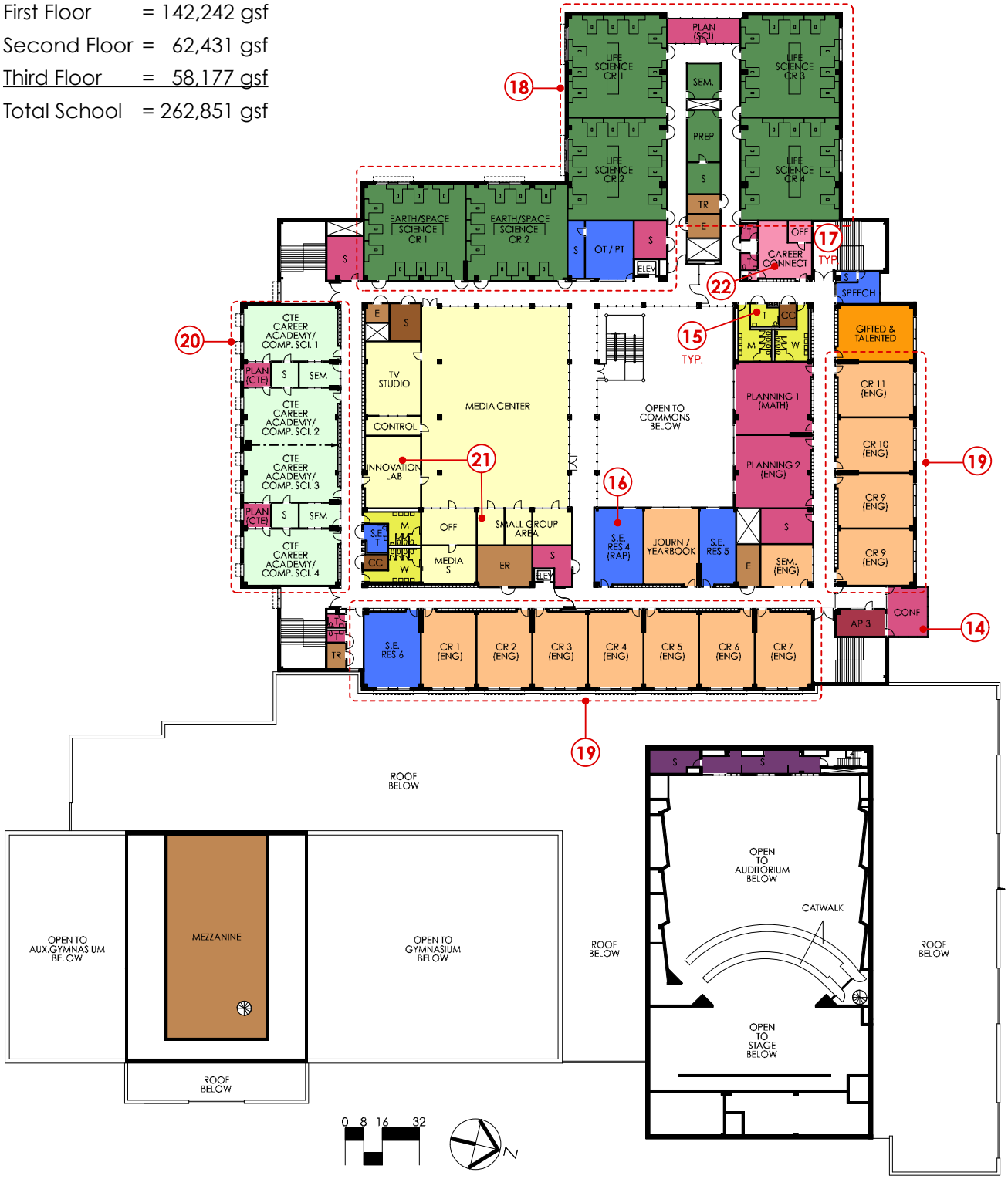
Third Floor = 58,177 gsf
Total School = 262,851 gsf



See page 18 for legend.
See page 20 for list of Abbreviations.

Modifications to Third Floor Prototype Plan

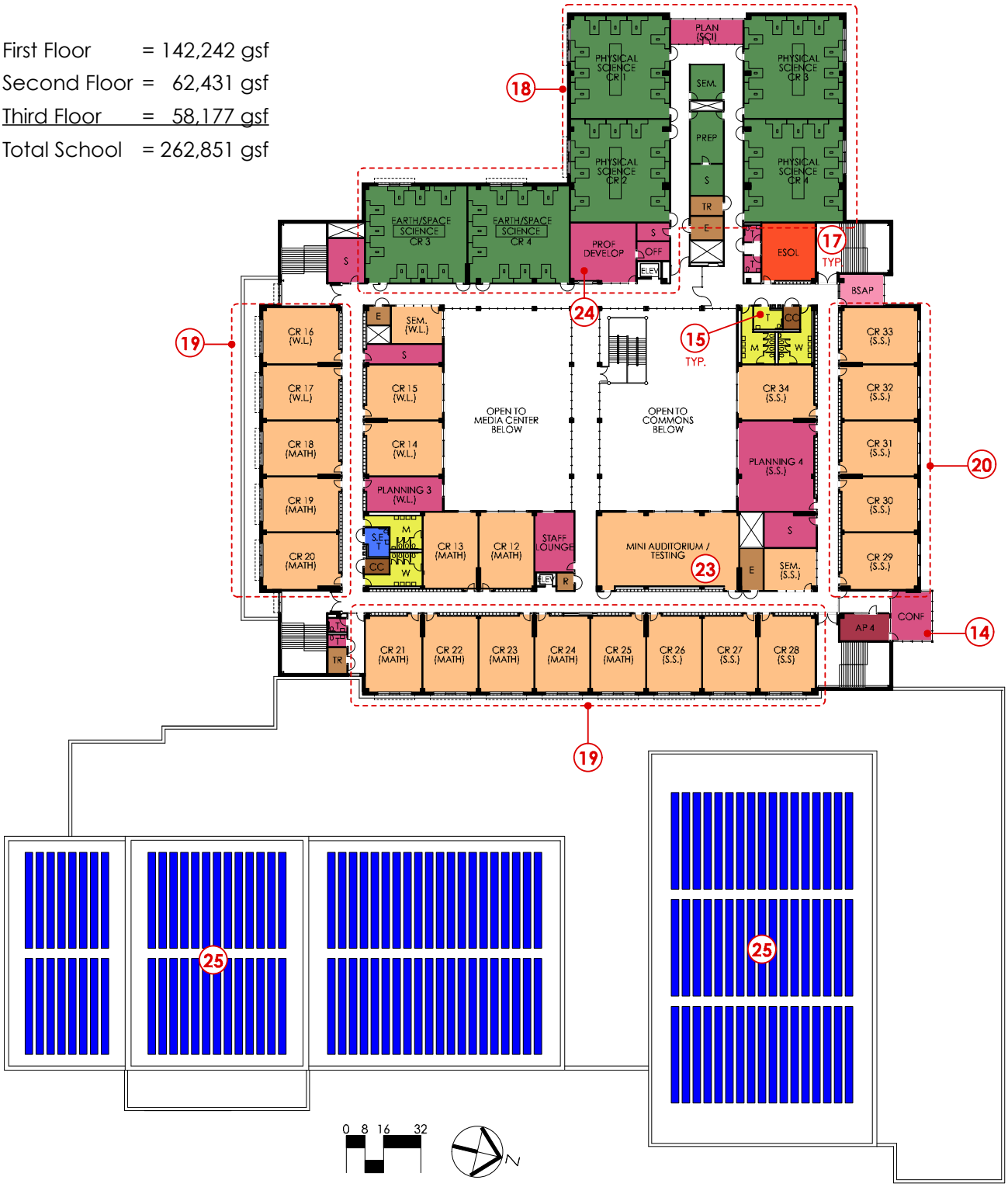
14. An office for the security resource officer has been added in the administrative suite near the front entrances; the attendance office moved closer to the main lobby and **an office for an assistant principal has been added on both the second and third floors with conference room as a result of post-occupancy comments received during tours of the prototype high schools.**
15. A single unisex toilet room has been added to each pair of men's and women's toilet rooms. One unisex toilet rooms on each floor has been sized to accommodate a hydraulic cot.
16. S.E. planning room and conference room have moved to the first floor closer to the administrative suite to improve collaboration between staff and access to these spaces for visitors attending meetings. Three S.E. resource rooms have moved to the first floor near elevator to provide easier access to students with mobility issues. T**here are no S.E. instructional areas located on the third floor. A S.E. toilet room will be located on each floor that can accommodate an hydraulic cot.**
17. All four stairwells have been reconfigured to provide daylight and views at the end of the corridors.
18. Science wing has been enlarged to accommodate twelve generic teaching stations. Shared lab spaces with two separate classrooms adjacent to the lab have been eliminated and larger labs have been provided that can accommodate both lab space and space at peninsulas for instruction per new curriculum requirements.
19. Ninth grade cluster has been removed and all the typical classrooms have been numbered consecutively, to show 34 classrooms. Classrooms have been grouped by department causing adjacent spaces to be relocated to accommodate this change.
20. Career academy and computer science classrooms are larger and have been moved from the third floor to the second floor over the larger art studio spaces, therefore reducing the footprint of the building.
21. See Modifications for Second Floor Prototype Plan on page 18.
22. Career connections room has been relocated, but it is still in close proximity to gifted and talented classroom as required by the Educational Specifications.
23. A Mini-Auditorium/Testing room has been provided in lieu of two computer labs. Room will have with retractable seating that will leave enough floor space for large group projects or testing.
24. Professional development room has been relocated from the first floor to the third floor to make room for larger current tech ed suite.
25. Solar photovoltaic panels will be provided on the roof to provide renewable energy.

ABBREVIATIONS

AD = ATHLETIC DIRECTOR
AE = ALTERNATIVE EDUCATION
BSM = BUILDING SERVICE MANAGER
C = COACH
CC = CUSTODIAL CLOSET
CON = CONTROL ROOM
CONF = CONFERANCE
CR = CLASSROOM
CTE = CAREER & TECHNOLOGY EDUCATION
E = ELECTRICAL ROOM
ENG = ENGLISH
ER = EQUIPMENT ROOM
FIN = FINISH
KIT = KITCHEN
L = LOCKERS
M = MEN'S TOILET ROOM
MAT = MATERIAL
P = PRACTICE ROOM
R = ROOF
RAP = READING ACCELERATION PROGRAM
REC = RECORDS ROOM
S = STORAGE ROOM
SRO = SECURITY RESOURCE OFFICER
SS = SOCIAL STUDIES
T = TOILET
TR = TELECOMMUNICATIONS ROOM
W = WOMEN'S TOILET ROOM
WL = WORLD LANGUAGE
WKRM = WORKROOM
WKSHP =WORKSHOP

Proposed Third Floor Plan

First Floor = 142,242 gsf
Second Floor = 62,431 gsf
Third Floor = 58,177 gsf
Total School = 262,851 gsf



See page 18 for legend.
See page 20 for list of Abbreviations.

Space Analysis

Net areas indicated in square feet.

	HS Prototype Design (Marriotts Ridge)			HS #13 Schematic Design			Major Changes to the Prototype Design
	#	S.F.	Total	#	S.F.	Total	Description
Administrative Suite			**2,745**			**3,805**	**39%**
Reception Area	1	691	691	1	705	705	Added another security office to main office and two additional conference rooms adjacent to the assistant principal offices on the second and third floor.
Attendance Office	1	130	130	1	125	125	
Finance Office/Business Manager	1	129	129	1	135	135	
Conference Room	1	223	223	1	285	285	
Mailroom / Workroom	1	403	403	1	520	520	
Parent / Committee Volunteer Room	1	130	130	1	140	140	
Principal's Office (incl. Closet)	1	256	256	1	270	270	
Principal's Secretary's Office	1	97	97	1	150	150	
Secure Room / Student Records	1	75	75	1	120	120	
Storage Room	1	73	73	3	75	225	
Assistant Principals' Offices	4	101	403	2	415	830	
Security Office (SRO) / Police Liaison	1	135	135	2	150	300	
Staff Support			**6,731**			**6,520**	**-3%**
Storage	12	190	2,275	8	256	2,045	Removed workrooms to accommodate larger teacher planning spaces. Dispersed planning spaces throughout school near specific areas (i.e. science, technology education)
General Instruction Teacher Planning	3	1,306	3,919	4	936	3,745	
Teacher Workroom	2	269	537	-	-	-	
Conference Room	-	-	-	2	183	730	
Staff Lounge			**1,421**			**1,115**	**-22%**
Dining - First Floor	1	686	686	1	690	690	Area reduced to reflect the area provided at the latest HCPSS HS project.
Third Floor Lounge	1	735	735	1	425	425	
Professional Development			**842**			**815**	**-3%**
Office	1	143	143	1	110	110	
Seminar Room (incl. storage)	1	699	699	1	705	705	
Guidance			**3,649**			**3,780**	**4%**
Offices	7	129	905	7	119	835	
Records / Registrar's Office	1	304	304	1	350	350	
Workroom (incl. storage)	1	246	246	1	245	230	
Conference Room	1	263	263	1	300	300	
Career Center	1	1,768	1,768	1	1,895	1,895	
Data Clerk	1	163	163	1	170	170	
Career Connections			**630**			**570**	**-10%**
Career Connections (incl. stor.)	1	630	630	1	480	480	Added office per Ed Spec.
Office	-	-	-	1	90	90	
Health Suite			**1,002**			**1,325**	**32%**
Waiting / Treatment	1	288	288	1	480	480	Added exam room and increased sizes of rooms per current COMAR requirements.
Office / Conference	1	116	116	1	100	100	
Cot Rooms	2	152	303	2	150	300	
Storage	1	86	86	1	45	45	
Toilets (including shower)	2	66	131	2	90	180	
Cluster Nurse Office	1	78	78	1	100	100	
Exam	-	-	-	1	120	120	

Space Analysis

Net areas indicated in square feet.

	HS Prototype Design (Marriotts Ridge)			HS #13 Schematic Design			Major Changes to the Prototype Design
	#	S.F.	Total	#	S.F.	Total	Description
Student Organizations			**565**			**655**	**16%**
Student Organization Room	1	312	312	1	365	365	
Storage	1	75	75	1	70	70	
School Store (incl. stor)	1	178	178	1	220	220	
Student Support Center			**1,133**			**1,230**	**9%**
BSAP Academic Mentor Office	1	256	256	1	255	255	
AEPS (Alt. Education) Office	1	274	274	1	145	145	
Contract Room (Alt. Education)	1	343	343	1	535	535	
Support Room	1	135	135	1	175	175	
Maryland Tomorrow Office	1	125	125	1	120	120	
ESOL			**321**			**555**	**73%**
ESOL	1	321	321	1	555	555	Increased size per most recent HCPSS HS renovation planning process.
Gifted & Talented			**922**			**780**	**-15%**
Gifted & Talented Classroom (w/ stor.)	1	922	922	1	780	780	Decreased to size of typical classroom,
General Instruction			**32,584**			**29,770**	**-9%**
Classrooms (Eng, WL, SS)	22	771	16,953	24	764	18,335	Added Mini Auditorium in lieu of technology resource rooms and computer lab. Labelled yearbook workroom as a typical classroom, since dedicated classroom space has not been required per post-occupancy comments from HS tours. Reduced size of typical math classroom to Ed Spec
Classrooms (Math)	10	899	8,987	10	762	7,620	
Seminar Room	2	295	589	3	380	1,140	
Technology Resource	3	893	2,680	-	-	-	
Computer Lab	2	975	1,949	-	-	-	
Mini Auditorium / Testing	-	-	-	1	1915	1,915	
Journalism/Yearbook Room	1	732	732	1	760	760	
Journalism/Yearbook Workroom	1	694	694	-	-	-	
Health Education			**861**			**1,560**	**81%**
Health Education Classroom (w/ stor.)	1	861	861	2	780	1,560	Additional health classroom per curriculum requirement.
Physical Education			**27,266**			**27,880**	**2%**
Main Gym	1	9,701	9,701	1	10,440	10,440	Increased width of main gymnasium. Added two team rooms to accommodate visiting teams during games. Resized locker rooms, coaches' planning rooms and training room to reflect sizes required during the design process at the latest HCPSS HS project.
Auxiliary Gym	1	4,684	4,684	1	4,830	4,830	
Wrestling Room (incl. stor.)	1	2,288	2,288	1	2,380	2,380	
Weight Training Room (incl. stor.)	1	3,013	3,013	1	3,025	3,025	
Locker Rooms	2	1,391	2,781	2	1,378	2,755	
Shower Rooms	2	198	395	2	225	450	
Team Rooms	4	260	1,041	6	262	1,570	
Athletic Director's Office (incl. stor.)	1	224	224	1	200	200	
Trainer Room (incl. stor.)	1	495	495	1	370	370	
Laundry Room	1	206	206	1	115	115	
P.E. Storage Area (incl. ext. stor.)	2	279	557	2	235	470	
Team Room Storage	2	162	324	2	120	240	
Coach Planning	2	252	504	2	210	420	
P.E. Planning	1	362	362	2	108	215	
Tickets (incl. stor.)	1	500	500	1	210	210	
Concessions	1	191	191	1	190	190	

Space Analysis

Net areas indicated in square feet.

	HS Prototype Design (Marriotts Ridge)			HS #13 Schematic Design			Major Changes to the Prototype Design
	#	S.F.	Total	#	S.F.	Total	Description
Media			**10,211**			**9,680**	**-5%**
Main Reading Room	1	5,627	5,627	1	5,490	5,490	Removed technology resource room to accommodate innovation lab. Removed media production to accommodate small group area.
Technology Resource Room	1	639	639	-	-	-	
Innovation Lab	-	-	-	1	730	730	
Office & Work Space	1	214	214	1	360	360	
Media Production	1	654	654	-	-	-	
Small Group Areas	-	-	-	3	203	610	
Storage (books & A/V equipment)	3	99	296	1	385	385	
TV Studio w/ control room	1	982	982	1	935	935	
Equipment Room (MDF/TER)	1	373	373	1	410	410	
Science			**15,475**			**23,970**	**55%**
Earth/Space (Earth Science)	4	1,125	4,501	4	1,785	7,140	Eliminated the concept used for Eath Space instruction at MRHS that had two smaller classroom spaces sharing a lab space between. Added a science classroom and greatly increased the square footage of each classroom lab per Science Department feedback during PAC meetings.
Life Science (Biology)	3	1,321	3,963	4	1,846	7,385	
Physical Science (Physics / Chemistry)	4	1,318	5,273	4	1,846	7,385	
Prep. for Life & Earth/Space Science	1	277	277	1	310	310	
Prep. for Physical Science	1	405	405	1	310	310	
Seminar Area	2	320	640	2	210	420	
Storage Area	2	208	416	2	185	370	
Teacher Planning	-	-	-	2	325	650	
Technology Education			**4,340**			**6,685**	**54%**
Large Engineering / Technology	1	2,042	2,042	1	2,445	2,445	Added an additional small engineering / technology work space per technology education department feedback during PAC meetings.
Material Storage (incl. dust)	1	250	250	1	250	250	
Project Storage & Finishing	2	160	319	1	205	205	
Small Engineering / Technology	1	1,553	1,553	2	1,700	3,400	
Storage	1	176	176	2	100	200	
Teacher Planning	-	-	-	1	185	185	
Career Academy (BCMS)			**4,263**			**4,790**	**12%**
Computer Labs	4	1,016	4,065	4	985	3,940	Added two teacher planning spaces per last HCPSS high school project.
Storage	1	198	198	2	123	245	
Seminar	-	-	-	2	180	360	
Teacher Planning	-	-	-	2	123	245	
Special Education			**5,197**			**5,520**	**6%**
OT / PT Area	1	379	379	1	520	520	
OT Storage	1	158	158	1	170	170	
Speech Language Therapy	1	221	221	1	240	240	
Conference Room	1	266	266	1	250	250	
Storage	2	57	113	3	67	200	
S.E. Resource (incl. Reading)	6	624	3743	6	632	3790	
Teacher Planning	1	317	317	1	350	350	
Food and Consumer Science			**3,519**			**2,460**	**-30%**
FACS Lab (Food & Nutrition)-incl. stor	1	1,151	1,151	1	1,310	1,310	Removed classroom space, increased FACS lab, decreased pre-school room and added a planning space adjacent to the Pre-School similar to most recent HCPSS high school project.
CDC- Preschool (Child Development)	1	1,105	1,263	1	950	950	
Classroom	1	944	944	-	-	-	
CDC - Outdoor Storage	1	161	161	1	120	120	
Teacher Planning	-	-	-	1	80	80	

Space Analysis

Net areas indicated in square feet.

	HS Prototype Design (Marriotts Ridge)			HS #13 Schematic Design			Major Changes to the Prototype Design
	#	S.F.	Total	#	S.F.	Total	Description
Cafeteria			**7,491**			**7,405**	**-1%**
Student Dining	1	7,491	7,491	1	7,405	7,405	
Auditorium			**14,347**			**17,840**	**24%**
Auditorium	1	7,954	7,954	1	7,890	7,890	Relocated control room inside the auditorium on the floor next to audience, which would increae the auditorium seating area. Dedicated two separate spaces for drama and dance. Added storage for dance and two offices, one for drama and one for dance.
Control Area	1	433	433	2	265	530	
Drama / Changing Room	2	697	1,174	2	1,080	2,160	
Workshop (incl. duster)	1	1,030	1,030	1	1,050	1,050	
Storage Rooms	2	331	662	3	300	900	
Stage / Wings	1	2,982	2,982	1	3,030	3,030	
Ticket Booth	1	112	112	1	120	120	
Dance Studio	1	1,618	1,618	1	1,510	1,510	
Dance Storage	2	58	116	1	435	435	
Offices	-	-	-	2	108	215	
Music			**6,548**			**6,965**	**6%**
Instrumental Rehearsal Room / Band	1	2,613	2,613	1	2,795	2,795	
Instrumental Equipment Storage	1	328	328	1	465	465	
Instrumental Repair Space	1	80	80	1	130	130	
Instrumental Uniform Storage	1	193	193	1	215	215	
Choral Rehearsal Room	1	1,652	1,652	1	1,645	1,645	
Choral Storage / Workroom	1	205	205	1	225	225	
Practice Rooms	4	78	312	4	91	365	
Electronics Laboratory	1	588	588	1	665	665	
Ensemble Room (incl. stor.)	1	577	577	1	460	460	
General Storage	1	78	78	-	-	-	
Music Storage	1	240	240	-	-	-	
Art			**4,506**			**4,750**	**5%**
General / Visual Art Studio / Kiln	2	1,250	2,499	2	1,005	2,010	Added teacher planning space and increased size of photo studio to match size of other two studios and creating a third teaching station.
Central Storage	1	517	517	2	290	580	
Photo Studio	1	378	378	1	995	995	
Digital Lab / Darkroom	1	328	328	1	440	440	
Sculpture	1	784	784	1	505	505	
Teacher Planning	-	-	-	1	220	220	
Custodial Area			**2,435**			**2,180**	**-10%**
Building Service Manager's Office	1	194	194	1	120	120	Area reduced to reflect the area provided at the latest HCPSS HS project.
Shop & Storage	1	514	514	1	410	410	
CC Closets	6	47	284	9	58	520	
General School Storage	8	129	1,032	4	140	560	
Outside Storage (Mower Room)	1	224	224	1	390	390	
Locker Room / Shower / Toilet	3	62	187	3	60	180	
Food Services			**3,529**			**3,285**	**-7%**
Can Wash	1	64	64	1	90	90	
Dry Storage Room	1	317	317	1	290	290	
Custodial Closet / Laundry	1	80	80	1	70	70	
Refrigerator / Freezer	2	189	378	2	233	465	
Office	1	128	128	1	115	115	
Locker Room / Toilet	1	119	119	2	108	215	
Dishwashing Area	1	265	265	1	225	225	
Kitchen & Serving (incl. A la Carte)	1	2,178	2,178	1	1,815	1,815	

Space Analysis

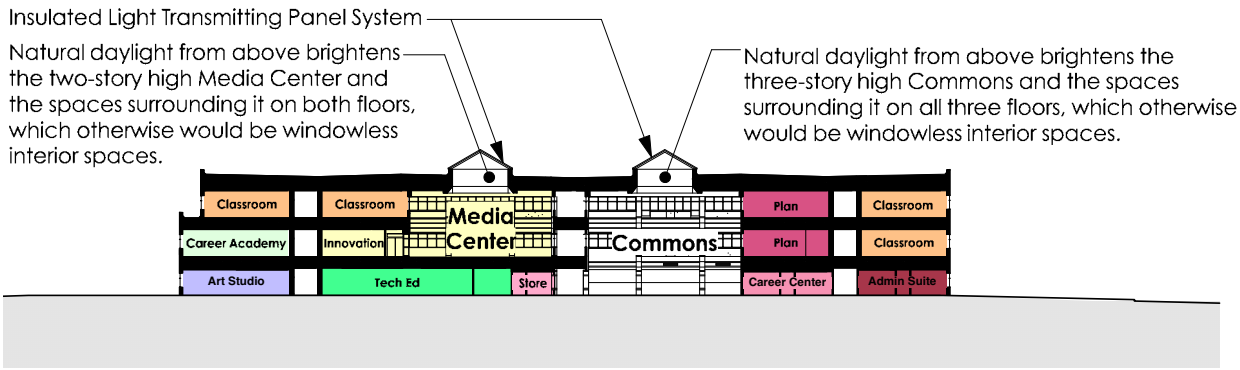
Net areas indicated in square feet.

	HS Prototype Design (Marriotts Ridge)			HS #13 Schematic Design			Major Changes to the Prototype Design
	#	S.F.	Total	#	S.F.	Total	Description
Academic Life Skills Program			611			0	-100%
Classrooms	1	611	611	-	-	-	Program is not going to be held at HS #13 in a separete dedicated classrom.
JROTC			2,118			0	-100%
Classrooms	2	705	1410	-	-	-	JROTC program is not going to be provded on site at HS #13.
Planning Offices	2	163	325	-	-	-	
Uniform Storage	1	708	708	-	-	-	

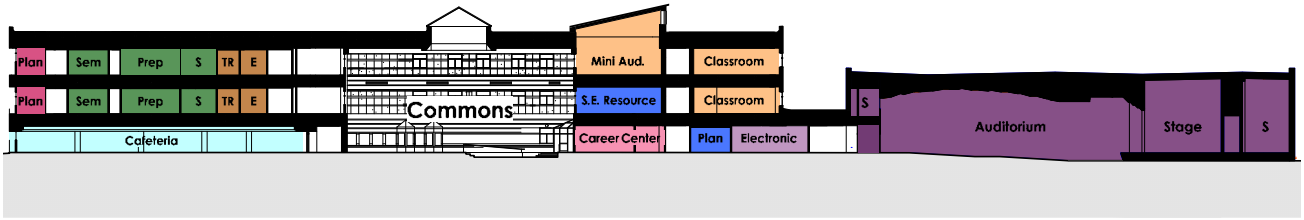
Space Analysis Summary

	HS Prototype Design (Marriotts Ridge)	HS #13 Schematic Design	Major Changes to the Prototype Design
Total Programmed Net Square Footage	**165,262**	**175,890**	**6%**
Gross Area Factor (Walls, Circulation, Toilets, Mech./ Elec. Rooms, Data Closets, etc.)	86,383	86,860	477
Efficiency = Net / Gross	**66%**	**67%**	**1%**
Gross Area Total	**251,645**	**262,750**	**11,105**

Building Sections



Section A-A



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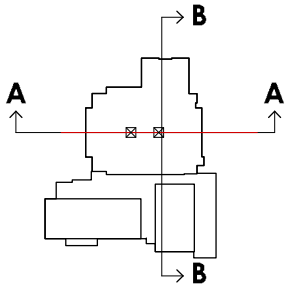


Architectural Character

The new High School #13 will be located within the community of Jessup, Maryland.

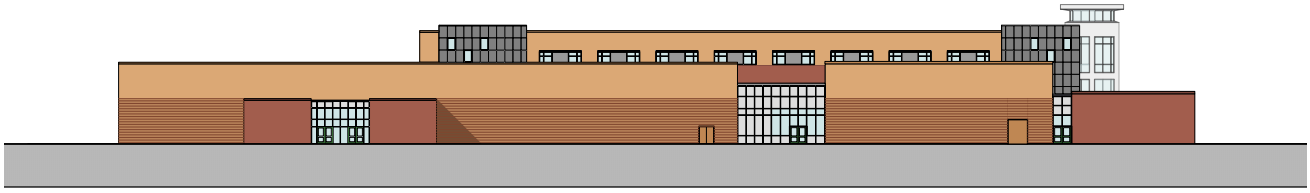
The new school is a three-story building design with masonry load-bearing walls and structural steel frame. Two roof mounted insulated light transmitting panel systems will bring daylighting to the core interior spaces.

The building elevations will be a combination of masonry veneer and insulated architectural metal wall panels.

FRONT ELEVATION (NORTH-FACING)

SIDE ELEVATION (WEST-FACING)

REAR ELEVATION (SOUTH-FACING)

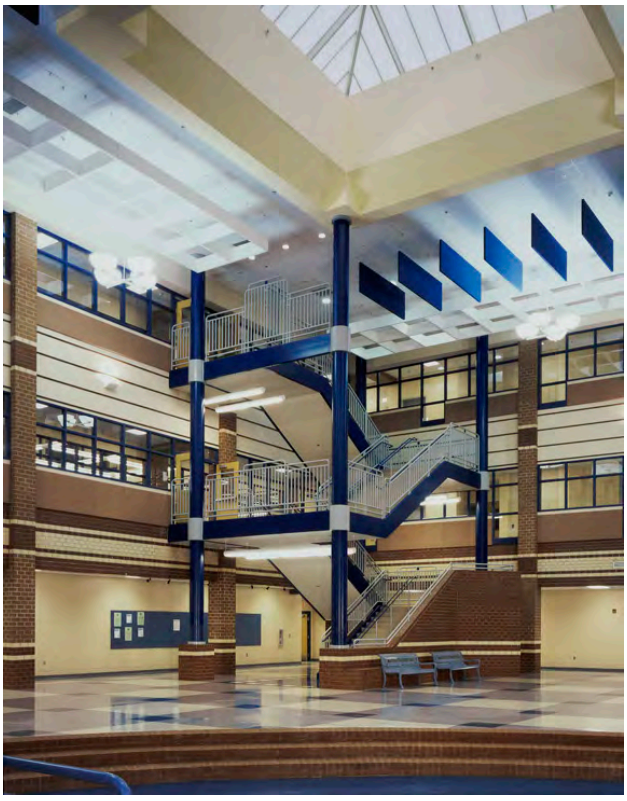


SIDE ELEVATION (EAST-FACING)

Views from the Original Prototype Design

Images below are from Marriotts Ridge High School.

Main Entrance



Three- Story Open Commons Area

Auditorium (above) Media Center (below)

Civil Design Narrative

PROPERTY DESCRIPTION

The existing property that will house the future high school is currently comprised of three existing parcels that equal a total fo 91 acres, which will be purchased by the Howard County government. This property spans from Mission Road on the northern edge to Route 1 on the southern edge. Once purchased, the 91 acre site will then be subdivided into five new parcels:

Parcel 1 = 8 acres for Public Road Right of Way

Parcels 2 and 3 = 12 acres for Howard County Recreation and Parks, located near Route 1.

Parcel 4 = 42 acres for HCPSS to build High School #13, located to the west of the new public road

Parcel 5 = 29 acres for HCPSS to build a practice field for the high school and stormwater management facility for the high school and a future elementary school, located to the east of the new public road, near Mission Road.

There are residential subdivisions adjacent to the north and west boundary lines of the HCPSS property. There is a single railroad line owned by CSX Transportation adjacent to the east boundary line of the property. There is an existing 30-foot wide sewer right of way within the property for an existing sewer line and existing industrial waste line.

WETLANDS

There are multiple existing wetland areas which will have wetland buffers and easements around their perimeter.

GRADING

The site is currently being pre-graded under the direction of the Department of Public Works.

ZONING

The existing zoning for the HCPSS sites is R-12 and RSC-MXD-3.

UTILITIES

The high school will be serviced with public water, public sanitary sewer, and natural gas.

Howard County will be constructing both a public water line within the public road right of way from Route 1 to the southern edge of the HCPSS site as part of a separate capital project. As part of the scope of this project the water line will constructed to the high school and to the existing water main in Mission Road.

The high school will connect the sewer lines to the existing easement that crosses the site.

FOREST CONSERVATION

Forest conservation will be required, and it is anticipated that an off-site tree bank will be utilized in addition to the on-site forest that will be retained where possible.

ACCESS AND SITE PROGRAM

A public road will provide ingress and egress to the high school from U.S. Route 1. Access from the high school to Mission Road will also be provided. A connection to the future elementary school site will be master planned as part of this project.

A capital project commission by the Howard County Government is being implemented for construction of a new water tank and approximately 2,000 feet of a public road from U.S. Route 1 which will connect to the proposed public road for the high school.

A 10-foot wide macadam pedestrian and bike pathway will be installed on one side of the public road connecting Mission Road and Route 1, which will provide access to the high school along the way.

There are two large parking lots proposed for the high school. The first parking lot has two entrances from the public road to access the parking area. The entrance furthest from Route 1 leads to the parent drop-off area on the east side of the school. The second parking lot in front of the main entrance will have one entrance from the public road and two exits. These entrances and exists will be shared with the service area traffic an the bus loop which will accommodate 22 busses. The total amount of parking spaces provided on site will be 582 spaces.

Recreational areas being provided include:

- Outdoor tennis courts and basketball
- Baseball and softball fields
- Grass field hockey area (180'x300')
- Outdoor classroom area adjacent to the existing wetlands
- Stadium for football, soccer and lacrosse
- Discus area
- Practice field on the future Elementary School parcel

A six foot high fence will constructed along the full length of the eastern property line to provide a physical barrier between the school site and the existing railway tracks and the quarry property. In addition, there is an existing fence that extends the length of the quarry property line.

STORMWATER MANAGEMENT AND STORM DRAIN

Site Storm Water Management will be provided by bio-retention facilities dispersed around the parking lots, a few larger stormwater management facilities and an underground management tanks which will provide an irrigation system to the fields.

LANDSCAPE PLAN

Proposed planting will consist of what is necessary to vegetatively stabilize the disturbed areas of the site, along with providing plantings necessary to meet requirements for the building and parking areas as well as the stormwater management facilities in order to meet requirements of the 2,000 Maryland Stormwater Design Manual and the 2007 update. Shade trees will be provided along pathways and near athletic fields and patios. Street trees will also be required along the public roadway. The County requires a minimum 2-1/2" caliper trees to be placed at 40 feet on center along each side of the public roadway which will be inside the county right of way and maintained by the county.

Architectural Design Narrative

PROPOSED FLOOR PLAN

The new High School #13 will be a three-story building design adaptation of the Marriotts Ridge High School prototype.

The design has a first floor area of 142,242 gross square feet, a second floor area of 62,431 gross square feet, and a third floor area of 58,177 gross square feet for a total of 262,851 gross square feet. The school will have a local capacity of 1,650 students.

The prototype type design provides a three-story open commons area and a two-story media center at the heart of the main educational portion of the school. There is looped circulation that provides access to the the classrooms, that have views to the outside and access to natural daylight. There is a two-story science wing which branches off of the main circulation loop on both the second and third floors. All of the public, louder spaces like the music and P.E. spaces are placed in the one-story portion of the building where they can have higher ceilings and be zoned both for sound and after-hours use.

New construction will allow for the latest HCPSS technology specifications to be fully integrated into the design.

LIFE SAFETY / BUILDING CODES

The project design will comply with applicable statutes, codes and regulations in place at the time construction documents are reviewed by Howard County code officials and the Maryland State Interagency Committee on School Construction, including the following:

- Building Code: 2018 IBC International Building Code
- Life Safety Code: 2018 Life Safety NFPA 101
- Fire Prevention Code: 2018 NFPA 1 Fire Prevention Code
- Energy Efficiency: 2018 International Energy Conservation Code (IECC)
- Mechanical Code: 2018 International Mechanical Code
- Plumbing Code: 2015 National Standard Plumbing Code Illustrated
- Fuel Gas Code: 2015 National Fuel Gas Code (NFPA 54)
- Electrical Code: 2017 National Electrical Code (NFPA 70)
- Handicapped Code(s): 2010 ADA Americans with Disabilities Act
  2012 Maryland Accessibility Code
- County Requirements: Howard County Public School System Design Guidelines

No asbestos or lead containing materials will be specified or used and its absence in the construction will be certified to the Owner.

BUILDING MATERIALS

Windows

Exterior aluminum storefront will be glazed with Low-E insulated glazing and, where possible, each classroom will be provided one operable window. Exterior solar shades will be provided at south, west and east building elevations.

Doors

Typical interior doors will be solid core metal doors with simulated wood grain texture and finish, and with vision panels at door openings into rooms intended to be occupied by students.

Door Hardware

Doors will be provided with ADA accessible hardware. Double exit doors will be provided with lockable removable center mullions. Doors to rooms that students may occupy will be lockable inside and out. Cross corridor fire doors shall be held with magnetic door holders wired to the fire alarm with standard closers.

FINISHES

Floors and Wall Base

Corridors and Cafeteria will receive epoxy terrazzo flooring and epoxy terrazzo wall base. The remaining floor finishes and base will be as required by the Howard County Public School System Design Guidelines.

Walls

Typical interior walls and partitions will have a painted concrete masonry unit (CMUs) finish. Corridor wall finishes will include face brick and glazed-faced masonry units (GMUs) accent areas.

Painting

All paint, both interior and exterior, will be free of lead and mercury and will be compliant with LEED, state and local regulations for Volatile Organic Compounds (V.O.C.).

Ceilings

Typical lay-in tile ceilings at classrooms, core learning spaces and other regularly occupied spaces shall be two foot by two foot acoustical tiles with a Noise Reduction Coefficient (NRC) of 0.70 or higher to comply with Minimum Acoustical Performance Prerequisite (IEQ Prerequisite) from LEED for Schools.

Kitchen and related rooms will receive a two foot by two foot grid and washable lay-in tiles.

Restrooms will receive gypsum dry wall ceilings.

All other ceilings shall be a two foot by two foot grid and 5/8" moisture resistant acoustical tile or exposed structure which will be painted.

Roofing Design Narrative

Typical low-sloped roofing system will consist of built-up roofing membranes over roofing insulation mainly due to their toughness and durability which will be especially important as numerous trades access the roof during construction, and as maintenance personnel access the roof thereafter. These systems will consist of four-ply asphalt and fiberglass felt built-up roofing membranes with a bright white SBS cap sheet over three layers of flat, rigid roofing insulation (R-30 total) over new sloped steel roof decks. The base layer of insulation will be mechanically attached and all subsequent layers, and insulation crickets, will be set in hot asphalt. All asphalt bleed-out at cap sheet seams will be broadcast with bright white granules to provide a uniform appearance and continuous reflective roofing surface. A 'No Dollar Limit' 20 Year manufacturer's warranty will be specified for all new built-up roofing systems.

Roof drains fabricated entirely of cast iron (including domes/strainers) with all stainless steel hardware will be specified as the primary storm drainage system on all low-sloped roofing sections. Overflow roof drains and/or sheet metal overflow roof scuppers through parapet walls will be used as the secondary back-up system.

Pre-finished aluminum sheet metal will be specified for use at all wall copings, and other roof flashing locations where aesthetics are a concern. Lead flashings will be specified at all roof drains and vent pipes. Separate lead flashing caps will be specified at all vent pipes. All other sheet metal flashings will be stainless steel and soldered watertight for leakproof performance.

Treated lumber will be specified for all wood nailers and curbs. All hardware securing or penetrating treated wood will be stainless steel.

Structural Design Narrative

BASIS OF DESIGN

Design Loads	2018 International Building Code	
Floor Live		
	Classrooms	40 psf
	Corridors/Lobbies	100 psf
	Public Areas	100 psf
	Stair	100 psf
	Mechanical Room	125 psf
Floor Dead	Partitions	15 psf (live loads of 100 psf or less only)
Roof Live		30 psf
Wind Load		120 mph, exposure C
Snow	Ground Snow Load	P_g = 25 psf
	Flat Roof Snow Load	P_f = 22 psf
	Snow Load importance Factor	I_s = 1.1
	Thermal Factor	C_t = 1.0
Seismic	Site Class D (Assumed) (Final Site Class to be determined by Geotechnical Engineer)	
Use Group	E - Educational	
Deflection Limitations	(Floors/Roofs and Exterior Walls)	
	Live Load Deflection:	L/480
	Total Deflection:	L/240
	Exterior Walls:	L/240

OUTLINE SPECIFICATION

Concrete	3,000 psi	(footings)
	3,500 psi	(slab on grade, framed floors)
	4,500 psi	(exterior sidewalks)

All concrete exposed to the weather shall have four to six percent entrained air.

All concrete shall be normal weight concrete with a maximum weight of 145 pounds per cubic foot maximum.

Structural Steel	Wide Flanges	- ASTM A992 (Grade 50)
	HSS Tubes	- ASTM A500 (Grade B)
	Plates, Angles, Rods	- ASTM A36
Concrete Reinforcing	Reinforcing bars shall conform to ASTM A 615, Grade 60	
	Welded wire fabric shall conforming to ASTM A 185, Grade 65	

FOUNDATION SYSTEM

The foundation system for this structure shall consist of conventional spread footings proportioned for a safe allowable bearing pressure determined by the geotechnical engineer of record. Footings shall be placed thirty inch minimum below finish grade around the entire building perimeter. Foundation walls shall be block masonry walls filled with 3,000 pounds per square inch (psi) grout and reinforced as required with waterproofing, drainage board, and gravel backfill.

FIRST FLOOR FRAMING SYSTEM

The lower level floor of this building structure shall consist of a four inch concrete slab on grade (fc'=3,500 psi) reinforced with six inch x six inch- W1.4 / W1.4 welded wire fabric poured over a vapor barrier over four inch of porous gravel fill. Tongue in groove 24 gauge metal screeds shall be installed at all column centerlines to act as construction and control joints for this facility. In addition, one and a quarter inch deep saw cut control joints shall be installed at 15'- 0" on center maximum between all tongue in groove joints within eight hours of pouring the structural slabs.

SECOND AND THIRD FLOOR FRAMING SYSTEM

The framed floors of this building structure shall consist of four and a half normal weight concrete topping slab (fc'=3500 psi) reinforced with six inch x six inch W2.1 / W2.1 welded wire fabric poured over two inch by twenty gauge composite metal deck. This framed slab shall be supported by composite steel beams spaced at eight feet on center maximum supported by composite steel wide flange beams supported by wide flange steel columns.

LOW ROOF SYSTEMS

The roof above the auditorium shall be one and a half inch by twenty gauge type "BA" acoustical painted metal roof deck supported by long span steel joists spaced at six feet on center maximum. The roof above the gym shall be three inch by twenty gauge type "N" galvanized metal roof deck supported by long span steel joists spaced at ten feet on center maximum. Long span steel joists at the gym and auditorium shall be supported by exterior masonry bearing walls. The remaining low roof shall be one and a half inch by twenty gauge type" B" galvanized metal roof deck supported by conventional steel joists spaced at six feet on center maximum. Steel joists shall be supported by steel wide flange girders that are supported on steel tube columns. Additional steel support is required for roof top units, roof screen, and folding partition. The roof above the gym and auditorium will be designed to support the proposed solar photovoltaic system.

HIGH ROOF SYSTEM

The high roof shall be one and a half inch type "B" galvanized metal deck supported by steel bar joist spaced at six feet on center. Steel joists shall be supported by steel wide flange girders supported by wide flange columns. Additional steel support is required for roof top units, roof screen, and folding partition.

EXTERIOR WALL CONSTRUCTION

The exterior walls of the three-story section of building shall consist of a combination of four inch brick veneer, cavity and eight inch reinforced masonry block and areas of insulated metal panels and eight inch reinforced masonry block. The exterior wall at the gymnasium and auditorium shall be four inch brick veneer, cavity, and sixteen inch reinforced block. All openings for window and doors shall be supported by galvanized steel lintels. All reinforced block walls shall be filled solid with 3,000 psi grout.

LATERAL FORCE RESISTING SYSTEM

The lateral force resisting system for this building shall consist of block masonry shear walls which are located throughout the building structure. The masonry shear walls, where necessary, will be reinforced with vertical rebar filled with 3,000 psi grout, and anchored to the building's foundation system.

Mechanical Design Narrative

APPLICABLE CODES AND STANDARDS

2018 International Building Code (IBC)
2018 International Mechanical Code (IMC)
2018 International Energy Conservation Code (IECC)
2018 International Fire Code (IFC)
2015 National Standard Plumbing Code
2015 National Fuel Gas Code
ASHRAE Standard 55-2007 - Thermal Environmental Conditions for Human Occupancy
ASHRAE Standard 62.1-2010 - Ventilation for Acceptable Indoor Air Quality
ASHRAE Standard 90.1-2016 - Energy Standard for Buildings
NFPA 13: Standard for the Installation of Sprinkler Systems, latest edition
NFPA 90A: Standard for the Installation of Air Conditioning and Ventilating Systems, latest edition

DESIGN STANDARDS

HVAC system design will be based on the following conditions:

Outdoor Design Temperatures:

Summer:	95°F (Dry Bulb) / 78°F (Wet Bulb)
Winter:	0°F DB

Indoor Design Temperatures (per HCPSS "Guidelines for Energy Conservation"):

Occupied Cooling Setpoint:	76°F DB (+2 F) / 50% Relative Humidity (Maximum)
Occupied Heating Setpoint:	70°F DB (-2 F)
Unoccupied Cooling Setpoint:	85°F DB (+2 F)
Unoccupied Heating Setpoint:	55°F DB (-2 F)
Utility Spaces Setpoint: (Mechanical and Electrical Rooms, etc.)	55°F DB Heating / 85°F DB Cooling
Stairwell Heating Setpoint:	65°F DB (-2 F) Occupied / 55°F DB (-2 F) Unoccupied

Building Occupancy Densities:
Architectural Furnishing Plans
Estimated Maximum Occupancy Densities Provided in IMC Chapter 4

Ventilation Rates:

Minimum Ventilation Rates:	IMC Chapter 4 and ASHRAE Standard 62.1-2010
Ceiling Supply Air Systems:	1.0 Ez (Zone Air Distribution Effectiveness)

Filtration Criteria:

Pre-filters:	30% efficient (including all fan coil unit systems)
Final filters:	85% efficient (including all DOAS and AHU systems)

LIFE CYCLE COST ANALYSIS

A 20-year life-cycle cost analysis will be performed during the design development phase to confirm the final mechanical system selection for the facility. The following mechanical system described on the following pages is expected based on our experience with similar high school facilities. All mechanical system components will be designed in strict accordance with all applicable codes, regulations, and the design standards described previously.

HEATING AND COOLING SYSTEMS

A four-pipe chilled water and heating water system is anticipated for High School #13. This type of mechanical system provides the ability to have independent heating or cooling year-round, while delivering an extremely high level of overall building energy efficiency.

Two 325-ton to 350-ton high-efficiency air-cooled chillers with variable frequency drives (VFDs) will be located within an equipment service yard area that is positioned adjacent to the main mechanical room. This equipment will generate chilled water for the school's four-pipe distribution system. A variable primary chilled water arrangement will be utilized. Chilled water will be piped from the chillers to three chilled water distribution pumps, located within the mechanical room, and circulated throughout the school.

Production of heating water for the school's four-pipe distribution system will be accomplished by four 2,000 MBH input gas-fired condensing type boilers, located within the main mechanical room. Three heating water distribution pumps, located in the mechanical room, will circulate heating water throughout the school. A maximum heating water supply temperature of 140 degrees F will be utilized, with this supply water temperature reset based on outdoor air temperature.

All chilled water and heating water pumping systems will be provided with N+1 redundancy, such that the operation of the school can be maintained in the event of a single pump failure. Pumping systems will utilize base-mounted end-suction type pumps, arranged in a lead/lag configuration. Variable frequency drives will be provided for reduced energy consumption during periods of reduced system demand. In addition to distribution pumps, other heating water and chilled water infrastructure components, including air separators and expansion tanks will be located within the main mechanical room.

HVAC SYSTEMS

Classroom Areas

Classroom areas throughout the school will be provided with direct-drive four-pipe horizontal fan coil units for space conditioning. Fan coil units will be positioned above the classroom ceilings, with supply and return air ductwork extending from these units to the classroom served. The use of filter return grilles (rather than filters within the fan coil units) will be provided, minimizing above ceiling maintenance requirements.

A series of modular, rooftop dedicated outdoor air systems with supply fan, exhaust fan, enthalpy wheel energy recovery devices, sensible plate heat exchangers, chilled water cooling coils, and hot water heating coils will be provided for delivering conditioned ventilation airflow to the classroom areas served. Airflow supplied from these units will be dehumidified, conditioned, and delivered to each fan coil unit's return air ductwork. Exhaust airflow from classrooms, restrooms, and storage room areas will be routed through each dedicated outdoor air unit's enthalpy wheel for pre-conditioning of outdoor air.

The feasibility and cost effectiveness of utilizing demand control ventilation within classroom areas will be evaluated during the design development phase. To accomplish this control strategy, a series of variable air volume (VAV) retrofit-type air terminal units will be installed within the conditioned outdoor air ductwork systems. Each classroom will be provided with a dedicated VAV air terminal unit, regulating the quantity of conditioned outdoor air delivered to each space based on the actual room carbon dioxide levels.

Administrative Suite and Administrative Support Areas

The administrative suite and administrative support areas (including the guidance and health suite areas) will be provided with space conditioning and ventilation through a single modular VAV rooftop air-handling unit. This air-handling unit will be complete with a supply air fan array, return air fan array, direct expansion (DX) cooling coil, chilled water cooling coil, and hot water heating coil. Fans in the supply and return air fan arrays will be equipped with variable speed electronically commutated motors for reducing airflow quantities during periods of reduced cooling demand. Return fan tracking will be accomplished through a room differential pressure transducer, located within one of the administrative area. In addition, the use of dry-bulb airside economizer operation and supply air temperature reset will be incorporated into the air-handling unit's control functions.

Air distribution will consist of medium pressure ductwork serving single-duct VAV terminal units with hydronic heating coils. Air distribution systems downstream of the VAV terminal units will consist of low pressure distribution ductwork serving ceiling mounted supply air devices. A dedicated VAV terminal unit is anticipated for each room. Sound attenuators will be installed at both the air-handling unit and VAV terminal unit discharge, minimizing mechanical system noise levels and promoting good acoustics within classroom areas. Return air will be ducted from each room and returned back to the air-handling unit.

Exhaust airflow from toilet rooms and storage room areas will be taken directly to roof mounted exhaust fan(s).

Media Center

A single-zone rooftop air-handling unit will be provided for space conditioning and ventilation within the media center area. This rooftop air-handling unit will be provided with chilled water cooling coil, hot water preheat and heating coils, and airside economizer operation. Fans in the supply and return air fan arrays will be equipped with variable speed electronically commutated motors for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy.

Gymnasium

A single-zone air-handling unit will be provided for space conditioning and ventilation within the gymnasium area. This rooftop air-handling unit will be provided with chilled water cooling coil, hot water preheat and heating coils, and airside economizer operation. Fans in the supply and return air fan arrays will be equipped with variable speed electronically commutated motors for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy.

Auxiliary Gym and Weight Training

Similar to the Gymnasium, both the auxiliary gym and the weight training room will be provided with a single-zone air-handling unit will be provided for space conditioning and ventilation within the mini auditorium area. This rooftop air-handling unit will be provided with chilled water cooling coil, hot water preheat and heating coils, and airside economizer operation. Fans in the supply and return air fan arrays will be equipped with variable speed electronically commutated motors for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor in each space will reduce minimum outdoor air quantities during periods of reduced space occupancy.

Auditorium and Stage

A single-zone air-handling unit will be provided for space conditioning and ventilation within the auditorium and stage areas. This rooftop air-handling unit will be provided with chilled water cooling coil, hot water preheat and heating coils, and airside economizer operation. Fans in the supply and return air fan arrays will be equipped with variable speed electronically commutated motors for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy.

Cafeteria and Serving Line

Similar to the media center area, the cafeteria and serving line will be provided with a single-zone rooftop air-handling unit for space conditioning and ventilation. This rooftop air-handling unit will be provided with chilled water cooling coil, hot water preheat and heating coils, and airside economizer operation. Fans in the supply and return air fan arrays will be equipped with variable speed electronically commutated motors for reducing airflow quantities during periods of reduced cooling demand. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy. Excess outdoor air quantities will be transferred to the adjacent kitchen area for exhaust hood make-up.

Kitchen

Space conditioning for the kitchen area will be accomplished primarily through transfer airflow from the adjacent serving line and cafeteria areas. The use of a UL listed exhaust fan to serve a Type I kitchen hood is anticipated. Additionally, a companion gas-fired make-up air unit will be mounted on the roof to serve the kitchen hood.

Stairwell Areas

Space conditioning for the stairwell areas will be accomplished through a series of hydronic heating-only cabinet unit heaters.

BUILDING AUTOMATION AND CONTROL SYSTEM

A building automation system consisting of direct digital control (DDC) components will be provided for the school. Damper and valve components will be provided with electric or electronic actuation. DDC control components will be utilized for all fan coil units, air-handling units, and dedicated outdoor air systems.

All control system components will be interfaced with the central HCPSS energy management control system for remote monitoring and energy management routines. All system components will be designed to meet HCPSS automation standards and naming conventions.

Plumbing Design Narrative

STORM WATER PIPNG SYSTEMS

Storm water drainage, including roof drains, overflow drains, and storm water piping systems will be provided for the school. Above- and below-grade piping will be constructed from ether schedule 40 PVC or cast-iron, with no-hub piping connections provided only for above-grade cast iron piping components. All storm water piping systems will exit the building at various locations and coordinate with available site piping connections provided for the school.

SANITARY AND VENT PIPING SYSTEMS

Sanitary waste and vent piping systems are provided for supporting plumbing fixtures within the school. Above- and below-grade sanitary and vent piping will be constructed from cast-iron, with no-hub piping connections provided only for above-grade piping components. Vent piping will terminate at the roof level, with a minimum 25-foot separation provided between vent piping terminations and any outdoor air intake locations. Sanitary piping systems will exit the building at various locations and coordinate with available site piping connections provided for the school.

The following special sanitary and vent piping systems are anticipated:

- Equipment and sinks that may discharge grease into the sanitary system from the kitchen will be piped to an underground concrete grease interceptor using only cast-iron piping. The discharge from this interceptor will be connected to site sanitary piping system.
- Sanitary and vent piping that is handling waste from science sinks and equipment will utilize acid-resistant piping material and be connected to an acid neutralization tank before connecting into the sanitary mains.
- Sinks within the art classrooms will be provided with solids interceptors, collecting debris and preventing it from entering into the site sanitary piping system.

DOMESTIC WATER PIPING SYSTEMS

A combination fire/water service will enter the building within the main mechanical room area. This service will be capable of supporting both the fire and water service demands of the new school. A new domestic water service, complete with basket strainer and dual reduced pressure zone backflow preventers will separate the domestic water and fire services prior to distributing water throughout the school. Domestic water piping will be distributed from this mechanical room area to plumbing fixtures and equipment located throughout the school. Based on one of two municipal water pressure test reports recently obtained, the use of a domestic water booster pumping system is anticipated. _

A series of gas-fired condensing type water heaters will be provided for generating domestic hot water for the school. Both 140-degrees Fahrenheit (for the kitchen area only) and 110-degrees Fahrenheit domestic hot water will be distributed throughout the school, with each piping loop complete with a dedicated hot water circulation pump and expansion tank.

PLUMBING FIXTURES

Institutional grade plumbing fixtures will be provided throughout the school. These fixtures will include floor-mounted water closets utilizing dual flush type 1.6/1.0 gallon per flush valves, pint flush (0.125 gallon per flush) wall-hung urinals, wall-hung lavatories with self-closing hot and cold water faucets that supply 0.35 gallons per minute, and showers with heads that supply 1.5 gallons per minute. All plumbing fixtures will comply with the Americans with Disabilities Act (ADA).

NATURAL GAS PIPING SYSTEM

A natural gas service will be provided by BGE for the school. The gas service meter and pressure reducing station will be located within an equipment service yard area, located adjacent to the main mechanical room. Gas piping will serve the emergency generator, boilers, and domestic water heater. Gas piping mains will be routed at the roof level, minimizing the amount of gas piping located above-ceilings within the building.

Fire Protection Design Narrative

FIRE SUPPRESSION SYSTEM

The entire building will be fully sprinklered. The building will be separated into several zones that will match the fire alarm pull zones for the building. Based on one of two municipal water pressure test reports recently obtained, the use of a fire pump is anticipated. During the design development phase, this water pressure will be confirmed based on the results of a new fire flow test. All work will be specified to conform to standards of the National Fire Protection Association (NFPA) and will include requirements for performance verification through hydraulic calculations.

FIRE ALARM AND DETECTION SYSTEM

The fire alarm system will be designed to comply with State of Maryland Fire Code, local authorities having jurisdiction, International Building Code, and NFPA. The fire alarm system will be a stand-alone, addressable, analog system and will have voice evacuation capability. The main fire alarm control panel (FACP) will be located in the main telecom room (TR room). The basis-of-design fire alarm system manufacturer will be Edwards Systems Technology (EST).

There will be two fire alarm annunciators. The first annunciator will be a remote graphic annunciator panel at the main entrance. The second annunciator will be an LED display with a static graphic map in the custodial office. The graphics will show the fire alarm zones. Zoning will follow the sprinkler zones.

Fire alarm manual pull stations will be provided at each exterior egress door. Smoke detectors will be provided at the FACP and on each side of a door with fire alarm magnetic door holders. Duct smoke detectors with remote test stations will be provided for air-handling systems where required, and will interface with the HVAC equipment for shutdowns. Each initiation device will have its own address.

Fire alarm combination speaker/strobes will be installed in classrooms, instructional spaces, offices, workrooms, conference rooms, resource rooms, staff lounge, media center, student dining, kitchen, gymnasiums, lockers, wrestling room, weight training, auditorium, lobbies, corridors, group toilets, mechanical rooms, and main electrical room. Fire alarm strobe devices will be installed in individual toilet rooms, large custodial rooms, large storage rooms, and electrical closets. Notification appliance circuit (NAC) power extender panels will be provided where needed for speaker/strobe and strobe devices. Strobe spacing, locations, and candela minimum required light output intensity will be per NFPA requirements.

Fire alarm cabling will be installed in conduit.

Electrical Design Narrative

APPLICABLE CODES AND STANDARDS

2010 Americans with Disabilities Act Standards for Accessible Design
Illuminating Engineering Society of North America (IESNA) Lighting Handbook, 10th Edition
2018 International Building Code (IBC)
2018 International Energy Conservation Code (IECC)
2018 Life Safety Code, NFPA 101
Maryland Occupational Safety and Health Act (MOSH Act)
2017 National Electrical Code (NEC) with local amendments (NFPA 70)
National Electrical Manufacturers Association (NEMA), standards
2019 National Fire Alarm and Signaling Code, NFPA 72

GENERAL

The electrical systems for High School #13 will include work associated with the power, generator power, lighting, lighting controls, and fire alarm systems. Electrical power will be provided for technology systems designed and specified by the IT consultant. The electrical systems, in concert with the architectural and mechanical considerations, are intended to create spaces that are flexible, functional, energy efficient and respond to the needs of this facility. The electrical design will comply with applicable codes, regulations, standards, and authorities having jurisdiction. Sustainable technologies will be incorporated into the design to achieve the goal of LEED Silver certification.

Electrical Service

There will be an outdoor BGE pad-mounted utility transformer located near the service area of the school. (The front of the utility transformer will be within 20 feet from the service driveway.) A secondary service concrete-encased ductbank (with minimum ten ducts) will be run from the utility transformer to the CT cabinet section of the main switchboard in the main electrical room. The BGE electric meter will be located on the exterior of the building per latest BGE requirements.

Power Distribution

Power will be distributed at 277/480 volts and 120/208 volts. The distribution system will consist of the following electrical equipment:

- Main switchboard
- Distribution panelboards
- Lighting panelboards
- Branch circuit panelboards
- Dry-type transformers
- Enclosed switches (safety switches/disconnects) and/or enclosed circuit breakers
- Combination starters and/or variable frequency drives for motor loads

The main electrical room will consist of a main switchboard, distribution panelboards, dry-type transformers, lighting panelboard, branch circuit panelboards and electrical equipment to support the photovoltaic (PV) system.

The main switchboard will be a 4,000-ampere, 277/480-volt, three-phase, four-wire switchboard with a CT cabinet section, two main sections, and distribution section with molded case circuit breakers. The first main section will have a 4,000-ampere electronic-trip main circuit breaker connected to BGE utility power. The second main section will have a 2,000-ampere electronic-trip main circuit breaker for connections to a temporary portable generator. The main circuit breakers will be key-interlocked so that only one main circuit breaker can be "closed" at a time. The main switchboard will incorporate ground fault protection, surge protection, and energy-reducing maintenance switch with local status indicator for each circuit breaker 1200 amperes or larger. The main switchboard will be sized with spare capacity and space for future circuit breakers in order to accommodate any future renovations to the school.

Panelboards will be rated at 277/480 volts and 120/208 volts and serve as distribution, lighting, or branch circuit panels. There will be dedicated panelboards for lighting, mechanical loads, and receptacle plug loads. Panelboards will have a copper bus structure. Panelboards will be sized with approximately 25 percent spare capacity and 25 percent spare breaker space. A three-phase surge protective device (SPD) will be connected to (and mounted adjacent to) each respective receptacle panel.

The typical dry-type transformer will have a 480-volt delta primary and 208/120-volt, three-phase, four-wire, wye secondary. Transformers serving receptacle panelboards will be general-purpose, energy-efficient type, complying with DOE 2016.

The Maryland State Board of Education on July 26, 2016 approved the discontinuation of the *Standards for Telecommunication Distribution Systems* as mandatory design requirements. Therefore, panelboards dedicated for computer loads with 200 percent rated neutral bus and UL K-13 type transformers serving computer panelboards will not be used on this project.

Sub-metering will be required on this project per the Maryland Green Building Council - High Performance Green Building Program, issued in March 2017 and revised in October 2017. The requirements of this Program apply to Maryland projects starting after March 2017 and "capital projects that are funded solely with State funds; and State-funded new and replacement school construction projects; and community college capital projects that receive State funds". This Program has the following compliance paths: LEED, IgCC, or Green Globes. For the LEED compliance path, there is a mandatory IgCC requirement for Energy Metering, Monitoring and Reporting, which requires electrical energy sub-metering for the following load types: HVAC, lighting, receptacles, kitchen, elevator, and exterior lighting.

Lighting will be connected at 277 volts, single-phase. Mechanical equipment will be connected at either 120 volts, single-phase; 208 volts, single-phase; 208 volts, three-phase; 277 volts, single-phase; or 480 volts, three-phase, depending upon the load requirements. Motors one horsepower or higher will be connected at 480 volts, three-phase. Receptacles will be connected at 120 volts, single–phase. Each feeder and branch circuit will have a separate copper grounding conductor in the same raceway.

The wiring system will be copper conductors with THHN/THWN-2 insulation installed in metallic conduit. The minimum size conduit will be three-quarter inches. Intermediate metal conduit (IMC) will be used for conduits that are three inches in diameter or larger, wiring to exterior equipment, first five feet of underground conduit extending outside of the building, and elbows penetrating floor slabs, exterior walls, or bearing walls. Electrical metallic tubing (EMT) will be used for conduits that are two-and-a-half inches in diameter or smaller. Polyvinylchloride (PVC) conduit will be used for underground feeders and circuits, except where IMC is required. Flexible metal conduit (FMC) will be used to connect to transformers. Liquid-tight flexible metal conduit (LFMC) will be used to connect to motors. FMC and LFMC will be limited to a maximum six foot length.

Receptacle branch circuits will utilize number twelve wiring when the run is 50 feet or less, number ten wiring when the run is between 50 and 100 linear feet, and number eight wiring when the run is more than 100 linear feet in length. Power wiring will be installed in raceway/conduit. Type MC

cable will be limited for use above ceilings with a maximum six foot length to serve luminaires (lighting fixtures).

Classrooms will be equipped with general convenience receptacles and receptacles at the teacher's desk, teacher's wardrobe, wall-mounted projector, student workstations, and "computer cart" charging station.

Tamper-resistant receptacles will be provided in rooms associated with the CDC- Pre-school to meet NEC requirements for spaces where small children will be present.

Electric charging stations will be provided in the parking lot to achieve LEED v4 Location and Transportation Credit for Green Vehicles.

Photovoltaic (PV) System

The solar photovoltaic (PV) system will consist of PV panels on the roof of the Gymnasium and Auditorium. Canopies with PV panels in parking lots will be provided as an alternate.

The solar PV system will use exterior distributed inverters. The locations of the distribution inverters will be grouped together in clusters. Each inverter "cluster" will either connect to a nearby dedicated "PV" panelboard (to be located in an electrical closet within the building) or connect directly to a "PV" main distribution panelboard (MDP). These inverters will have integral disconnects that comply with 2017 NEC 690.13 so that an external disconnect per inverter will not be needed.

The "PV" MDP will have the "Point of Connection" (POC) to the utility (BGE) grid at the main switchboard. The "PV" MDP can be located either in the main electrical room or in a room closer to the inverter "clusters." The location of the "PV" MDP will depend on the cost/benefit analysis of running multiple smaller circuits versus running single larger feeders back to the POC

The POC at the main switchboard will be either on the "supply side" of "load side" of the main service disconnect of the switchboard, utilizing a circuit breaker or fuse in the switchboard. Connections will be in accordance with 2017 NEC 690.59 and 705.12.

- Supply side: The POC will be between the BGE CT cabinet and the building main electrical service disconnect.
- Load side: The POC will be at the distribution section of the switchboard.

The distributed solar PV inverters will be outside the building, in lieu of inside the building, due to the amount heat produced by inverters.

The solar PV system will be on the supply side of any generator automatic transfer switch (ATS). In other words, the solar PV system and generator power will always be separate from each other.

The solar PV system will be utility grid-connected ("on-grid") and not use on-site battery storage. If there is a desire to have the an "off-grid" or "bi-modal" (meaning both on-grid and off-grid) solar PV system, it is understood that an "off-grid" or "bi-modal" solar PV system will require on-site battery storage, which may be cost and space prohibitive. *(Note: Lithium-ion batteries are used on a solar PV systems, which are the same batteries used in electric vehicles. The space required for lithium-ion batteries is 4 kWh per square foot for a 6-foot tall battery system, or 0.66 kWh per cubic foot. There is a 50% space added when using lead-acid batteries.)*

Emergency Public Shelter Requirements

Per house bill 1783, the local Office of Emergency Management (OEM) will determine if a school is to be used in conjunction with their master plan. Howard County OEM has noted that while elementary schools and middle schools will not be used, they could foresee the use of a high school as a shelter. Therefore, it is likely that High School #13 will also be designated as an emergency public shelter.

Electrical equipment for the MEMA emergency public shelter will include an outdoor 2,000–ampere quick-connect generator switchboard (equal to Square D Power-Style QED-2 Quick Connect Generator Switchboard) with multiple cam-lock connectors per phase located in the new service yard as a means to connect to a temporary portable generator. This quick-connect generator switchboard will be connected to the 2,000–ampere main circuit breaker in the main switchboard. The gymnasium, cafeteria, kitchen, administrative suite and health suite as well as the mechanical loads required to support these spaces will be designated by MEMA to be used as an emergency public shelter with the electrical loads connected to a temporary portable generator.

Per HCPSS requirements, a temporary portable generator will also serve mechanical equipment for the entire school.

Generator Power Distribution

An outdoor natural-gas generator in a weatherproof enclosure will be installed in the service yard of the school. The generator will be rated at 277/480 volts, three-phase, four-wire. The basis-of-design generator manufacturer will be Cummins.

The generator will be sized at 350 kilowatts and be connected to two automatic transfer switches (ATS) located in the main electrical room.

ATS #1 will be the "life safety" ATS and will serve emergency panelboard(s). Emergency panelboard(s) will provide power to emergency egress lighting in corridors and classrooms, and exit signs.

ATS #2 will be the "standby" ATS and will serve the automatic temperature control/direct digital building control (ATC/DDC) system panels, kitchen refrigerator and freezer, data/voice communications equipment, intercom/public address equipment, security equipment, fire alarm equipment, heat trace, sump pumps, and other equipment and devices as determined by HCPSS. The "standby" ATS will also serve selected receptacles in the principal's office, main office, health suite, corridors, gym, cafeteria, and kitchen.

Lighting

Building lighting will generally consist of recessed 2' x 2' Architectural style lensed luminaires (lighting fixtures). These luminaires will utilize light emitting diode (LED) light sources with electronic LED drivers. Building lighting will also include high-bay LED luminaires in the gymnasium, a combination of LED pendants and LED downlights in the media center and student dining, LED house lights in the auditorium, recessed LED downlights in selected areas, vandal-resistant LED luminaires in group toilet rooms, gasketed LED luminaires with smooth lenses (for easier cleaning) in the kitchen, narrow LED lensed strip lights for support spaces with open ceilings, LED exit signs with red lettering, exterior perimeter building-mounted full-cutoff LED luminaires, and exterior pole–mounted full-cutoff LED luminaires at parking lots. The finish of exterior luminaires will be selected by the Architect. Exterior sports lighting will be by Musco and utilized LED luminaires.

The lighting design will comply with 2018 IECC, which states that the lighting power density (LPD) will not exceed 0.87 watts per square foot for the entire school. The selection of lighting fixtures for the building will be compliant with the energy code.

Lighting levels will be designed in accordance with the recommendations of the Illuminating Engineering Society of North America (IESNA). Maintained illumination values will be calculated using a total maintenance factor of 90 percent. Classrooms will have an average between 30 and 50 foot-candles at the task plane.

Lighting Controls

Switching of luminaires will be both multi-level and zoned as appropriate for each space. Occupancy sensors will be used for interior lighting. The ATC/DDC system via lighting contactors will be used to control exterior lighting.

Lighting controls in each classroom will include a dedicated lighting room controller (to be located in the ceiling space above the entrance door), two low-voltage lighting control stations (switches), and ceiling vacancy sensor(s). The lighting control station at the entrance door will be three-button for OFF, 50 percent lighting level, and 100 percent lighting level. The lighting control station at the teacher's desk will be multi-button for OFF, 50 percent lighting level, 100 percent lighting level, audio/video (AV) mode, and raise/lower lighting level capability. AV mode will have the front row OFF and the remaining luminaires at 50 percent lighting level. One luminaire in each classroom will be connected to an emergency lighting circuit and will be automatically switched ON during a power outage.

Lighting controls in offices and similar spaces will include a lighting room controller (to be located in the ceiling space above an entrance door), entry lighting control station (switch), and ceiling vacancy sensor(s). The lighting control station at the entrance door will be multi-button for OFF, 50 percent lighting level, and 100 percent lighting level.

Vacancy sensors in classrooms, instructional spaces, offices, workrooms, conference rooms, resource rooms, storage rooms, staff lounge, media center, student dining, gymnasiums, wrestling room, weight training, and auditorium will be set to "vacancy" mode, meaning that lighting in these spaces will need to be manually turned ON via local lighting control station.

Occupancy sensors in lockers, lobbies, corridors, stairways, and group toilets will be set to "occupancy" mode, meaning that lighting in these spaces will be automatically turned ON when occupied. Occupancy sensors in corridors will be spaced between 24 and 32 feet apart, and within 10 feet at end of corridors.

Automatic daylight controls (daylight photocell/sensor that automatically dims lighting when there is sufficient daylight in a space) for daylight harvesting will be utilized only where required per 2018 IECC. Daylight harvesting will be required in rooms where there is more than 150 watts of “general lighting” within sidelight or toplight “daylight zones”.

Technology and Security Design Narrative

Data Network General Description

The data network shall be an implementation of 10/100/1000 Mbit Ethernet over Category 6 (Cat6) and Category 6a (Cat 6a) copper UTP cable and Gigabit Ethernet over multimode/singlemode fiber, complying with the Institute of Electrical Engineers' (IEEE) 802.3 standards for Ethernet. Backbone cabling between the Equipment Room (ER) and all Telecom Rooms (TR's) shall be a hybrid single-mode/multimode fiber optic cable (6/24 strands). Multimode Fiber shall be a minimum OM4 type fiber while singlemode Fiber shall be reserved for Distributed Antenna Systems (DAS) applications or future use as needed.

All horizontal cabling shall be terminated in Category 6/6a rack-mounted patch panels in the Telecom Rooms, and in communication network outlets (CNO's) at the workstation. The data infrastructure will support the implementation of a wireless LAN system and potential convergence of voice and video onto the data distribution network. Horizontal voice and data cables shall not exceed 90 meters in length. Data Electronics (routers, switches, servers, etc.,) shall be employed and utilize the data network infrastructure. Telecom Rooms will be managed through stackable switches sharing a gigabit uplink to an aggregate switch located in the ER. Each terminated data outlet shall be cross-connected to an active switch port.

Data outlets intended for wireless use shall be cross-connected to inline powered switch ports or power inverting equipment. These outlets shall be mounted above the drop ceiling in a low voltage biscuit box. Each wireless drop shall include two cables and may utilize Cat 6a to provide 10 Gb Ethernet out to 95 meters. In either scenario, the ceiling grid must be tagged and a fifteen foot service loop must be allocated. The school district has currently standardized on Aruba as their wireless solution.

Number of data drops in all types of instructional and non-instructional spaces will be determined during the design development phase to ensure that it complies with Howard County Public School System's standards and guidelines as well as MSDE Technology Standards.

Telephone Voice Distribution Infrastructure Description

The voice cable plant will consist of Category 6 UTP cables extended from Telecom Rooms to the workstation. These cables will be terminated in Category 6 patch panels and will be cross-connected to either rack mounted Cat 6 patch panels or 100-pair Category 5e rack mounted 110 blocks. Multi-pair Cat 5e cables shall be installed for analog backbone connectivity and interconnect Telecom Rooms with the Equipment Room. Cat 5e backbone cables shall be terminated in wall-mounted 110-blocks in the Equipment Room and connected to various analog services where required. The infrastructure will support analog, digital and internet protocol (IP) based services. The school should also maintain a minimum number of separate incoming analog telephone lines for elevator, fax, fire and security connections throughout the facility.

Video Distribution Description

Comcast cable service will be brought to the building. Comcast shall provide three Digital Transport Adaptors (DTAs) to convert encrypted digital signals to de-encrypted analog signals. A small coaxial cable plant will be installed to strategic locations for immediate viewing without the need for a set-top box.

The IP data network shall be used for IP video streaming. The IP video streaming head end will consist of a distribution cabinet holding rack mounted video distribution equipment from Haivision

and be located in the Main Telecom Room. The system will allow for content to be streamed over the data network and viewed through a computer or through a display using a video decoder. The head end will receive signals from external and internal sources and establish channels to display images on demand. Digital signage applications shall be included as part of the system to allow for calendars, announcements, menus and other relevant information to be displayed around the facility.

Classroom Audio/Video System Description

The instructor's station in each classroom will have cable harness assembly that will allow the teacher's computer to display to a video monitor, wall mounted LCD projector or electronic whiteboard. The A/V harness shall include HDMI, USB, VGA and 3.5 MM audio at a minimum and be connected to various devices around the room.

Sound Reinforcement will be included in each instructional space as part of the A/V systems. The system includes two or four ceiling mounted speakers that can also be integrated with other classroom equipment such as the LCD projector, DVD player or television tuner to amplify sound from those sources as well. The system has the ability act as a mixer to switch audio sources and control volume levels on multiple inputs. Sound levels are equalized throughout the space so students hear at proper volume and clarity levels.

Intercom and Master Clock Description

The intercommunication system shall utilize a copper cable infrastructure to distribute multiple, simultaneous conversations on separate channels throughout the facility through telephones, call-in switches and loudspeaker assemblies. A programmable master clock with correction of secondary clocks shall also be included as part of the overall system. In addition, the system must be scalable to meet the user's future expansion needs and be programmable from a computer terminal located at the facility. Analog speakers, call switches and admin handsets shall be connected to IP nodes with multi-pair copper cables in each Telecom Room. Each node shall be connected to the IP data network to connect to the central node, located in the Equipment Room.

The master clock system shall be connected to the intercom system for bell tone scheduling. The system shall be corrected via Ethernet time correction. Slave clocks shall be battery powered, wirelessly corrected analog type clocks in classrooms and offices. Public spaces shall have 24v wired power, wirelessly corrected digital clocks.

Auxiliary Sound Systems Description

Specific spaces within the facility shall have local auxiliary sound systems that allow for sound amplification and reproduction. These spaces include gymnasiums, cafeterias, music rooms and auditoriums. The spaces shall have a combination of hardwired and wireless microphone inputs output speakers and system control.

A typical auxiliary sound system shall include rack or cabinet mounted electronics consisting of pre-amplifiers, mixers, program sources, equalizers, amplifiers, wireless microphone inputs, assistive listening stations and storage space for microphones. Each system should be connected to the facilities intercom system and Fire Alarm Control Panel to allow for system override in the event of an important or emergency announcement.

Video Surveillance Description

Closed Circuit Television (CCTV) shall provide visual surveillance and recording of the school, internally and externally, 24 hours per day. Currently, HCPSS utilizes GE/Interlogix cameras connected via Cat 6 UTP and Fiber cables to GE/Interlogix network video recorders (NVR) strategically located within facilities. Each IP camera location shall have a Cat6 UTP cable, identical to other data infrastructure at the facility, terminated with a 15 service loop and an 18/2 AWG wire that follows the same path (for possible future transition to a pan-tilt-zoom (PTZ) camera.). Exterior and exterior pole mounted cameras shall receive a fiber and two conductor cable for signal transmission along with associated power conductors.

Cameras will survey the corridors, specific rooms and portions of the perimeter of the facility. Digital video recordings will be transmitted from each camera location and stored for no less than 30 days. The CCTV will be connected to an emergency backup system that will keep the system operational in a power outage.

All external cameras shall be fixed type cameras and cameras facing access doors will have an auto focus iris to allow for the change in lighting conditions. Cameras will record digital pictures in color whenever light conditions permit and only revert to black and white where low light conditions will not permit accurate color images. Interior fixed cameras should generally be considered over PTZ type cameras due to cost and operator issues.

The location of the system cameras, NVRs, power supplies and associated control software/ hardware will be located during design phase of the project. The system will be capable of reviewing images based upon time and location inquiries.

Access Control and Intrusion Detection Description

The Access Control and Intrusion Detection system shall allow/prevent access, track movement throughout the facility and provide an alarm signal on and offsite in the event of an unauthorized entry. The systems shall be integrated and will be controllable on and offsite to allow for efficient system management. Bosch shall be used for the Intrusion System and AMAG shall be used for the Access Control System.

The system shall consist of motion detectors, door and window contacts, card readers, door controllers, power supplies and intelligent software all connected to alarm panels throughout the facility. (Electric locking devices and door hardware shall be provided by others.)

Cabling for this system will be installed in dedicated pathways with panels located in telecommunications rooms and storage rooms. All entrances will be equipped with handicapped reachable speakers, intercom, and video camera entry systems. Entrance areas will be fitted with cable for future installation of metal detectors.

Food Services Design Narrative

Description

The facility will be equipped with all-new commercial-grade appliances meeting current National Sanitation Foundation requirements and installed according to local governing health codes. All countertops and work surfaces will be of durable stainless steel finishes and mounted on legs to promote sanitation and ease of cleaning. Likewise, shelving inside the walk-in cooler/freezer will be installed with casters to aid in re-stocking of food supplies.

The kitchen will be equipped to operate as an on-site prep/cooking facility capable of serving meals to 1,800 students and staff during three meal periods of grades 9 thru 12. Bulk refrigerated items will be stored in a walk-in cooler/freezer with remote refrigeration. Onsite cooking will take place in fryer assembly, convection oven, 40-gallon tilting kettle, steamer and range with standard oven base. A Type I ventilator with fire protection system is required. Meals will be served on disposable dinnerware not requiring a full dishroom complement. Trays and utensils will be washed and sanitized through a high-temperature dishmachine. Clean ware will be stored on mobile pot & pan shelving.

Serving of students will take place on modular cafeteria serving counter equipped with: 5-well steam table for hot food, mechanically-refrigerated cold pans for cold food, ice cream cabinet, salad bar and bulk milk cooler for milk and beverages.

Area Designation

The overall foodservice operation will contain approximately 3,300 square feet and encompass the following functional work areas:

- Receiving Area
- Walk-in Cooler/Freezer
- Dry Storage
- Soap Storage/Janitor's Closet
- Manager's Office
- Kitchen/Prep Area
- Serving Area (5 lines) Including A La Carte
- Staff Toilet/Locker
- Dish/Pot & Pan Washing Area

Energy Statement

Energy conservation is an important goal for the HCPSS high school prototype design. Many energy saving techniques are incorporated into the building to achieve energy efficiency and compliance with LEED energy requirements. These techniques include the following:

- Mechanical systems will exceed the energy efficiency requirements mandated by the 2018 International Energy Conservation Code.
- Energy recovery will be used to pre-condition outdoor ventilation air where appropriate and permitted per the 2018 International Mechanical Code.
- Mechanical systems (pumps and fans) will include variable frequency drives to allow systems to operate at lower capacities when building loads are reduced. Premium efficiency or electronically commutated motors will be specified for all fans and pumps and all non-variable frequency drive motors over ten horsepower will be power-factor corrected to 90 percent minimum.
- Air-handling unit systems will incorporate dry-bulb economizer control allowing the use of "free cooling" when outdoor air temperature and humidity conditions permit. Systems will include MERV 13 filtration to improve indoor air quality.
- Mechanical systems will be designed to maximize indoor air quality by effectively mixing and delivering fresh air to building occupants. Air-handling unit systems will include airflow monitoring stations on outdoor air connections to assure the delivery of outdoor air.
- Designated areas will include carbon dioxide monitoring to reset the quantity of outdoor air required during periods of reduced occupancy.
- Environmentally friendly refrigerants will be specified for mechanical equipment to meet ozone depletion and global warming thresholds.
- Mechanical systems will be designed to allow occupants to control temperature within their zone and will meet the requirements of ASHRAE Standard 55.
- Building commissioning will be provided to assure that systems operate as designed.
- The HVAC system will be controlled by the latest generation of computerized energy management equipment.
- The HVAC system is divided into many occupancy zones for efficient year-round and after-hours use.
- Specifications will exclude materials that lead to poor indoor air quality.
- Low-flow fixtures will be specified to reduce overall building water usage. Specific strategies will include two-position flush valves for water closets, high efficiency type urinals, low-flow aerators and low-flow shower heads.
- Building envelope will exceed the energy efficient requirements mandated by the 2018 International Energy Conservation Code.
- Finishes installed will be designed to use the least amount of energy to maintain.
- Solar photovoltaic panels on the roof of the school will provide renewable energy to the school and thus reduce the energy consumption.

Construction Cost Estimate

New Construction - High School #13

Site Work	$	16,296,762
Building	$	81,483,810
Construction Cost Total	$	97,780,572

Notes

- Construction cost was prepared by the construction manager, Oak Contracting and assumes that bids will be received in December 2019.
- Construction cost includes cost of food service equipment.
- Estimate includes a schematic phase cost estimate contingency of +10% percent.
- Estimate assumes wage-rate pricing.
- Estimate does not include a project contingency.
- Estimate includes a cost contingency for constructing a LEED 'Silver' design.

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Appendix

High School #13

Schematic Design Report

Howard County Public School System

Board of Education

Marriotts Ridge High School
First Floor Plan

Previous Prototype Design as Constructed Provided for Reference

First Floor	=136,752 gsf
Second Floor	= 59,867 gsf
Third Floor	= 55,026 gsf
Total School	=251,645 gsf

Marriotts Ridge High School
Second Floor Plan

Previous Prototype Design as Constructed Provided for Reference

First Floor	=136,752 gsf
Second Floor	= 59,867 gsf
Third Floor	= 55,026 gsf
Total School	=251,645 gsf

Marriotts Ridge High School
Third Floor Plan

Previous Prototype Design as Constructed Provided for Reference

First Floor	=136,752 gsf
Second Floor	= 59,867 gsf
Third Floor	= 55,026 gsf
Total School	=251,645 gsf