ACTION

HOWARD COUNTY
PUBLIC SCHOOL SYSTEM

BOARD OF EDUCATION OF HOWARD COUNTY
MEETING AGENDA ITEM

TITLE: Wilde Lake Middle School Design Development Report **DATE:** August 14, 2014

PRESENTER(S): Bruce Gist, Acting Executive Director, Facilities Planning and Management

Scott Washington, Manager, Design and Construction

Michael Lahowin, Principal, TCA Architects

OVERVIEW:
The attached design development report describes the new replacement school for Wilde Lake Middle School. Wilde Lake Middle School opened in 1969 with an open classroom design for Grades 6 through 8. The school, a single story building with masonry exterior wall construction, has had one building addition and one major renovation in 1975 and 1996 respectively.

This project, the sixth iteration and adaptation of the current middle school prototype design based on the General Educational Specifications for new Howard County Middle Schools, will be constructed directly behind the existing school. Not only will this be another Leadership in Energy and Environmental Design (LEED) "Gold" school for the county, but the state and county's first Net Zero Energy school as well.

Since the schematic design presentation, numerous refinements have been made as a result of meetings with the Howard County Public School System staff, Maryland Emergency Management Agency, local code authorities, and our design team. Some of these refinements include: additional water service per Howard County Planning and Zoning, the reconfiguration of the guidance and health suites, enlargement of the music suite, addition of a corridor for planning room access near the locker room area, inclusion of an environmental dashboard in the main entry, creation of a centralized mechanical room on the second floor to house all rooftop equipment, and the addition of two classrooms on the second floor for projected enrollment increases.

RECOMMENDATION/FUTURE DIRECTION:
It is recommended that the design development report for Wilde Lake Middle School be approved as submitted.

Submitted by:

Bruce Gist
Acting Executive Director
Facilities Planning and Mgmt.

Approval/ Concurrence:

Renee A. Foose, Ed.D.
Superintendent

Susan C. Mascaro
Chief of Staff

Camille B. Jones
Chief Operating Officer

Ken Roey
Chief Facilities Officer

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View of main entrance of net zero energy prototype middle school

Design Development Report

(NEW) WILDE LAKE MIDDLE SCHOOL

Howard County Public School System

tca | architects
Annapolis, Maryland 410-841-6205

August 14, 2014

Annapolis, Maryland

Specializing in the design of educational facilities

Design Development Report

(New) Wilde Lake Middle School

FOR THE BOARD OF EDUCATION OF HOWARD COUNTY:

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August 14, 2014

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Schematic Planning Advisory Committee

Planning Committee

Joyce Agness	HCPSS, Instructional Facilitator, MS/Special Education
Heather Bartham	Wilde Lake Middle School, PTA President
Mike Borkoski	HCPSS, Technology Officer
Robert Coffman	HCPSS, Instructional Facilitator, Secondary Social Studies
Gary Davis	HCPSS, Construction Project Manager
Marie DeAngelis	HCPSS, Director of Elementary Curricular Programs
Frank Eastham	HCPSS, School Administration
Tonge Enoh	Wilde Lake Middle School, Student Representative
Peter Gaylord	Wilde Lake Middle School, Assistant Principal
Bruce Gist	HCPSS, Director of School Construction
Annette Grzybinski, RN	Wilde Lake Middle School, Cluster Nurse
Marcy Hersl	HCPSS, Analyst, Safety, Environment & Risk Management
Dan Keiser	HCPSS, Construction Program Manager
Lindsay Kelley	Wilde Lake Middle School, Math Instructional Support
Phil Lindberg	Wilde Lake Middle School, Parent
Wendy McNeill	Wilde Lake Middle School, Media Specialist
Dave Messick	Wilde Lake Middle School, Band Director
Ron Miller	HCPSS, Manager of Safety, Environment & Risk Management
Dr. Eric Minus	HCPSS, Administrative Director of Middle Schools
April Motaung	Wilde Lake Middle School, G/T Resource Teacher
Tiffanie Nunley	WLMS, Instructional Team Leader, Special Eduction
Nichelle Parker	Maryland Energy Administration, Program Manager
Judith Pattik	HCPSS, Coordinator, Special Education
David Ramsay	HCPSS, Director of Transportation
Ken Roey	HCPSS, Chief Facilities Officer
Bala Srini	Maryland Energy Administration, Energy Program Consultant
Lisa Smithson	Wilde Lake Middle School, Principal
Michael Walsh	Wilde Lake Middle School, Science Teacher
Scott Washington	HCPSS, Manager of Design & Pre-Construction Services
Ann Yetter	Wilde Lake Middle School, Principal's Secretary
Betsy Zentz	HCPSS, Interagency Specialist

Architects

Mike Lahowin, AIA	Principal, LEED AP
Robyn Toth, AIA	Associate Principal, Project Manager, LEED AP
Michael Smith, RA	Staff Architect, LEED AP

Design Team

ARCHITECT	TCA Architects	Annapolis, MD
CIVIL ENGINEER	Fisher, Collins & Carter, Inc.	Ellicott City, MD
STRUCTURAL ENGINEER	Johnson Engineering Assoc.	Darnestown, MD
M/E/P ENGINEER	James Posey Associates	Baltimore, MD
DAYLIGHTING ENGINEER	EMO Energy Solutions	Falls Church, VA
ROOFING CONSULTANT	Gale Associates, Inc.	Baltimore, MD
ACOUSTICAL ENGINEER	Miller, Beam & Paganelli, Inc.	Reston, VA
FOOD SERVICE DESIGN	Nyikos Associates	Gaithersburg, MD
SOLAR PV ENGINEER	SepiSolar, Inc.	Sausalito, CA
CONSTRUCTION MANAGER	Oak Contracting	Towson, MD

Design Development Phase Participants

HCPSS

Maha Abdelkader	ESOL, Acting Coordinator
Julie Alonso Hughes	IT, Coordinator
Bill Barnes	Secondary Math, Coordinator
Richard Bilenki	Master Plumber
Mike Borkoski	Director of Technology
Olivia Claus	Manager, Custodial Services
Nancy Czarnecki	Secondary Language Arts, Instructional Facilitator
Gary Davis	Construction Project Manager
Frank Eastham	School Administration
Terry Eberhardt	Music, Instructional Facilitator
Clarissa Evans	Secondary Curriculum, Executive Director
Carol Fritts	Career and Technology Education, Coordinator
Rob Geelhaar	HVAC Leadman
Bruce Gist	Acting Executive Director Facilities Planning and Management
Joe Goins	Master Electrician
Melissa Grabill	LM, Instructional Facilitator
Leslie Grahn	World Languages, Coordinator
Laurel Johnson	Area Field Representative, Food Services
Dan Keiser	Construction Program Manager
Lisa Katz	DEP
Hummy Khan	Assistant Manager, Building Services
Mary Klatko	Former Director, Food & Nutrition Services
Sam Knight	Boilers Specialist
Pat McCord	Asst. Manager, Systems Engineering Services
Kathryn McKinley	Acting Director, Secondary Curricular Program
Gino Molfino	Fine Arts, Coordinator
Eric Minus	Administrative Director of Middle Schools
Jonathan Naill	Maintenance
Linda Rangos	Health-PE, Coordinator
Geordie Paulus	IT, Resource Teacher
Larry Phebus	Master Electrician
Keith Richardson	Manager, Grounds Services
Ken Roey	Chief Facilities Officer
Sarah Russo	Library Media Specialist
Herb Savje	Manager, Building Services
Mike Senisi	PE, Instructional Facilitator
Dave Shaw	Network Operations, Manager
Diane Sweeney	Energy Management Specialist
Ed Voland	AV Technician
Scott Washington	Manager of Design & Preconstruction Services
Mary Weller	Secondary Science, Coordinator
Jeff Wetzel	Carpentry, Building Services
Jon Wray	Secondary Math, Instructional Facilitator

WILDE LAKE MIDDLE SCHOOL

Laura Attridge	Social Studies Teacher
Karen Baldwin	Family & Consumer Sciences
Marion Carter	Technology Education
Kathy Corbett	Alternative Education
Renee Cornelius	Guidance Department
Annette Grzybinski	Cluster Nurse
Maggie Kapustin	World Languages Teacher
Lindsay Kelly	Math Teacher
Rhonda Kershaw	ESOL Teacher
Brett Lebowitz	English Language Arts Team Leader
Lee McMillan	Health Teacher
Wendy McNeill	Former Media Specialist
Dave Messick	Band Director
April Motaung	G/T Resource Teacher
Tiffanie Nunley	Instructional Team Leader, Special Eduction
Sarah Russon	Media Specialist
April Simpson	Art Teacher
Lisa Smithson	Principal
Steve Tiffany	Physical Education Teacher
Mike Walsh	Science Teacher
Emily Warner	Reading Specialist
Ann Yetter	Principal Secretary

MEA

David Comis	Energy Program Consultant
Tony Hans	MEA Supporter, CMTA
Wyck Knox	MEA Supporter, VMDO
Nichele Parker	Energy Program Manager
Ken Seibert	MEA Supporter, CMTA
Bala Srini	Energy Program Consultant
Asato Tashiro	MEA Supporter, CMTA

DESIGN TEAM

Chuck Crovo	Civil Engineer
Bob Johnson	Structural Engineer
Mike Lahowin	TCA Architects, Principal
Dale Madeiry	Civil Engineer
Patrick Marquez	Electrical Engineer
Rob Nyikos	Kitchen Consultant
Mike Smith	TCA Architects
Mike Sherren	Mechanical Engineer
Robyn Toth	TCA Architects, Associate Principal

CONSTRUCTION MANAGEMENT

Jim Fowler	Oak Contracting,
Steve Krell	Oak Contracting
Ed Lurz	Oak Contracting
Matt Lurz	Oak Contracting
Wayne Temple	Oak Contracting
Joe Tiberi	Oak Contracting

Project Description

The new Wilde Lake Middle School will be constructed directly behind the existing Wilde Lake Middle School. This building will be an adaptation of the current prototype middle school design and is designed to accommodate a population of 752 students.

The 'Space Analysis' section of this report contains a complete listing and size of every space included in this middle school design.

The Howard County Public School System (HCPSS) has elected to take advantage of the Net Zero Schools Initiative grant provided by the Maryland Energy Administration (MEA) to modify the prototype middle school design to significantly reduce energy consumption and to produce the balance of the energy required to run the building on site. This will be accomplished by the installation of solar photovoltaic (PV) panels located on the school's roof and site. (See page 8 for more on Net Zero Energy Design.)

It is the intent that the design and construction of this new middle school achieve a Leadership in Energy and Environmental Design (LEED)'Gold' designation making this facility yet another 'Green' school for the HCPSS. The 2009 version of 'LEED for Schools' 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.)

Project Facts

	Existing Wilde Lake MS	New Wilde Lake MS
Total size of site	± 15.0 acres	± 15.0 acres
On site car parking provided	68 cars	108 cars
On site bus parking provided	15 busses	15 busses
Building Square Footage	70,530 gsf	106,221 gsf
Student Capacity	506 Students	752 Students *

* 712 + 40 special education students

Project Schedule

Schematic Planning Meeting Completed	March 10, 2014
Schematic Design Approved by the Board of Education	April 10, 2014
Design Development presented to Board of Education for Review and Approval	August 14, 2014
Construction Documents presented to Board of Education for Review and Approval	December 2014
Project out for Bids: (1 month)	February 2015
Bids Received	March 2015
Construction Starts	May 2015
Construction Completed (27 months)	August 2017

Continuation of the School Design Process

This design development report is intended to explain and illustrate those aspects of the Wilde Lake Middle School design which have changed since the schematic design report. Included are updates on all aspects of the project and detailed interior room layouts which have been developed since the schematic report.

The planning process for the new Wilde Lake Middle School, was described in detail in the schematic design report submitted to the Board and approved on April 10, 2014. Following approval of the schematic design, a formal schematic design submittal was sent to the Maryland State Department of Education (MSDE) and later approved by them for continuation of the design process.

Noteworthy refinements to the project since the schematic design approval are noted below:

- A listing of all design development phase participants can be found on page 4.
- The 'Project Facts' and 'Project Schedule' on page 5 have been updated to include the latest building square footage and project dates.
- Design development phase floor plan refinements are identified on pages 18 and 20.
- Exterior building elevations have been added to this report on pages 25 and 26.
- The 'Space Analysis' on page 27 now includes both schematic and design development phase square footages.
- The 'Cost Estimate' on page 30 has been updated by the construction manager for the design development phase.
- Design development phase illustrations for interior room layouts are found in the 'Design Development Furniture and Equipment Plans' section of this report beginning on page 31.
- The system narratives in the Appendix section of this report have been updated to reflect the latest systems proposed for use in this net zero energy building design.

<u>Noteworthy project development and coordination efforts:</u>

Since the schematic phase, a number of coordination meetings have taken place involving the Design Team, the Construction Manager, the Maryland Energy Association (MEA) , Baltimore Gas and Electric, the Department of Planning and Zoning, the Department of Fire and Rescue Services for Howard County, and HCPSS staff. These meetings discussed aspects of the project that include, but are not limited to, latest fire department site access requirements, the development of proposed mechanical, electrical, and IT systems, the development of site and building construction phasing, methods of reducing energy consumption, and the development of furniture and equipment plans for each space in the school.

Sustainable 'Green' Design Goals

It is the intent that the design and construction of this new school achieve a LEED 'Gold' certification, making this 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, enhanced classroom acoustics, improved indoor air quality, thermal comfort, and opportunities to integrate green features into the school's curriculum.

In order to measure and compare how 'Green' a building is, the USGBC, founded in 1993, has developed industry standards with design and construction rating systems and guidelines for many different building types.

One such rating system is the USGBC 2009 Edition of "LEED for SCHOOLS" to which the design will closely adhere. Final LEED certification levels are based on the number of credit points obtained in the "LEED for SCHOOLS" rating system. The four levels of certification from lowest to highest are: Certified, Silver, Gold, and Platinum.

We have included an 'in progress' LEED scorecard below which summarizes the credits 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 79 likely credits (with an additional '6 possible credits') allowing for the loss of some and still complying with the goal of a LEED 'Gold' Building with a remote chance of achieving a 'Platinum' level.

LEED
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LEED for Schools 2009 Scorecard
(New) Wilde Lake Middle School

Sustainable Sites — Possible Credits: 16

Prereq 1	**Construction Activity Pollution Prevention**
Prereq 2	**Environmental Site Assessment**
Credit 2	**Development Density & Community Connectivity**
Credit 4.1	**Alternative Transportation,** Public Transportation Access
Credit 4.2	**Alternative Transportation,** Bicycle Use
Credit 4.3	**Alternative Transportation,** Low Emitting Vehicles
Credit 5.2	**Site Development,** Maximize Open Space
Credit 6.1	**Stormwater Design,** Quantity Control
Credit 6.2	**Stormwater Design,** Quality Control
Credit 7.2	**Heat Island Effect,** Roof
Credit 10	**Joint Use of Facilities**

Water Efficiency — Possible Credits: 4

Prereq 1	**Water Use Reduction,** 20% Reduction
Credit 1	**Water Efficient Landscaping,** No Potable Use or No Irrigation

Energy and Atmosphere — Possible Credits: 30

Prereq 1	**Fundamental Commissioning of Building Energy Systems**
Prereq 2	**Minimum Energy Performance**
Prereq 3	**Fundamental Refrigerant Management**
Credit 1	**Optimize Energy Performance,** 48% energy savings
Credit 2	**On-Site Renewable Energy,** 13%
Credit 3	**Enhanced Commissioning**
Credit 5	**Measurement & Verification**

Materials and Resources — Possible Credits: 7

Prereq 1	**Storage & Collection of Recyclables**
Credit 2	**Construction Waste Management,** Divert 75% from Disposal
Credit 4	**Recycled Content,** 20%
Credit 5	**Regional Materials,** 20%
Credit 7	**Certified Wood**

Indoor Environment Quality — Possible Credits: 13

Prereq 1	**Minimum IAQ Performance**
Prereq 2	**Environmental Tobacco Smoke (ETS) Control**
Prereq 3	**Minimum Acoustical Performance**
Credit 1	**Outdoor Air Delivery Monitoring**
Credit 3.1	**Construction IAQ Management Plan,** During Construction
Credit 3.2	**Construction IAQ Management Plan,** Before Occupancy
Credit 4.1	**Low-Emitting Materials,** Adhesives & Sealants
Credit 4.2	**Low-Emitting Materials,** Paints & Coatings
Credit 4.3	**Low-Emitting Materials,** Flooring Systems
Credit 4.4	**Low-Emitting Materials,** Composite Wood & Agrifiber Products
Credit 5	**Indoor Chemical & Pollutant Source Control**
Credit 6.1	**Controllability of System,** Lighting
Credit 6.2	**Controllability of System,** Thermal Comfort
Credit 7.1	**Thermal Comfort,** Design
Credit 7.2	**Thermal Comfort,** Verification
Credit 8.1	**Daylight & Views,** Daylight 75% of Classrooms

Innovation and Design Process — Possible Credits: 5

Credit 1.1	**Innovation in Design,** Exemplary Performance SSc5.2
Credit 1.2	**Innovation in Design,** Green Cleaning Program
Credit 1.3	**Innovation in Design,** Exemplary Performance EAc1
Credit 1.4	**Innovation in Design,** Exemplary Performance EAc2
Credit 2	**LEED Accredited Professional**

Regional Priority Credits — Possible Credits: 4

Credit 1	**Regional Priority,** SSc4.1
Credit 2	**Regional Priority,** SSc6.2
Credit 3	**Regional Priority,** EAc1
Credit 4	**Regional Priority,** EAc2

79 Total Credits (not including 6 maybe credits)

LEED for Schools 2009 Rating Scale:
Certified 40-49 Silver 50-59 Gold 60-79 Platinum 80-112

Net Zero Energy Design

A net zero energy building generates as much energy as it uses over the course of a year, as a result of extreme building system efficiencies and on-site renewable energy sources such as solar and geo-exchange systems. The HCPSS has elected to take advantage of a $2,773,000 grant provided by the MEA to modify the prototype middle school design to significantly reduce energy consumption and then to generate the balance of energy needed to run the building on the school site. $2,240,000 is to be used for the construction of the building, while the balance of the grant monies is allocated for the design. In order for a building to achieve zero energy without over-reliance on renewable energy, the design must get all the basics of sustainable design right.

According to a comparative study and analysis of eleven net zero energy schools titled "Zero Energy Schools - Beyond Platinum" by author/architect Paul C. Hutton, the fundamental design strategies necessary to achieve zero energy are:

1. **Building Orientation and Massing:**
   Orienting the long axis of the building within 15 degrees of east-west axis results in energy savings by reducing heating loads on the building in the summer and by facilitating daylight harvesting. Buildings should also seek to utilize multi-story construction in lieu of single floor designs. Combining optimum orientation and massing can easily yield 15 percent energy savings.

2. **Building Envelope:**
   By exceeding the current building code requirements for the thermal design of exterior walls and roofs, a well designed, constructed, and insulated building envelope can yield energy savings of 15 percent over minimal code compliant construction.

3. **Daylighting:**
   Electric lighting can consume as much as 20 percent of the total energy use in a building. Substituting free daylight for costly electric light during the day, can reduce electric lighting energy by half with proper light dimming controls as discussed below.

4. **Electric Lighting and Controls:**
   The first step to reduce energy use related to electric lighting is to minimize lighting power density (LPD) while maintaining comfortable interior lighting. This is accomplished through careful fixture selection and placement, as well as, automated controls such as occupancy sensors and dimming sensors in response to daylighting.

5. **HVAC and Controls:**
   The combination of space heating, ventilation, and air-conditioning consume more energy than any other single component in a school building. It was found that geothermal systems reduce energy use substantially and were utilized in all but two of the eleven net zero energy schools in this study.

6. **Occupant Behavior and Plug Loads:**
   Occupant behavior poses a challenge to school districts attempting to predict energy usage for the designer's energy model. No where is this more evident than in the effort to control potentially excessive and wasteful plug loads. Bringing in an appliance such as a small refrigerator; using incandescent desk lamps; neglecting to turn off computers and monitors each night or stores very little food in a large walk-in kitchen cooler while school is closed for the summer are all examples of staff behavior that can substantially increase energy consumption over the course of a year.

7. **Renewable Energy:**
   Renewable energy sources on a school building or site are necessary in order to achieve Net Zero Energy. Photovoltaic (PV) panels, otherwise known as 'solar panels' and wind power are the two most commonly used technologies for renewable energy. It was found that PV panel systems were utilized in all but one of the eleven net zero energy schools in the study regardless of geographic, climatic, size or programmatic variation among each of the schools.

Net Zero Design for New Wilde Lake Middle School

As a result of pursuing a net zero energy building for the already energy efficient, prototype middle school design, some of the more noteworthy modifications and required upgrades for the new Wilde Lake Middle School design are listed below:

A. The prototype geothermal system will be modified to a 'unitary' geothermal design for each room of the building. As a result, heat pump closets and a large centralized mechanical room will be added to the building.

B. The storage and delivery of hot water throughout the school will be redesigned to consist of four heat pump type water heaters distributed in four small loops throughout the school. These water heaters have an extremely high level of production energy efficiency and their varied locations throughout the school will reduce pump energy associated with hot water recirculation.

C. The building lighting plan will be redesigned to minimize the lighting power density by way of careful LED light fixture selection and placement. LED lighting will also be utilized for all exterior building and site lighting. All interior lighting will utilize occupancy sensor controls as well as photocell dimming capabilities where natural daylighting exists.

D. The design will strive to maximize daylight opportunities while carefully analyzing and balancing the amount of wall and roof openings against the overall thermal building envelope goals and rooftop PV system design.

E. The building envelope will be upgraded to provide a minimum of R-25 for the exterior walls by way of increased wall insulation, higher performing double-glazed windows and the use of thermally broken exterior doors and door frames. The roof design will remain at the current R-30 unless whole building energy modeling dictates otherwise.

F. The current roof structure design will be modified to support the additional PV panel loads of 10 lbs/s.f.

G. Food service equipment will need to be the most energy efficient equipment available. Options such as the use of R-290 refrigerant for refrigeration systems, thicker insulated walk-in cooler and freezer walls, use of electric 'Energy Star' appliances, demand defrost system for walk-in boxes, lower energy Type II exhaust hood, and boiler-less steamers will be integrated into the design.

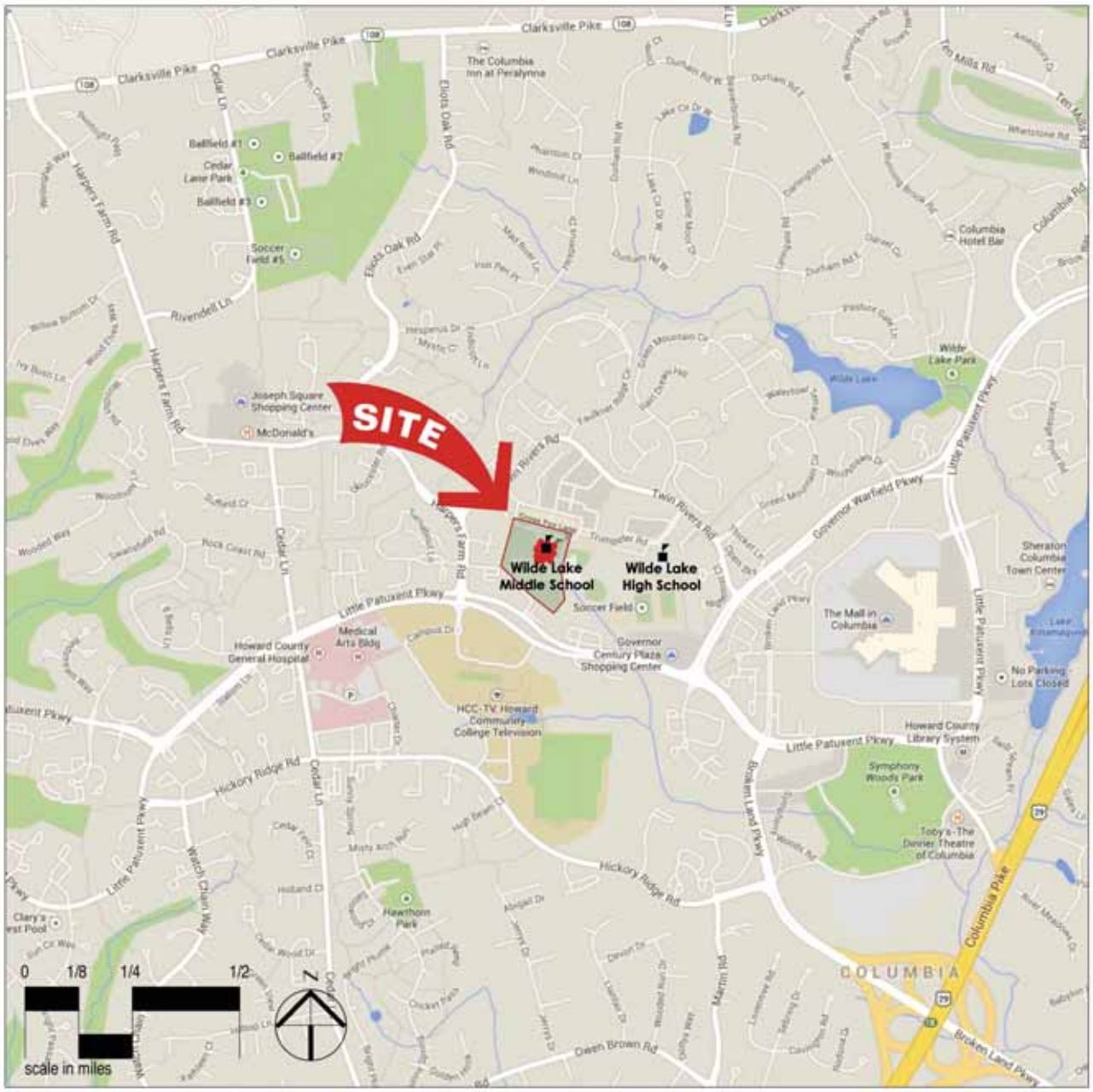
H. Design and engineering services for the construction of a PV Panel system (both rooftop and at grade) will be provided.

Energy Use Index Comparison

Existing Wilde Lake Middle School Building	66 kBTU/sf
Base Building per ASHRAE 90.1-2007/ LEED Minimum	51 kBTU/sf
Middle School No.20	38 kBTU/sf
Net Zero Goal Wilde Lake Middle School Replacement Building	**25** kBTU/sf

Energy Use Index (EUI) is the measure of the total energy consumed in cooling or heating of a building during the course of a year, expressed in thousand British thermal unit (kBtu) per square feet (sf).

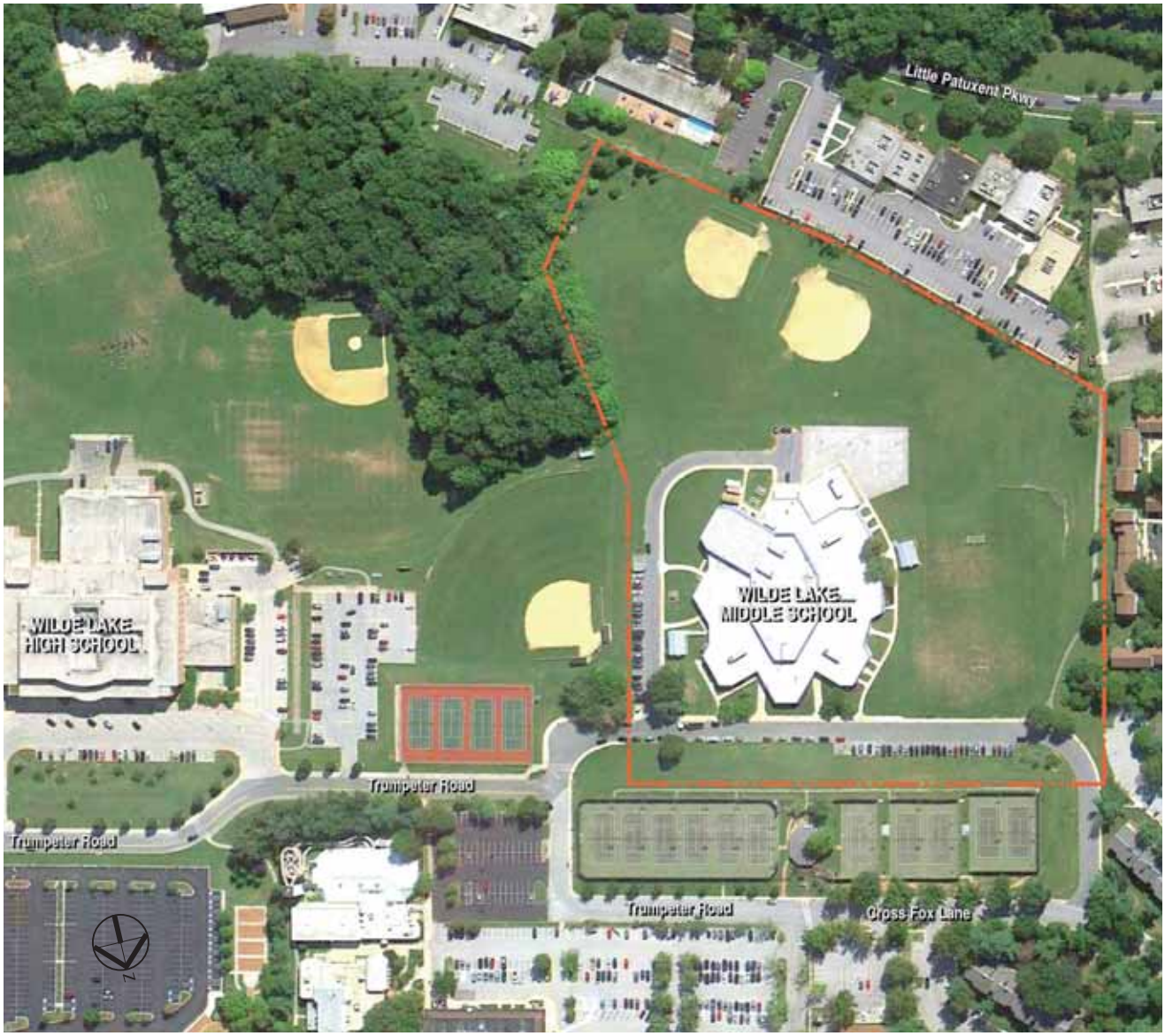
Vicinity Map



The existing Wilde Lake Middle School is located on Cross Fox Lane in Columbia, Maryland approximately one mile west of the Mall in Columbia.

Public water, sewer and natural gas serve the site.

Aerial Site Photo

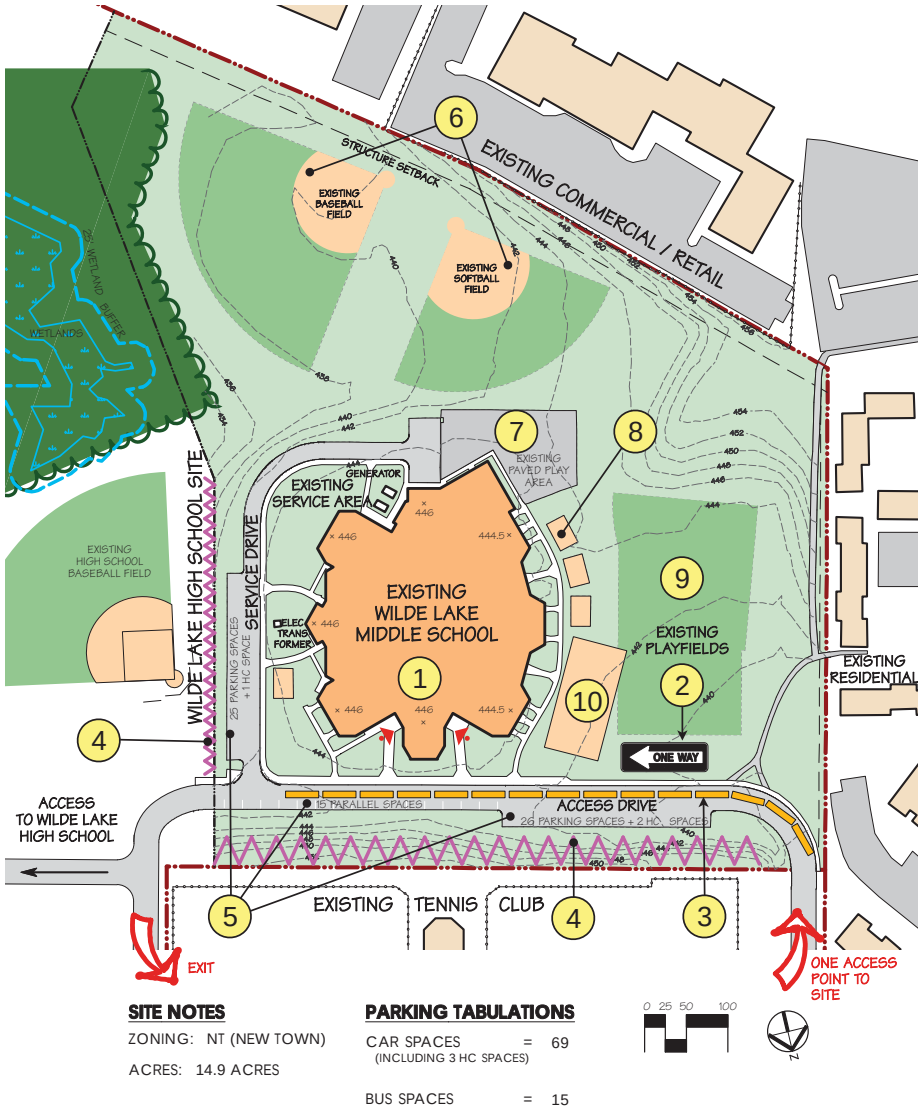


The Wilde Lake Middle School site was originally developed for the school in 1969 and is currently shared with Wilde Lake High School. The middle school site elements utilize ± 15 acres of the shared site.

Wilde Lake Middle School is bordered to the north by a tennis club, to the west by a residential community, and to the south by a commercial area and to the east by Wilde Lake High School.

Note: The aerial site plan is rotated 180° from the vicinity map on page 10. North is facing the bottom of the page to match the orientation of the subsequent drawings in the report.

Existing Site Plan



SITE NOTES

ZONING: NT (NEW TOWN)

ACRES: 14.9 ACRES

PARKING TABULATIONS

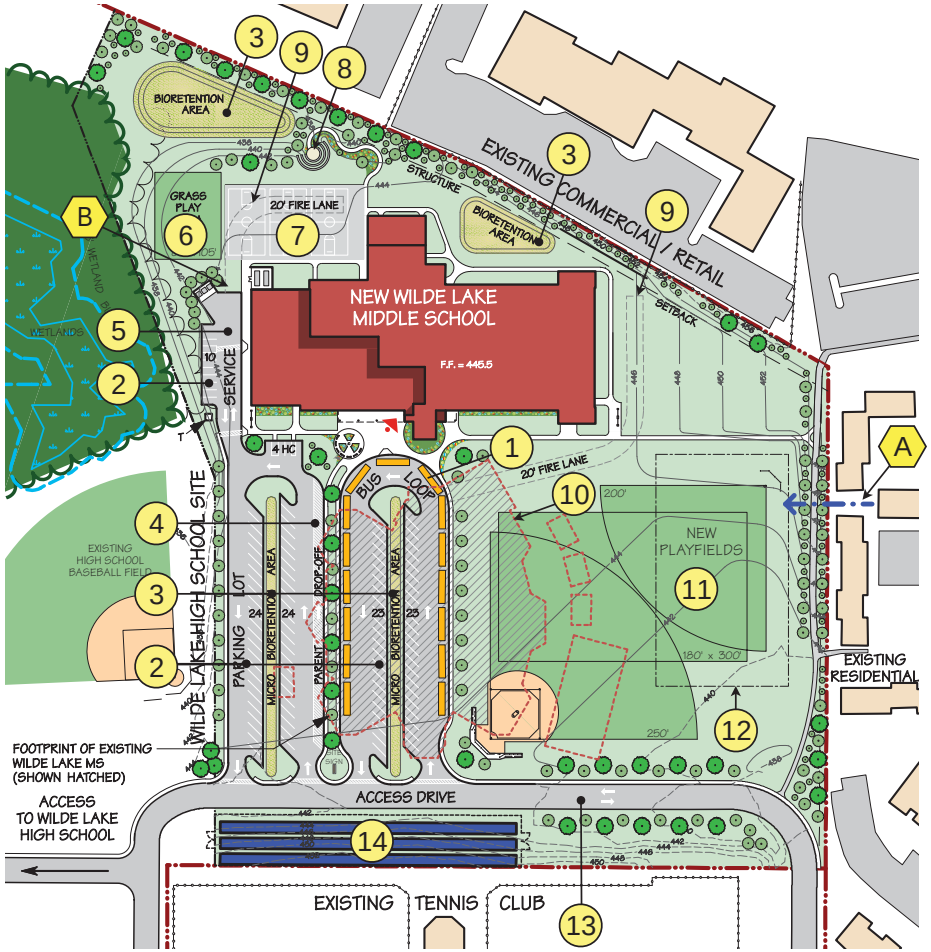
CAR SPACES = 69
(INCLUDING 3 HC SPACES)

BUS SPACES = 15

Existing Site Conditions

1. The existing 70,000 sf Wilde Lake Middle School shares a site with Wilde Lake High School. The middle school utilizes approximately 15 acres of this combined site.
2. Access Drive is the only vehicular path to the middle school. It is a one-way road which is shared by busses and cars during student drop-off and pick-up, delivery trucks accessing the service area and cars parking for the middle school or traveling to the high school site.
3. 15 curbside bus spaces are provided on the one-way road in front of the school.
4. Steep slopes exist along the north and east property lines.
5. The number of existing staff parking spaces is inadequate. The number of parking spaces provided on the one-way road in front of the school and within the service drive totals 69 car parking spaces.
6. Existing baseball and softball fields.
7. Existing paved play area with two outdoor basketball courts.
8. Currently there are four portable classrooms on site; three to the west of the school and one on the east.
9. Existing multi-purpose play field.
10. It is anticipated that a large nine portable classroom unit, will be delivered to the site in January 2015 to accommodate the increase in student capacity at Wilde Lake Middle School which is projected to occur before the new school is built.

Proposed Site Plan



Proposed Site Features

1. Curbside bus parking for 15 busses. The bus driveway is separate from the parent drop-off driveway to reduce vehicular congestion on site.
2. 108 parking spaces have been provided in three areas in an effort to provide as much car parking on site as possible.
3. Four potential locations have been designated for stormwater management bio-retention facilities.
4. Parent drop-off and pick-up area near the main entrance with ample queuing area to eliminate back-ups on the Access Drive in front of the school.
5. Service drive for access to kitchen and mechanical spaces and ten staff parking spaces.
6. Grass play area near the cafeteria for use during student recess.
7. Paved play area with three outdoor basketball courts adjacent at gymnasium and cafeteria.
8. Outdoor classroom area located adjacent to a bio-retention area, outside the art room and easily accessible from the science labs.
9. 20' wide fire access lane.
10. Building footprint of existing Wilde Lake Middle School to be demolished and converted into parking lot, bus loop and playfields after the new Wilde Lake Middle School is occupied.
11. All playfields are accessible from the school without students crossing any vehicular roads or driveways.
12. Approximate location of new geothermal well field for heating, ventilation and air conditioning (HVAC) system, ±60,000 sf.
13. Access Drive is expected to be converted to a road with two-way traffic, which would provide two options for all vehicles entering and exiting the site.
14. Location of ground mounted solar photovoltaic (PV) panel field.

Design Development Site Plan Refinements

A. At the request of Howard County Planning and Zoning a second water service will be extended to the school site to create a looped water service for the school. The second water service requires the creation of a public water easement through the residential property to the point of water main connection.

B. At the request of the Fire Marshall, the outdoor equipment enclosure and the dumpsters have been moved to allow for the fire lane to continue onto the paved play area.

SITE NOTES

ZONING: NT (NEW TOWN)

ACRES: 14.9 ACRES

PARKING TABULATIONS

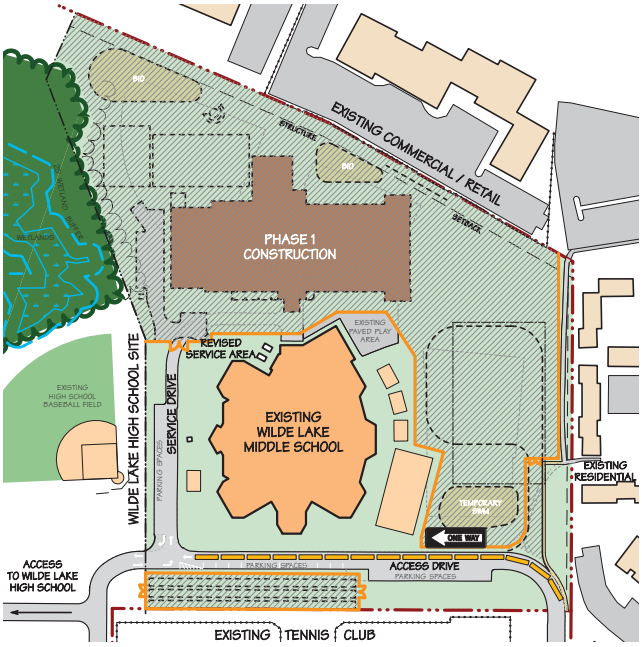
CAR SPACES = 108
(INCLUDING 5 HC SPACES)

BUS SPACES = 15

0 25 50 100

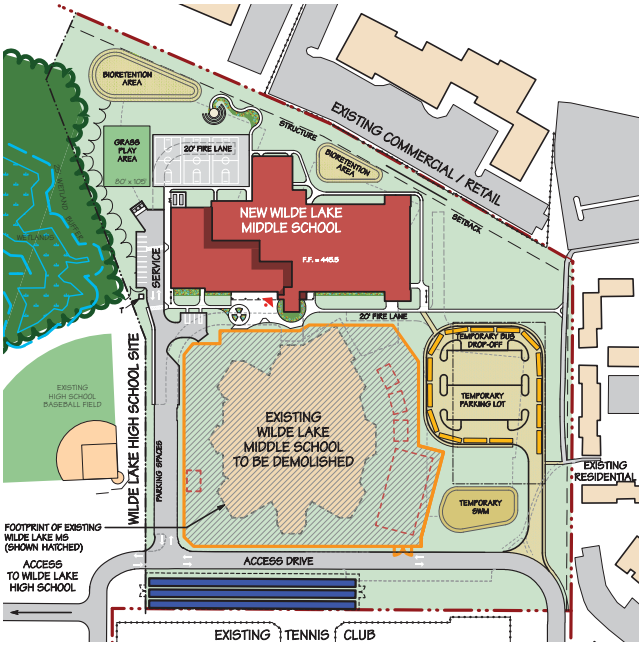
Conceptual Site Phasing Diagrams

(27 month duration)



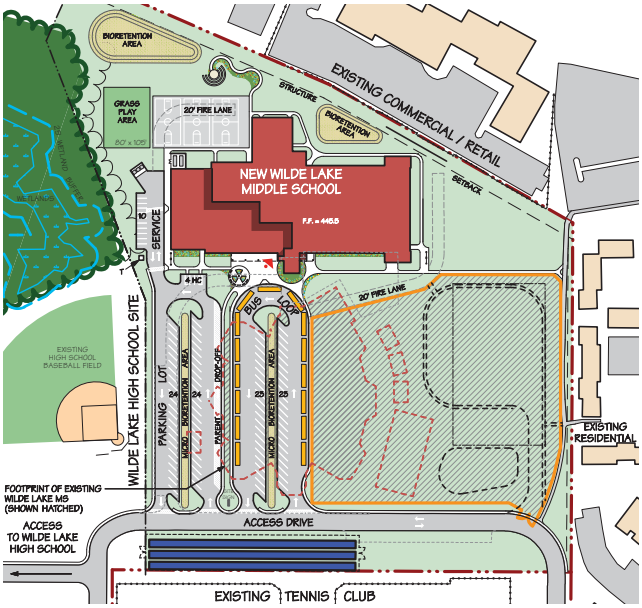
Phase 1

Relocate existing stormwater piping.
Provide temporary service area.
Drill geothermal wells.
Construct new school.
Construct temporary bus loop and parking area.
No playfields and reduced paved play area.



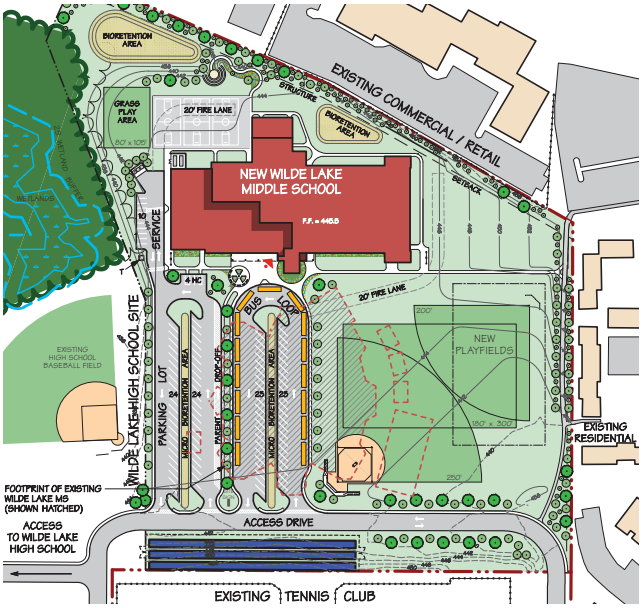
Phase 2

Demolish existing school.
Construct new bus loop and parking lot.
No playfields during this phase.



Phase 3

Remove temporary bus loop
and parking area.
Install and stabilize new playfields.
No use of playfields during the phase.



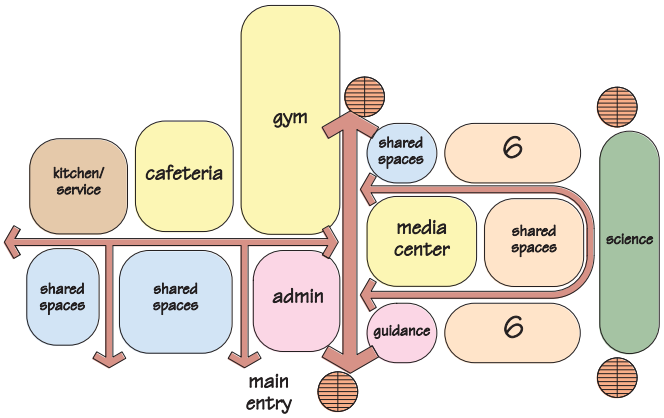
Final Site Plan

Aerial View

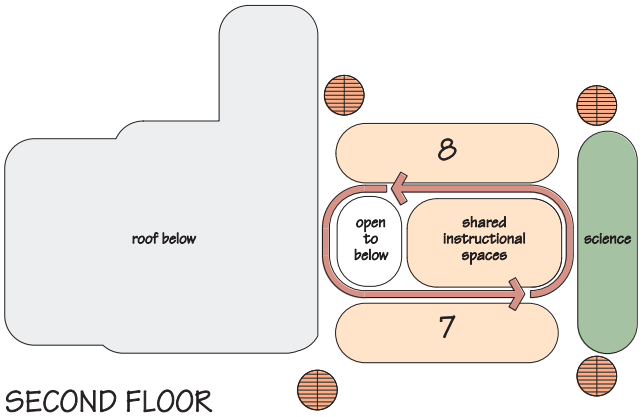
Basic Prototype Floor Plan Features

Basic features of the layout include:

- The office location has a commanding view of the main entrance and visibility of the parent drop-off areas.
- The health suite, staff lounge, and staff workroom are adjacent to the office area.
- Circulation patterns are simple and direct.
- The elevator is very close to the main entrance and near the office for supervision.
- The guidance suite is near the main entrance, easily accessible to visitors and convenient to the office, yet has a separate identity.
- Related-arts spaces are grouped together.
- The sixth-grade classrooms are separated from seventh and eighth-grade areas, and placed on the first floor to facilitate travel to related-arts spaces, cafeteria, and guidance.
- Teacher planning, special education, storage, and restrooms are easily accessible to each grade level.
- A centrally located media center is convenient to all grade levels and visible from much of the school as a symbol of the learning process.



FIRST FLOOR



SECOND FLOOR

- The music rooms are near the stage for easy access and are acoustically separated from adjacent spaces by corridors.
- The gymnasium, cafeteria, and physical education activity room are arranged so that access can be easily restricted to these spaces for after-hours use.
- The seventh-grade and eighth-grade classrooms on the second floor are physically separated so that each grade has its own area of the school.
- Science labs are located on both floors for convenience to all grade levels.
- The fifth science lab is on the second floor adjacent to a stair so it can be conveniently used by any grade level.
- The gifted and talented room is centrally located on the second floor, overlooking the media center.
- Plenty of flexible spaces have been provided, so that when the student population increases, there are more spaces which could function as a classroom, if needed.

See the space analysis on page 27 of this report for a listing of all spaces in the school.

Schematic Phase First Floor Plan Modifications

The plan is based on the latest prototype middle school, Thomas Viaduct Middle School, which is currently under construction.

Specific revisions to the first floor requested by the Planning Committee are listed below and are identified by the circled letters on the proposed first floor plan on page 19.

A. Reconfigured administrative suite so that the principal's secretary's office is adjacent to the reception area to allow for supervision of the main entrance, if needed. Added an enclosed office in the main office to accommodate the administrative intern. Rearranged the health suite to ensure that the nurse's assistant is centrally located and is able to adequately supervise the entire suite. Relocated school store and removed volunteer room from this area.

B. Added the infrastructure so that an operable wall could be installed to the family and consumer science room if needed in the future.

C. Rotated technology education suite to allow for exterior windows in the production lab. Moved ensemble room closer to music suite and enlarged the space.

D Provided rectangular teaching spaces for the music suite.

E Added stairs that discharge on the opposite side of the stage as the ramp, thus providing two ways to enter and exit the stage during performances.

F. Added two secure areas for stage storage: one small space in an alcove at end of ramp and one larger space accessible directly from the cafeteria.

G. Added an office for the student resource officer (SRO) and an alternative education resource room near the lobby to the cafeteria and gymnasium. These program spaces are found in the existing Wilde Lake Middle School building.

H. Reconfigured gym planning area to provide two separate offices for conferencing with students and one-way glass panel for supervision of locker rooms.

I. Added a data clerk office to the guidance suite. This program space is found in the existing Wilde Lake Middle School building.

J. Removed TV studio from media production room.

K. Added a speech room, academic life skills (ALS) classroom and special education planning room to meet the program needs of the existing new Wilde Lake Middle School population. These spaces are grouped with special education department to create a suite on first floor.

L. Flipped the art suite to allow for more natural daylight into the space.

M. Moved the computer lab to a typical classroom block, allowing for flexibility in use.

N. Moved two classrooms to the first floor, so that science lab five could be upstairs near the seventh and eighth grade classrooms. Added english for speakers of other languages (ESOL) resource room to the second floor directly across the corridor from world languages.

O. Moved special education resource rooms two and three to the first floor to an exterior wall with window. In addition, a third seminar room has been added to the floor plan.

P. Unitary heat pump rooms have been distributed throughout the building to support the highly efficient geothermal mechanical system.

For a complete description of the plans refer to the 'Floor Plan Narrative' on page 22.

Design Development Phase First Floor Plan Refinements

The refinements identified by numbers in hexagons on the proposed first floor plan on page 19 are the most notable changes since the schematic phase.

1. Health suite has been reconfigured to move the treatment area behind the health assistant desk and move the handicap accessible toilet to a more centralized location.

2. Size of Ensemble room has increased so that it can be used as a teaching station for the general music curriculum in addition to being used for sectionals.

3. Storage rooms in music suite have been revised to provide a large storage room with access both from the choral and the band Room, and then a repair room and an area for a music filing system which is accessed from the planning room.

4. A large custodial closet has been provided near the custodial office to house all of the equipment that will be needed for the daily maintenance of the cafeteria. The small custodial closet which was located near the fitness lab has been eliminated.

5. A unisex single stall student toilet has been added in a centralized location near the gymnasium and the cafeteria.

6. A corridor has been added to access the planning room of a male or female teacher without entering the respective locker room. This configuration allows teachers to have conferences with parents and students of the opposite sex within their office.

7. An environmental dashboard will be provided for both students and visitors to access live data in regard to the building's energy usage. The dashboard will consist of a touch screen monitor which will allow the building to be used as a teaching tool. The dashboard will be an interactive way to learn about the energy saving measures that have been incorporated into the building design along with the renewable energy that is being generated on the school site.

8. The guidance suite has been reconfigured to provide proper size and adjacencies to each of the spaces within the suite, for example the records room has been moved closer to the reception area, so that all those accessing this space are not constantly passing by the private offices.

Proposed First Floor Plan

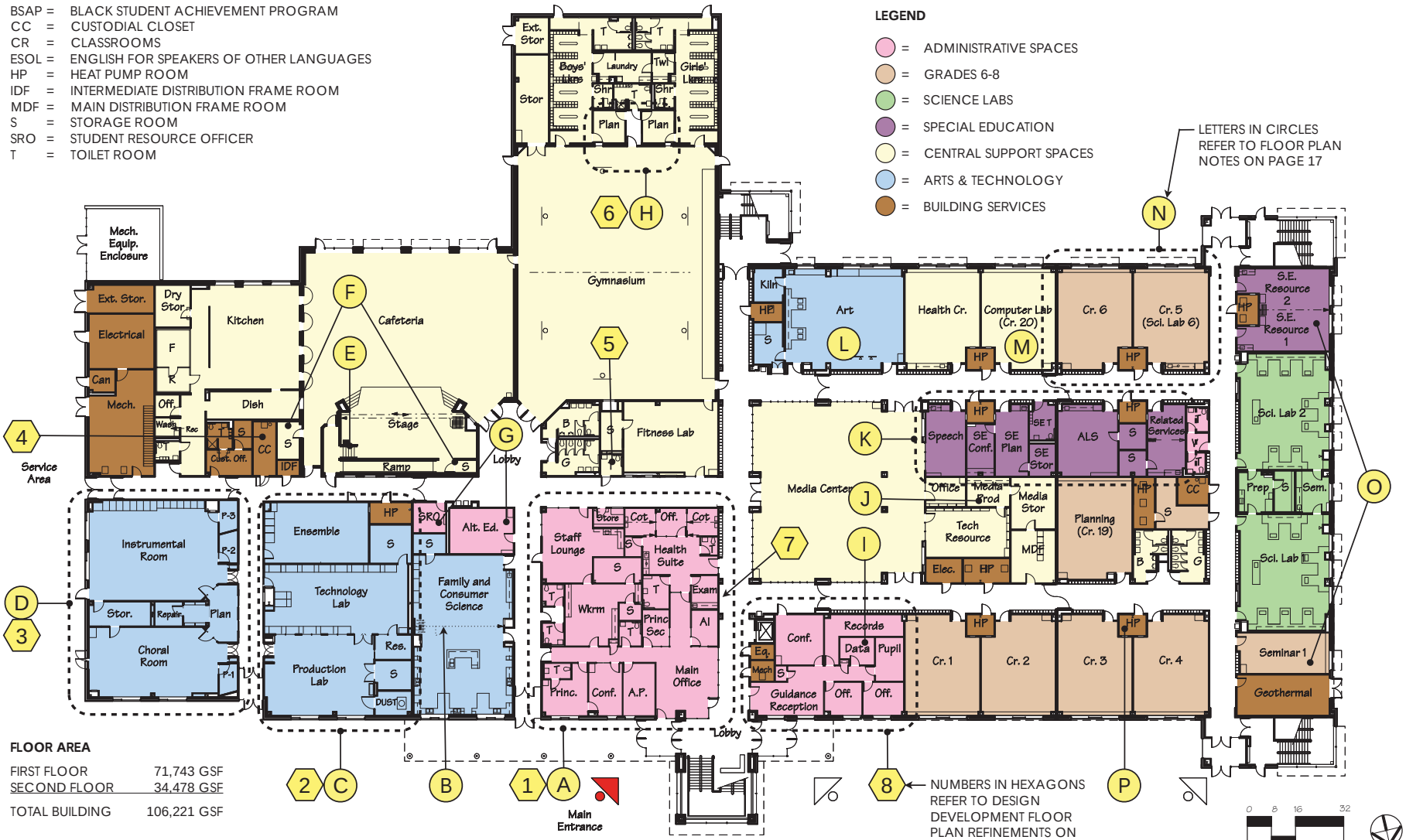
ABBREVIATIONS

ALS = ACADEMIC LIFE SKILLS
BSAP = BLACK STUDENT ACHIEVEMENT PROGRAM
CC = CUSTODIAL CLOSET
CR = CLASSROOMS
ESOL = ENGLISH FOR SPEAKERS OF OTHER LANGUAGES
HP = HEAT PUMP ROOM
IDF = INTERMEDIATE DISTRIBUTION FRAME ROOM
MDF = MAIN DISTRIBUTION FRAME ROOM
S = STORAGE ROOM
SRO = STUDENT RESOURCE OFFICER
T = TOILET ROOM

LEGEND

= ADMINISTRATIVE SPACES
= GRADES 6-8
= SCIENCE LABS
= SPECIAL EDUCATION
= CENTRAL SUPPORT SPACES
= ARTS & TECHNOLOGY
= BUILDING SERVICES

LETTERS IN CIRCLES REFER TO FLOOR PLAN NOTES ON PAGE 17



NUMBERS IN HEXAGONS REFER TO DESIGN DEVELOPMENT FLOOR PLAN REFINEMENTS ON PAGE 18

FLOOR AREA

FIRST FLOOR	71,743 GSF
SECOND FLOOR	34,478 GSF
TOTAL BUILDING	106,221 GSF

Schematic Phase Second Floor Plan Modifications

The plan is based on the latest prototype middle school, Thomas Viaduct Middle School, which is currently under construction.

Specific revisions to the second floor requested by the Planning Committee are listed below and are identified by the circled letters on the proposed second floor plan on page 21.

N. Moved two classrooms to the first floor, so that science lab five could be upstairs near the seventh and eighth grade classrooms. Added english for speakers of other languages (ESOL) resource room to the second floor directly across the corridor from world languages.

O. Increased square footage on the second floor. See design development second floor plan refinements below for changes in use of these spaces during this phase of the project.

P. Unitary heat pump rooms have been distributed throughout the building to support the highly efficient geothermal mechanical system.

Q. Added a black student achievement program (BSAP) office. This program space is found in the existing Wilde Lake Middle School building.

R. Moved volunteer room to the second floor.

S. Created a dedicated TV studio space, separate from the media production room and adjacent to the gifted and talented classroom, since the G/T teacher is typically responsible for the TV productions.

T. Relocated seminar one and seminar two to the core of the building allowing another typical classroom to be placed along the perimeter wall with access to natural daylight.

U. Moved world language space across the corridor from the ESOL room.

For a complete description of the plans refer to the 'Floor Plan Narrative' on page 22.

Design Development Second Floor Plan Refinements

The refinements identified by numbers in hexagons on the proposed second floor plan on page 21 are the most notable changes since the schematic phase.

9. A centralized mechanical room has been created on the the second floor which will house all the heating, ventilation and air conditioning (HVAC) system units which used to be located on the roof. This strategy clears up even more roof area for solar (PV) panels that will provide renewable energy to the school.

10. Two additional classrooms have been added to the second floor to accommodate the projected increase in student enrollment for this school.

Proposed Second Floor Plan

ABBREVIATIONS

ALS = ACADEMIC LIFE SKILLS
BSAP = BLACK STUDENT ACHIEVEMENT PROGRAM
CC = CUSTODIAL CLOSET
CR = CLASSROOMS
ESOL = ENGLISH FOR SPEAKERS OF OTHER LANGUAGES
HP = HEAT PUMP ROOM
IDF = INTERMEDIATE DISTRIBUTION FRAME ROOM
MDF = MAIN DISTRIBUTION FRAME ROOM
S = STORAGE ROOM
SRO = STUDENT RESOURCE OFFICER
T = TOILET ROOM

LEGEND

= ADMINISTRATIVE SPACES
= GRADES 6-8
= SCIENCE LABS
= SPECIAL EDUCATION
= CENTRAL SUPPORT SPACES
= ARTS & TECHNOLOGY
= BUILDING SERVICES

FLOOR AREA

FIRST FLOOR	71,743 GSF
SECOND FLOOR	34,478 GSF
TOTAL BUILDING	106,221 GSF

Floor Plan Narrative

In addition to the basic features of the prototype layout listed on page 16, the new Wilde Lake Middle School will maintain the following spatial relationships:

Access and Circulation

Entrances

The main entrances are clearly marked for visitors by both their location and by the architectural significance of the projecting main stairwell.

Entrances are arranged to distribute student traffic during arrival and departure times, to meet code egress requirements, and to permit easy access to the gym and cafeteria for after-hours activities. Particular attention has been paid to providing an adequate number of doors in the heavily populated classroom areas for dismissal time.

Corridor Arrangement

A conscious effort was made to develop a corridor pattern which is clear-cut in its arrangement and easy to supervise. Stairs are located at the four corners of the two-story wing. As noted, an elevator is provided very close to the main entrance for the use of handicapped persons and for the easy movement of furniture and equipment.

The main interior stair at the front of the building is next to the main entrances and is immediately adjacent to the administrative area.

Student Lockers are located along corridor walls throughout the classroom areas in lieu of a pod design with concentrated areas of lockers. Lockers are located on just one side of corridors, wherever possible, to minimize congestion.

Student Restrooms are located on both floors near stairways in all three grade level areas and adjacent to the cafeteria and gymnasium entrances. The cafeteria/gymnasium lobby restrooms are also intended to be used during after-hours activities. Teachers' toilets are located on both floors of the classroom wing and adjacent to the staff lounge.

The **administrative area** is central to the building and adjacent to the main entrance with a view of the parent and bus drop-off areas. The **health suite** and **staff lounge** are all directly accessible from this area. Both the health suite and the staff lounge have separate entrances from main corridors. The teachers' mailboxes, which will be in the workroom, can be conveniently serviced from the administrative area. Proximity to the cafeteria was also a consideration in the location of the staff lounge.

The **guidance suite** is located in an easy-to-reach location, convenient to the office area, yet with a distinct identity.

Classrooms are located in the two-story portion of the school and arranged so that each grade level has its own distinct area. Almost all classrooms are located on exterior walls with windows.

Science laboratories have been placed on both levels convenient to all three grade levels. Four of the five labs are adjacent to prep rooms and project/seminar rooms. In addition, one classroom will have a safety shower and cabinetry to support basic science instruction.

Teacher planning rooms, seminar rooms, and **storage rooms** are distributed throughout the two-story classroom wing.

Floor Plan Narrative (continued)

A **special education suite** is located on the first floor of the classroom wing. This suite includes the speech room, classroom, related services therapy room, handicap accessible toilet, a conference room, planning room, storage room and two resource rooms. The system 44 room has been located on the second floor.

The **media center** is the symbolic, as well as, the actual center of the school. It is located on the first floor in the middle of the classroom area and is visible from the second floor corridors above. Natural daylight from above brightens this dramatic two-story high space and the rooms surrounding it on both floors. The media center can be entered from all three adjacent corridors to encourage student use. The **technology resource room** is entered and monitored from the media center.

The **gifted and talented resource room** has a central location in the second floor classroom area overlooking the media center. The **TV studio** is adjacent to this space, since it is monitored by the G/T teacher.

The **art classroom** and the **health classroom** are located on the first floor, near other related-arts spaces and easily reached from all classroom areas. Both of these rooms are located on an exterior wall with windows.

The **world languages classroom** is placed in the center of the second floor classroom area across the corridor from the **ESOL resource room**.

The **technology education rooms**, **family and consumer science rooms**, and **music suite** are located on the first floor away from the quiet two-story classroom wing, yet are easily accessed both during the school day and during after-hours use.

The **gymnasium** is located so that it can be entered from the classroom side of the school or from a lobby which also serves the cafeteria entrance. Direct access has been provided from the gym to the outdoor paved play area and a grass play area. The gym and the adjoining **fitness lab/activity room** are located for easy, but controlled, access during after-hours activities. Locker rooms are designed to be entered from inside the gymnasium for visual control by physical education teachers and are provided with access directly to the outside.

The **cafeteria** is located for easy access by after-hours users and in close proximity to the music rooms for use of the stage. For after-lunch recess there is direct access to the outdoor paved play area and there is convenient access to the gymnasium and to restrooms. Large windows are provided to ensure visibility from the cafeteria to the paved play area during lunch time supervision. Kitchen serving lines are entered from inside the cafeteria and there is convenient access to the service area for trash removal. An operable wall has been provided at the front of the **stage** to permit use of this area as a teaching station during lunch periods. A ramp has been provided for handicap access to the stage.

The **kitchen** has a full-preparation arrangement and is convenient to the service area for deliveries and trash removal.

The **custodial areas** are placed on a main corridor near the service entrance and adjacent to the mechanical and electrical rooms. Custodial closets are distributed throughout the school and placed next to restrooms for plumbing economy.

The **service area** has direct corridor access to the center of the school, allowing for convenient deliveries and trash removal.

Architectural Character

Just as the exterior facade for the prototype middle school (Thomas Viaduct Middle School) was entirely redesigned to reflect the traditional design aesthetic of the Oxford Square community, the facade of the new Wilde Lake Middle School will be redesigned due to the need for a highly insulated building envelope which, secondarily, will help distinguish this building from the other prototype middle schools.

The facade will incorporate super-insulated masonry walls on the first floor and where greater durability is required and highly insulated metal wall panels on the second floor with masonry on the interior face.

Exterior masonry unit sizes will recall those used on the adjacent Wilde Lake High School. Double-glazed, thermally broken aluminum windows will allow daylight into the building while resisting thermal temperature differences between the interior and exterior. Exterior windows on the south -facing and west-facing facades will also be provided with exterior sunshades to shield the interior from the high, hot summer sun, while allowing the low winter sun to penetrate the interior during the heating season.

As seen in the image to the right, the main entrance 'stair tower' will be flooded with diffused northern daylight. A wall of glass will provide exterior views from the main office and lobby and the new stair design will be open below the landing.

Exterior Elevations

Choral Room | Tech Ed | Family and Consumer Sciences | Administrative Suite | Main Entrance | Guidance Suite | Two-Story Academic Wing | Stair

Front Elevation (North - Facing)

Paved Play Area Locker Rooms Beyond | Outdoor Equipment Enclosure | Electrical Room | Mechanical Room | Entrance | Band Room | Choral Room | Parking Lot Bus Loop Beyond

Side Elevation (East - Facing)

Exterior Elevations

Rear Elevation (South - Facing)

Side Elevation (West - Facing)

Space Analysis

	Existing Wilde Lake Middle School		New Wilde Lake Middle School SD Phase		New Wilde Lake Middle School DD Phase	
	Area(s)	Total Net	Area(s)	Total Net	Area(s)	Total Net
Administration		**2,224**		**2,993**		**3,120**
Principal's Office (incl. toilet)	1	237	1	247	1	251
Assistant Principal's Office	1	220	1	176	1	183
Conference Room	1	215	1	189	1	187
Workroom/Mailroom (incl. storage)	2	294	1	574	1	569
Reception Area/Secretarial	1	316	1	533	1	573
Staff Dining	1	497	1	411	1	505
Principal's Secretary	1	119	1	102	1	104
Toilet	5	191	7	358	7	354
Security Office (SRO) *	**1**	**135**	**1**	**98**	**1**	**108**
Administrative Intern *	**0**	**0**	**1**	**100**	**1**	**103**
Volunteer/Community Room **	**0**	**0**	**1**	**139**	**1**	**121**
School Store **	**0**	**0**	**1**	**66**	**1**	**62**
Art		**942**		**1,546**		**1,523**
Studio	1	874	1	1,294	1	1,270
Kiln Room	1	68	1	106	1	107
Storage **	**0**	**0**	**1**	**146**	**1**	**146**
Cafeteria / Food Service		**5,326**		**7,097**		**7,188**
Kitchen Area	1	1,514	1	2,050	1	2,050
Dry Storage Area	1	166	1	161	1	159
Office	1	63	1	59	1	57
Student Dining	1	2,800	1	3,509	1	3,569
Stage	1	631	1	912	1	925
Stage Storage	1	152	2	176	2	190
Stage Ramp **	**0**	**0**	**1**	**230**	**1**	**238**
Computer Lab		**406**		**779**		**771**
Computer Lab	1	406	1	779	1	771
Building Services		**1,951**		**6,963**		**7,973**
Can Wash	1	105	1	63	1	64
Decentralized Custodial Closets	3	290	3	226	3	316
General School Storage	1	276	1	127	0	0
Outside Equipment Storage	2	245	1	169	1	200
Toilet w/ shower	1	33	1	66	1	67
Electrical	4	478	3	552	3	549
Mechanical (incl. Heat Pump Rooms & Geothermal)	1	440	28	5,177	26	6,208
Main Distribution Frame (MDF) Room	1	84	1	247	1	254
Telecommunications (IDF)**	**0**	**0**	**2**	**102**	**2**	**80**
Kitchen Wash Room **	**0**	**0**	**1**	**52**	**1**	**52**
Custodial Office (incl. Storage)**	**0**	**0**	**1**	**182**	**1**	**183**
General Academic Areas		**14,874**		**16,383**		**17,635**
Classrooms (does not include 1 classroom located in portable classroom)	15	11,920	17	13,229	19	14,531
Storage Area	6	454	2	369	2	389
Teacher Planning Room	1	267	2	1,673	2	1,626
Seminar Room (includes existing CRs below 660sf)	5	2,233	3	1,112	3	1,089

Space Analysis (continued)

	Existing Wilde Lake Middle School		New Wilde Lake Middle School SD Phase		New Wilde Lake Middle School DD Phase	
	Area(s)	Total Net	Area(s)	Total Net	Area(s)	Total Net
Gifted & Talented Resource Room		**474**		**1,016**		**1,030**
GT Resource Room	1	274	1	768	1	785
TV Studio	1	144	1	194	2	190
Planning Storage Room	1	56	1	54	1	55
Guidance		**837**		**1,363**		**1,350**
Secretarial/Reception (incl. closet)	1	195	1	369	1	343
Counseling Offices	2	372	2	282	2	280
Record Storage	2	136	1	172	1	228
Data Clerk *	**1**	**134**	**1**	**144**	**1**	**97**
Conference Room **	**0**	**0**	**1**	**259**	**1**	**267**
Pupil Services Office **	**0**	**0**	**1**	**137**	**1**	**135**
Health Education		**0**		**781**		**780**
Classroom ***	**0**	**0**	**1**	**781**	**1**	**780**
Health Suite		**264**		**817**		**838**
Waiting	1	52	1	200	1	216
Treatment	1	64	1	92	1	95
Office	1	50	1	98	1	88
Rest Area	1	56	2	182	2	180
Toilets	1	42	2	113	2	128
Exam **	**0**	**0**	**1**	**99**	**1**	**95**
Storage **	**0**	**0**	**1**	**33**	**1**	**36**
Family and Consumer Science		**815**		**1,693**		**1,752**
Classroom	1	815	2	1,638	1	1,682
Storage **	**0**	**0**	**1**	**55**	**1**	**70**
Media Center		**3,411**		**4,259**		**4,207**
Main Reading Room	1	2,683	1	3,268	1	3,238
Technology Resource Room	1	225	1	476	1	455
Office/Work Space	1	84	1	126	1	127
Media Production	1	364	1	137	1	137
Storage Area	2	55	1	252	1	250
Music		**2,135**		**3,389**		**3,720**
Choral Room	1	876	1	989	1	976
Instrumental Room	1	851	1	1,387	1	1,405
Instrument Storage	1	171	1	200	1	161
Materials/Repair	1	80	1	95	1	73
Teacher Planning	1	157	1	157	1	235
Ensemble Room ***	**0**	**0**	**1**	**372**	**1**	**691**
Practice Rooms **	**0**	**0**	**3**	**189**	**3**	**179**
Physical Education		**8,431**		**8,880**		**8,982**
Gymnasium	1	6,421	1	5,555	1	5,598
Shower Area	2	420	2	202	2	97
Lockers (incl. toilets)	2	1,276	2	1,395	2	1,425
Storage (Large Equipment)	1	146	1	308	1	324
Storage (Towel)	2	30	2	120	1	65
Office/Shower/Toilet	2	138	2	268	2	319
Laundry **	**0**	**0**	**1**	**114**	**1**	**180**
Storage (Small Equipment) **	**0**	**0**	**1**	**127**	**1**	**135**
Fitness Lab/Activity Room (incl. storage) **	**0**	**0**	**1**	**791**	**1**	**839**

Space Analysis (continued)

	Existing Wilde Lake Middle School		New Wilde Lake Middle School SD Phase		New Wilde Lake Middle School DD Phase	
	Area(s)	Total Net	Area(s)	Total Net	Area(s)	Total Net
Science		**4,895**		**6,279**		**6,353**
Science Laboratories	5	4,308	5	5,579	5	5,578
Preparation Room	1	261	2	272	2	299
Storage Room	3	326	2	170	2	180
Project/Seminar Room **	0	0	2	258	2	296
Special Education		**1,323**		**2,872**		**2,987**
Conference Room	1	180	1	152	1	154
Teacher Planning Room *	2	536	1	255	1	246
Speech *	1	267	1	304	1	299
ALS Classroom (including storage) *	1	340	1	535	1	530
Related Services Therapy Area (incl. storage) **	0	0	1	352	1	356
Classrooms **	0	0	3	1,085	3	1,212
Storage **	0	0	1	97	1	89
ADA Toilet **	0	0	1	92	1	101
Student Support Spaces		**455**		**451**		**439**
BSAP (Academic Mentor Office) *	1	120	1	139	1	121
Alternative Education (Contract Room) *	1	335	1	312	1	318
Technology Education		**2,212**		**2,732**		**2,474**
Production Lab	1	1,462	1	1,014	1	927
Tech Laboratory	1	591	1	1,220	1	1,070
Resource	1	159	1	98	1	96
Dust Room **	0	0	1	99	1	93
Storage Rooms **	0	0	2	301	2	288
Toilet Rooms		**1,096**		**1,313**		**1,346**
Public Toilets (Men & Women)	4	1,096	4	1,313	4	1,296
Unisex Toilet **	0	0	0	0	1	50
World Language		**166**		**1,227**		**1,140**
ESOL *	1	166	1	420	1	405
Classroom (incl. storage) ***	0	0	1	807	1	735

Space Analysis Summary

	Existing Wilde Lake Middle School	New Wilde Lake Middle School SD Phase	New Wilde Lake Middle School DD Phase
Total Net Sq. Ft.	51,235	66,755	68,517
Mech/Elec Spaces	1,002	6,078	7,091
Walls, Circulation, Structure, Shafts, etc	18,293	30,195	30,613
Gross Area Total	**70,530**	**103,028**	**106,221**

* Existing program at WLMS

** New space at WLMS

*** Currently located in portable classroom

Construction Cost Estimate

The new Wilde Lake Middle School

	Schematic Phase	Design Development Phase
Site Work (includes demolition of existing building)	$ 5,250,944	$ 5,957,680
Building (includes solar PV system)	$ 25,747,802	$ 28,889,176
Construction Cost Total	$ 30,998,746	$ 34,846,856
Less Net Zero School Program grant from MEA	(-$ 2,200,000)	(-$ 2,240,000) *
Total for Project	**$ 28,798,746**	**$ 32,606,856**

* Dollar amount has been adjusted to the reflect the actual amount documented in the Net Zero Schools Program Grant Implementation Agreement between HCPSS and MEA.

Notes

- Construction cost estimate was prepared by the construction manager, Oak Contracting, and assumes that bids will be received in March 2015.
- Estimate includes cost of food service equipment.
- Estimate includes a design development phase cost estimate contingency of +3 percent.
- Estimate assumes wage rate pricing per Maryland House Bill 727 entitled “Procurement - Prevailing Wage- Applicability” which took effect July 1, 2014. Wage rates are based on prevailing wage scale guidelines for the geographical area of this project at this time.
- Estimate does not include a project contingency.
- Estimate does not include costs associated with the relocation of any portable classrooms shown on site.

Design Development
Furniture and Equipment Plans

The layouts on the following pages are the result of numerous meetings between the architect and the HCPSS staff. These layouts, which include furniture and equipment arrangements, will be used as the construction documents are prepared to properly locate electrical outlets, plumbing fixtures, and fixed accessories such as cabinetry, projection boards, tackboards, and markerboards in each room.

List of Furniture & Equipment Plans

Design Development Meetings
Furniture & Equipment Plans

(New) Wilde Lake Middle School

1. Administrative and Health Suite
2. SRO, BSAP, and Volunteer Room
3. Alternative Education
4. Art
5. Classroom, Seminar, and Planning
6. Computer Lab
7. Custodial
8. Family and Consumer Science
9. Gifted and Talented
10. Guidance
11. Media Center
12. Music Suite
13. Physical Education
14. Science
15. Special Education Resource
16. Special Education Support Spaces
17. Stage
18. Technology Education
19. World Languages and ESOL

Design Development Meetings
Furniture & Equipment Plans

(New) Wilde Lake Middle School
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Furniture and Equipment: (ALL ITEMS LISTED BELOW ARE NOT IN CONTRACT (NIC) UNLESS OTHERWISE NOTED)

1. 30"D. x 48"W. TEACHER DESK W/ CHAIR
2. STUDENT DESK & CHAIR
3. NOT USED
4. 30"D. x 60"W. TABLE W/ CHAIRS WHERE INDICATED
5. 30"W. x 12'L. FOLDING TABLES WITH SEATING FOR 12
6. STUDENT MUSIC STAND
7. 36" DIAMETER TABLE W/ CHAIRS
8. 60"W. x 30"D. DESK W/ RETURN AND CHAIR
9. UPHOLSTERED WAITING CHAIRS
10. 36"W. x 28"H. x 19"D. FILE CABINET
11. 42" DIA. TABLE W/ CHAIRS
12. 36"W. x 24"D. x 7'-3"H. STEEL STORAGE SHELVING
13. 96"W. x 42"D. CONFERENCE TABLE
14. CONFERENCE ROOM CHAIRS
15. 12"D. BOOK SHELVING UNIT
16. 36"W x 19-1/2"D TALL LATERAL FILE CABINET
17. BROCHURE DISPLAY SHELVING
18. 36"W. x 12"D. x 7'-3"H. STEEL STORAGE SHELVING
19. AV MIXER
20. STUDENT CHAIR
21. 18"W. x 27"D. x 52"H. (4) DRAWER FILE CABINET
22. 18"W. x 27"D. x 28"H. (2) DRAWER FILE CABINET
23. 36"W. x 18"D. x 7'-3"H. STEEL STORAGE SHELVING
24. STUDENT LAB TABLES AND CHAIRS
25. GOGGLE CABINET
26. FIRE BLANKET CABINET
27. CONDUCTORS DOUBLE PODIUM WITH RAIL
28. CONDUCTORS STAND
29. FLAMMABLE STORAGE CABINET
30. ACID STORAGE CABINET
31. ADULT WORKSTATION CHAIR
32. FIRE EXTINGUISHER
33. 48" x 24" CUSTODIAL CART
34. BACKPACK VACUUM CLEANER
35. BATTERY OPERATED SPEED SCRUBBER
36. BATTERY OPERATED SPEED BURNISHER
37. 19" HAND SCRUBBER
38. 19" HAND BURNISHER
39. CHAIR/DESK WITH TABLET ARM
40. 48"W. x 30"D. WORKTABLE
41. DRAFTING TABLE
42. 60"W. x 42"D. ART TABLES AND STOOLS
43. PORTABLE CLAY CART
44. 24" x 36" PORTABLE SUPPLY CART
45. 36"W. x 36"D. x 7'-3"H. STL STORAGE SHELVING
46. SPRAY BOOTH
47. CONDUCTORS CHAIR
48. VIOLIN RACK
49. CELLO RACK
50. 72"W. x 36"D. PRINCIPAL'S DESK AND CHAIR
51. 72"W. x 24"D. CREDENZA
52. 25" x 25" DRYING RACK
53. 60"W. x 36"D. CONFERENCE TABLE
54. 33"W. x 48"D. PAPER CUTTER
55. GYM MAT
56. TABLE TOP COPIER/FAX/PRINTER
57. GYM BENCH
58. BASS RACK
59. 24" x 24" RECYCLING CONTAINER
60. 60"W. x 30"D. SEC. DESK W/ RETURN
61. END TABLE
62. VENDING MACHINE
63. COFFEE TABLE
64. DUMBBELL RACK
65. 12"D. x 36"W. x 42"H. STEEL BOOKSHELVING
66. 12"D. x 36"W. x 72"H. STEEL BOOKSHELVING
67. REVOLVING PAPERBOOK RACK
68. 72"L. x 30"W. PATIENT COTS
69. SCALE
70. 36"W. x 41"H. x 19"D. (3) DWR. LAT. FILE CAB
71. 36" x 36" TABLE W/ CHAIRS
72. ATLAS STAND
73. DICTIONARY STAND
74. 6'L. PORTABLE PROJECTION BOARD
75. TRAPEZOIDAL TABLE W/ CHAIR
76. MEDIA CENTER CIRCULATION DESK
77. 30"W. x 24"D. STUDY CARREL W/ CHAIR
78. LEG EXTENSION / CURL UP MACHINE
79. STUDENT ACTIVITY WORKTABLE W/ CHAIRS
80. STUDENT STOOL
81. 4 STUDENT WORKBENCH W/ VICES
82. 8' WALL WORKBENCH
83. 6' WALL WORKBENCH
84. TOOL CABINET
85. 11'-0" LUMBER RACK
86. LEG PRESS MACHINE
87. CHEST PRESS MACHINE
88. LAT PULL DOWN MACHINE
89. STEEL TOP TABLE
90. THREE PIECE REAR CYCLORAMA
91. CENTER TEASER W/2 CTR PIVOT CURTAINS
92. TWO PIECE MAIN ACT CURTAIN
93. 30"W. x 144"L. FOLDING TABLE W/ SEATING (12)
94. CONDUCTOR PODIUM
95. STUDENT MUSIC POSTURE CHAIR
96. PIANO
97. ELECTRONIC KEYBOARD
98. STEREO CABINET
99. INSTRUMENT CART
100. SPIN BIKE
101. NOT USED
102. 36"W. x 94"L. CONFERENCE TABLE AND CHAIR
103. HYDRAULIC COT
104. MUSIC SORTING CART
105. 24" x 48" WORKTABLE W/ CHAIRS WHERE INDICATED
106. TRASH CAN
107. WALL MTD SOAP DISP. W/ CLEANING PRODUCT BUCKETS
108. WALL MOUNTED GUITAR RACK
109. 36"W. x 24"D. STUDY CARREL W/ CHAIR
110. PORTABLE CHORAL RISER
111. CHAIR STORAGE CART (48 CHAIR CAPACITY)

Appliances: (ALL ITEMS LISTED BELOW ARE NOT IN CONTRACT (NIC) UNLESS OTHERWISE NOTED)

1. RANGE
2. REFRIGERATOR
3. DISHWASHER
4. MICROWAVE
5. COMMERCIAL WASHER
6. COMMERCIAL DRYER
7. WASHING MACHINE
8. DRYER
9. FREEZER
10. UNDERCOUNTER
11. REFRIGERATOR
12. SMALL COPIER
13. LARGE COPIER
14. KILN
15. 42" WALL MOUNTED TV
16. DUPLICATOR
17. LAMINATOR
18. PLOTTER
19. BAND SAW
20. DRILL PRESS
21. COMBINATION SANDER
21. PORTABLE TABLE SAW
22. SCROLL SAW
23. TREADMILL
24. STEP MACHINE
25. MOBILE COMPUTER CART
26. STACKED WASHER DRYER

ABBREVIATIONS

FD = FLOOR DRAIN
MH = MOUNTING HEIGHT
AFF= ABOVE FINISHED FLOOR
NIC = NOT IN CONTRACT
PT = PORCELAIN TILE
VCT= VINYL COMPOSITION TILE
CT CERAMIC TILE
PS = PROJECTION SCREEN

TACKBOARDS
TB-1 = 4'L. x 4'H.
TB-2 = 8'L. x 4'H.
TB-3 = 12'L. x 4'H.
TB-4 = 4'L. x 7'H.
TB-5 = 6'L. x 4'H.
TB-6 = 2'L. x 4'H.
TB-7 = 3'L. x 4'H.
TB-8 = 10'L. x 2'H.

TACKSTRIPS
TS-1 = 16'L.
TS-2 = 12'L.
TS-3 = 8'L.

MARKERBOARDS
MB-1 = 4'L. x 4'H.
MB-2 = 8'L. x 4'H.
MB-3 = 12'L. x 4'H.
MB-4 = 16'L. x 7'H.
MB-5 = 6'L. x 4'H.

PROJECTION BOARD
PB-1 = 6'-5"L. x 4'H.

CHALKBOARD
CB-1 = 10'-0"L. x 4'H.

ELECTRICAL & TELECOMMUNICATION SYMBOLS

(ALL ITEMS LISTED BELOW ARE IN CONTRACT UNLESS OTHERWISE NOTED)

2D = DATA DROP FOR COMPUTER CONNECTION (2 DATA JACKS & QUAD ELEC. OUTLET)

W = WARDROBE DATA DROP FOR CONNECTION TO LCD PROJECTOR AND VOICE ENHANCEMENT SYSTEM DROP TO BE 66" A.F.F. (1 DATA JACK, 3.5MM AUDIO JACK, 3 RCA JACKS, PLATE TO SPEAKERS & QUAD ELEC. OUTLET)

L = LOW DATA DROP FOR CONNECTION TO LCD PROJECTOR (2 DATA JACKS, 1 VOICE JACK, VGA, 3.5 AUDIO JACK & QUAD ELEC OUTLET)

V = VOICE DROP (1 VOICE JACK & DUPLEX OUTLET)

= VIDEO DROP (1 DATA JACK & DUPLEX ELEC. OUTLET)

A = ADMINISTRATIVE DATA DROP (2 DATA JACKS, 1 VOICE JACK & QUAD ELEC OUTLET)

AV = AUDIO VIDEO DROP (1 DATA JACK, 3.5MM AUDIO JACK, 3 RCA JACKS & DUPLEX OUTLET)

WIFI = WIRELESS ACCESS POINT (ABOVE CEILING)

C P = COMPUTER / PRINTER (NIC)

= DUPLEX ELECTRICAL OUTLET

= QUAD ELECTRICAL OUTLET

2D = DATA DROP IN FLOOR (SEE DESCRIPTIONS TO LEFT)

= QUAD ELECTRICAL DROP IN FLOOR

= RETRACTABLE CEILING OUTLET W/ DROP CORD

$ = LIGHT SWITCH LOCATION

P = WALL MOUNTED LCD PROJECTOR (U.O.N.)

= CALL STATION STAFF TELEPHONE

= VOLUME CONTROL SWITCH

= ANALOG CLOCK LOCATION (HARDWIRED)

K = SECURITY KEY PAD

CR = CARD READER

= BUZZER

M = MICROPHONE

CATV = RCA COMPOSITE AUDIO & VIDEO JACKS TO CATV SYSTEM

= EMERGENCY CUT-OFF SWITCH

S = WALL MOUNTED SPEAKER

= SPECIAL PURPOSE GROUNDING TYPE RECEPTACLE

CCTV = CCTV MONITOR LOCATION (SECURITY CAMERA MONITOR)

Legend of Symbols and Abbreviations

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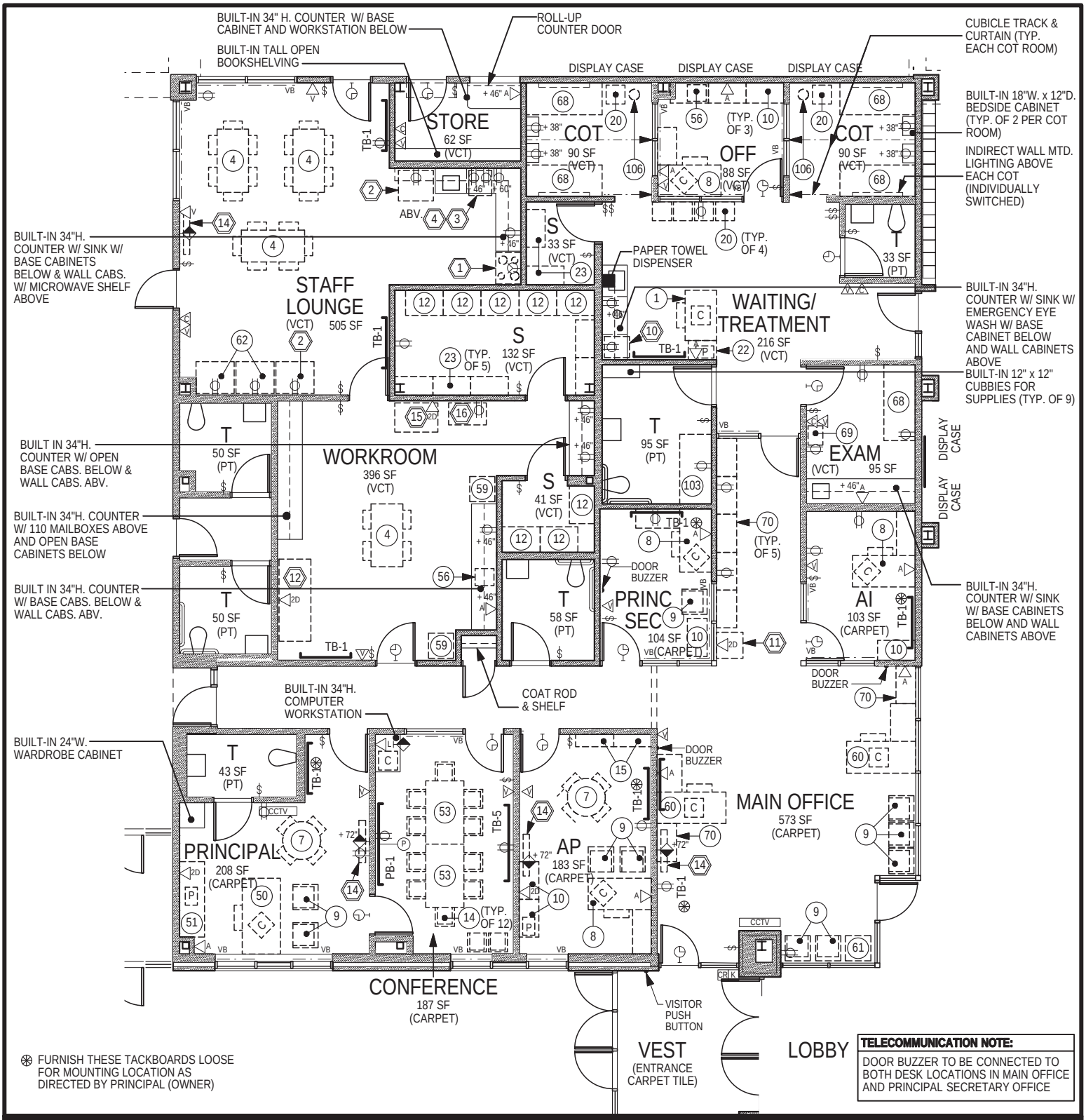

Administrative and Health Suite
Equipment Plan

Scale: 3/32" = 1'-0"

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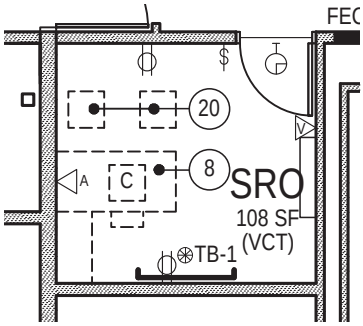
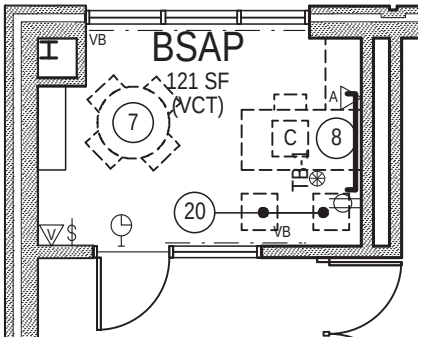
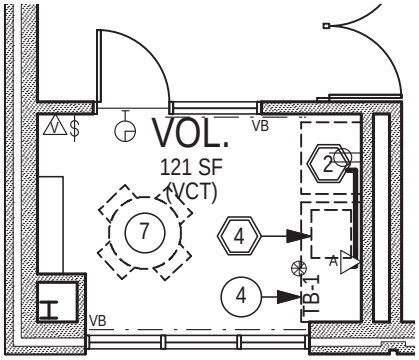
1



FIRST FLOOR





SECOND FLOOR

⊛ FURNISH THESE TACKBOARDS LOOSE FOR MOUNTING LOCATION AS DIRECTED BY PRINCIPAL (OWNER)

SRO, BSAP, and Volunteer Room
Equipment Plans

Scale: 1/8" = 1'-0"

(New) Wilde Lake Middle School
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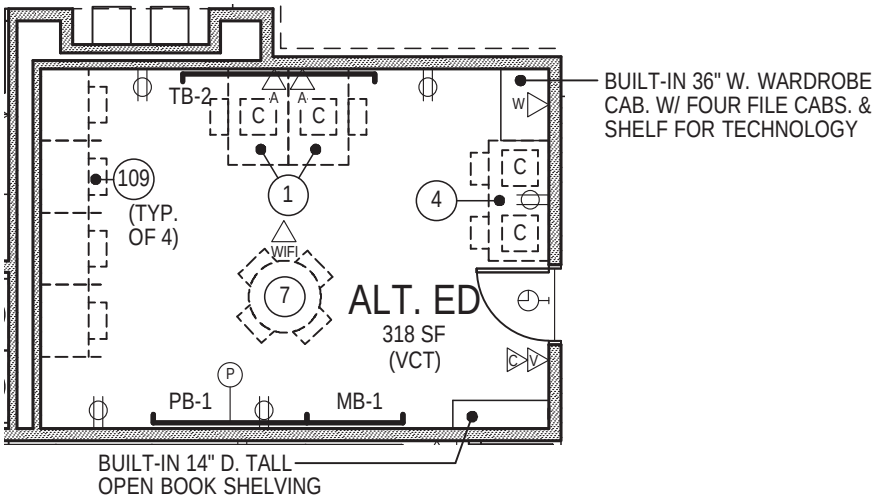
2



Alternative Education
Equipment Plan

Scale: 1/8" = 1'-0"

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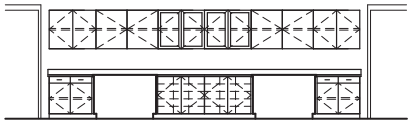
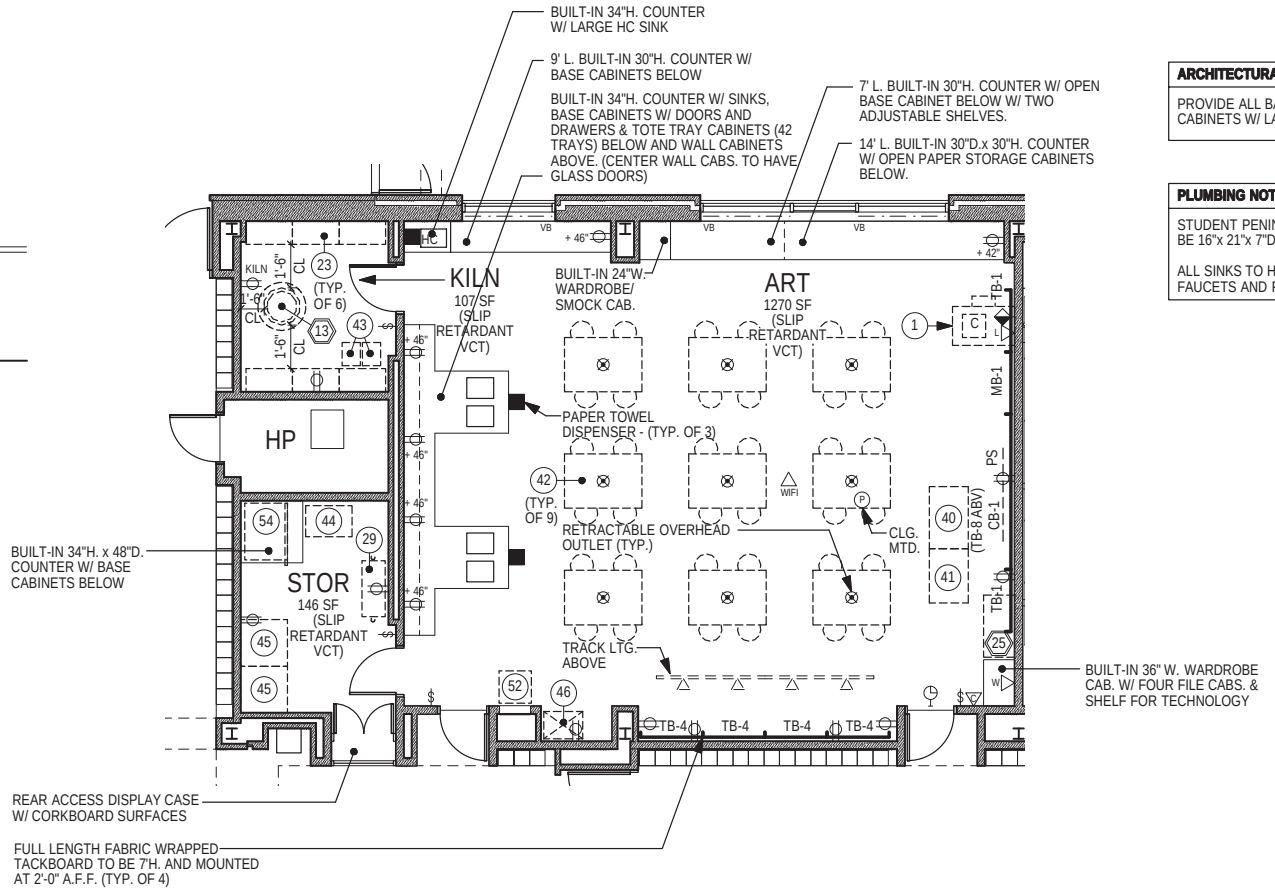
3



ELEVATION AT STUDENT WORKSTATIONS



ARCHITECTURAL NOTES:

PROVIDE ALL BASE AND WALL CABINETS W/ LABEL HOLDERS.

PLUMBING NOTES:

STUDENT PENINSULA SINKS TO BE 16"x 21"x 7"D.

ALL SINKS TO HAVE GOOSENECK FAUCETS AND PLASTER TRAPS

Art
Equipment Plan

Scale: 1/8" = 1'-0"

(New) Wilde Lake Middle School
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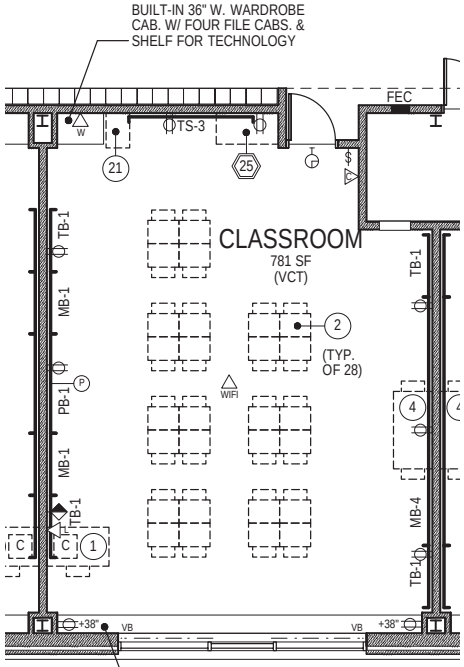
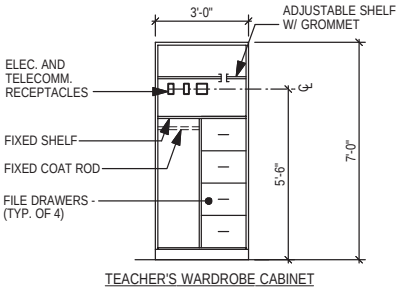
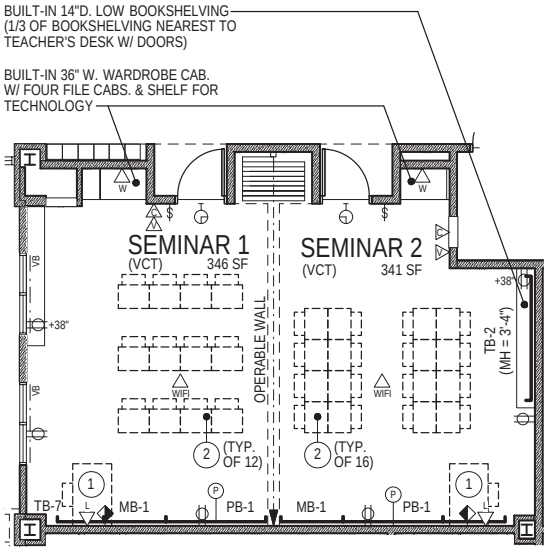


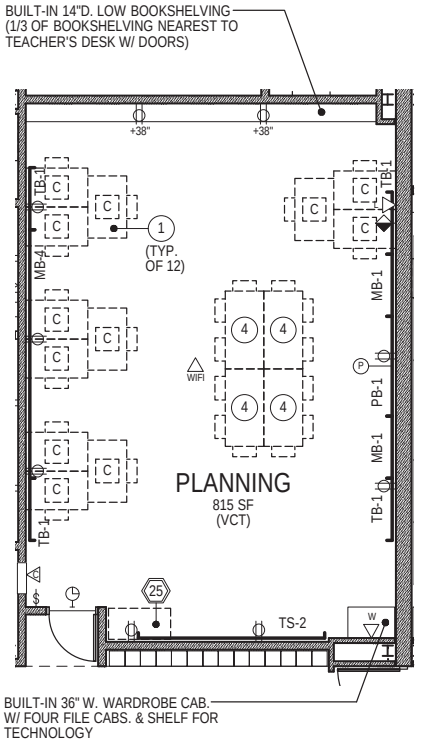


TEACHER'S WARDROBE CABINET



TELECOMMUNICATION NOTE:

PROVIDE SOUND ENHANCEMENT SPEAKERS IN SEMINAR 1 AND 2 FOR WHEN OPERABLE WALL IS OPEN AND THE ROOMS ARE USED AS ONE CLASSROOM.



Classroom, Seminar and Planning
Equipment Plan

Scale: 1/8" = 1'-0"

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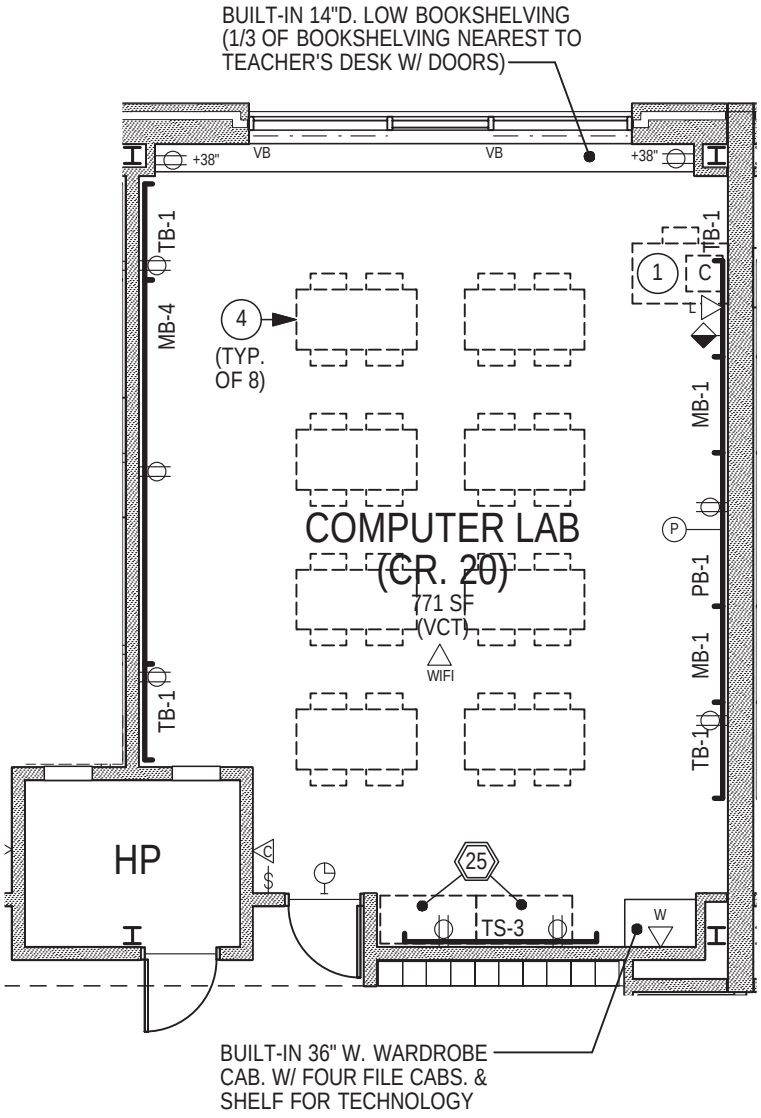

Computer Lab
Equipment Plan

Scale: 1/8" = 1'-0"

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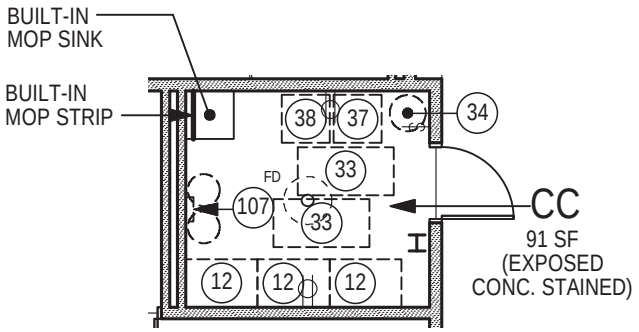
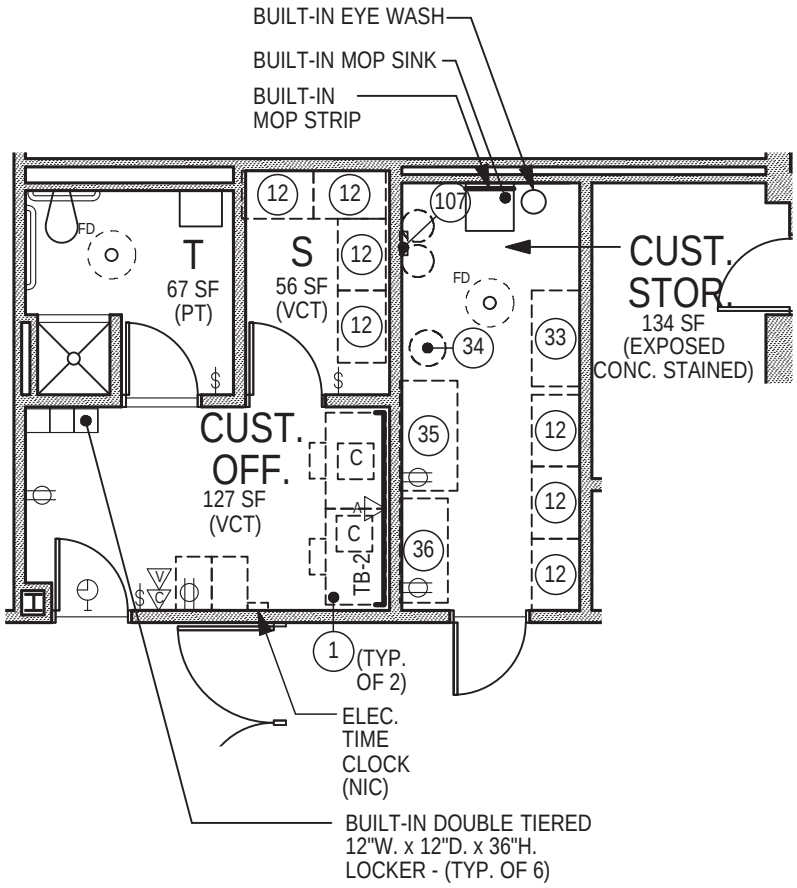
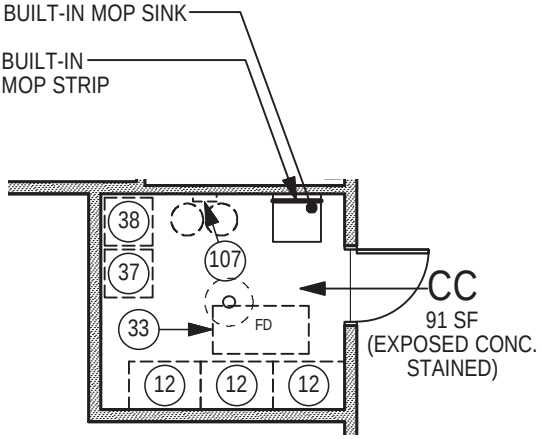


SECOND FLOOR



FIRST FLOOR



FIRST FLOOR

Custodial
Equipment Plan

Scale: 1/8" = 1'-0"

(New) Wilde Lake Middle School
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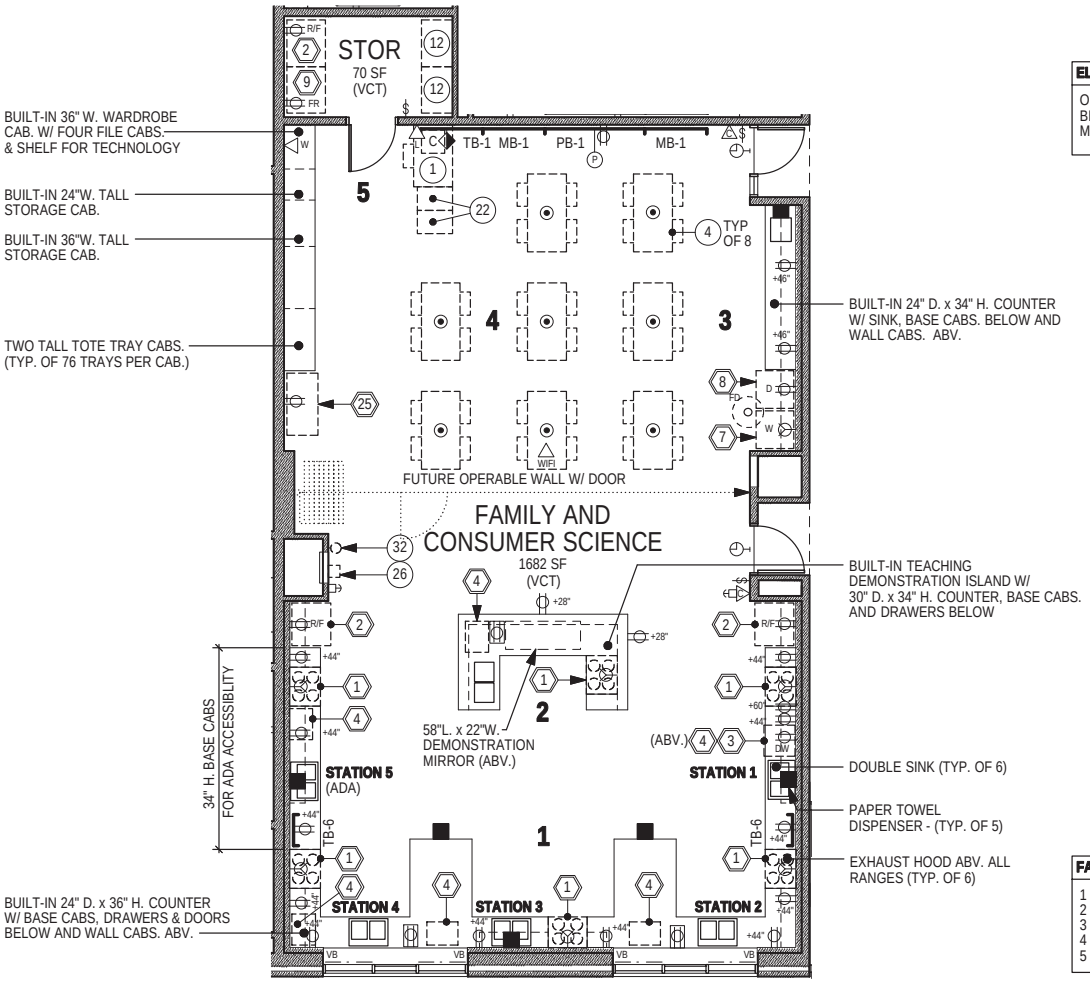
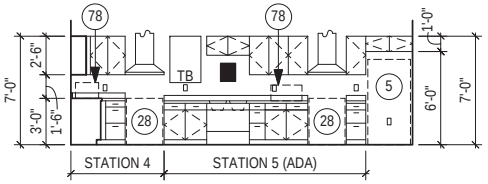


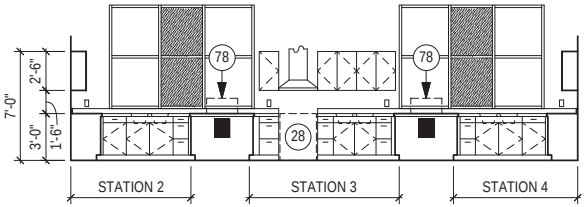
ELECTRICAL NOTE:

OUTLETS OVER COUNTERS SHALL BE 44" AFF. HIGH OUTLETS FOR #78 MICROWAVES SHALL BE 60" AFF.



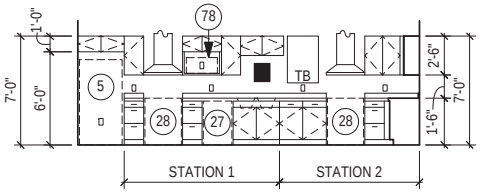
WEST ELEVATION

FACS LAB - FOOD PREPARATION CENTER



NORTH ELEVATION

FACS LAB - FOOD PREPARATION CENTER



EAST ELEVATION

FACS LAB - FOOD PREPARATION CENTER

FACS SUB-AREAS:

1 FOOD PREPARATION CENTER
2 DEMONSTRATION CENTER
3 LAUNDRY CENTER
4 STUDENT WORKSTATIONS
5 TEACHERS WORK CENTER

PLUMBING / ELECTRICAL NOTE:

BATCH FEED TYPE **GARBAGE DISPOSALS** TO BE PROVIDED AT FOOD PREPARTION & DEMONSTRATION CENTER SINKS (TYP. OF 5) EXCLUDING ADA STATION 5. EACH DISPOSAL TO HAVE A DISCONNECT SWITCH MOUNTED UNDERNEATH COUNTERTOP.

GENERAL NOTE:

PAPER TOWEL DISPENSERS TO BE CASCADES EASY ROLL OUT MODEL NO. 10105.

Family and Consumer Science
Equipment Plan

Scale: 1/8" = 1'-0"

(New) Wilde Lake Middle School
Howard County Public School System

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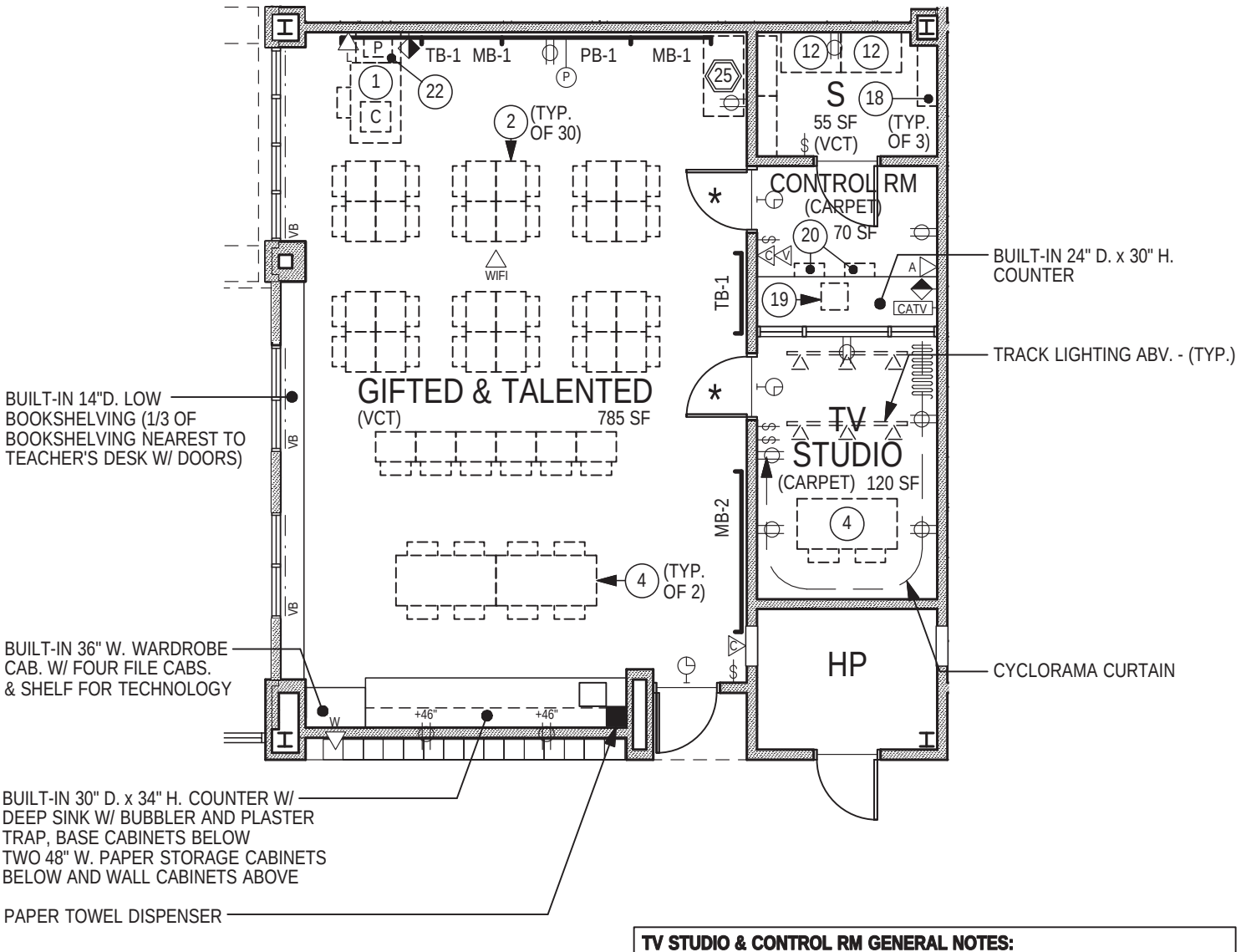

TV STUDIO ELECTRICAL NOTE:

- NO SPEAKERS OR PROVIDE CAPABILITY TO TURN OFF SPEAKERS DURING PRESENTATIONS
- PROVIDE SEPARATE SWITCHES FOR EACH TRACK LIGHTING STRIP

TV STUDIO & CONTROL RM GENERAL NOTES:

- SOUNDPROOFING AND INTERIOR ACOUSTICAL TREATMENT (TO REDUCE REVERBERATION) TO BE PROVIDED
- DOORS MARKED AS ' * ' TO RECEIVE SOUND SEALS
- PROVIDE 8" DIA. SLEEVE THRU WALL FOR CABLING CONNECTIONS TO CONTROL EQUIPMENT

Gifted and Talented
Equipment Plans

Scale: 1/8" = 1'-0"

(New) Wilde Lake Middle School
Howard County Public School System

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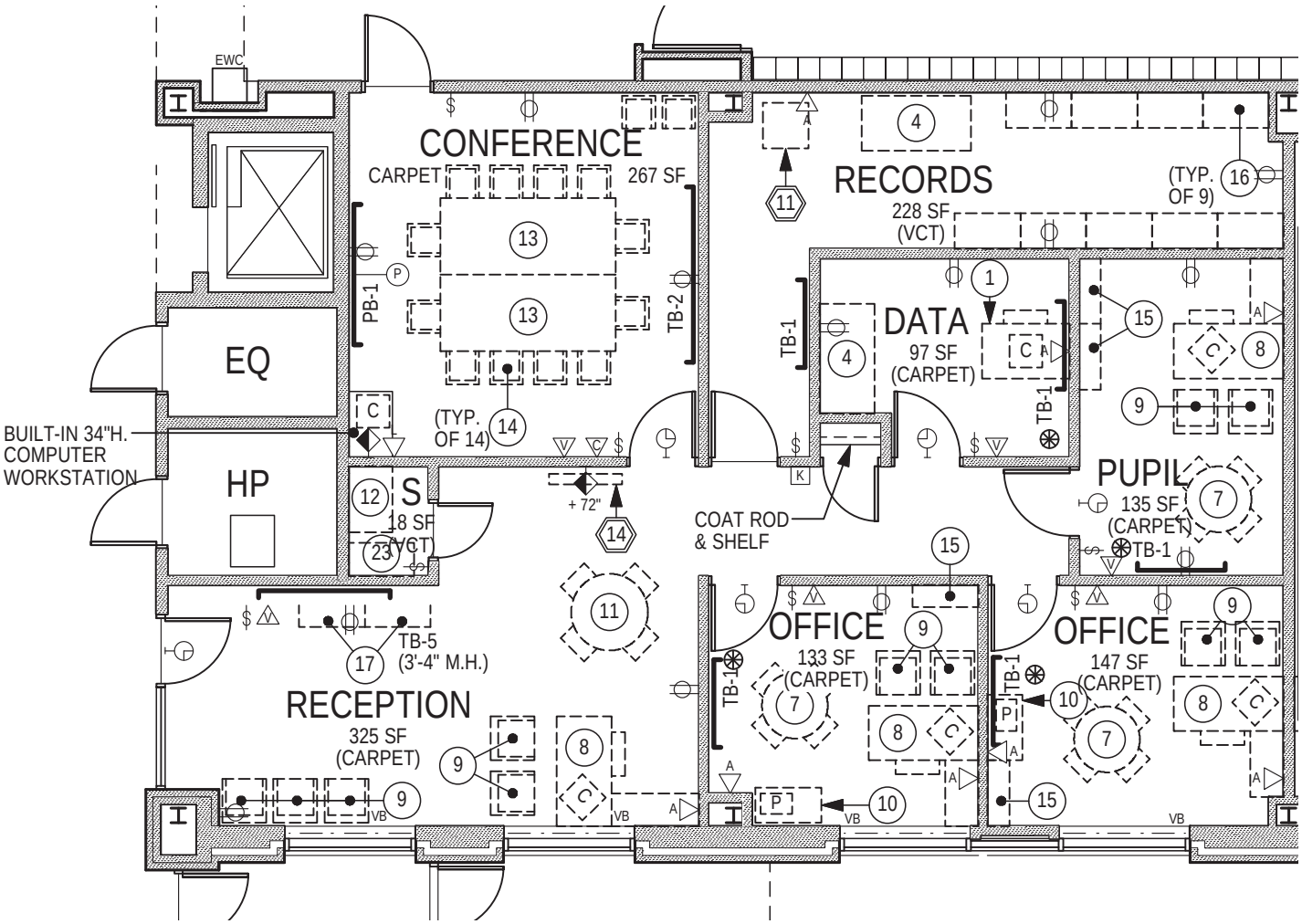

⊛ FURNISH THESE TACKBOARDS LOOSE FOR MOUNTING LOCATION AS DIRECTED BY PRINCIPAL (OWNER)

Guidance
Equipment Plan

Scale: 1/8" = 1'-0"

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Howard County Public School System

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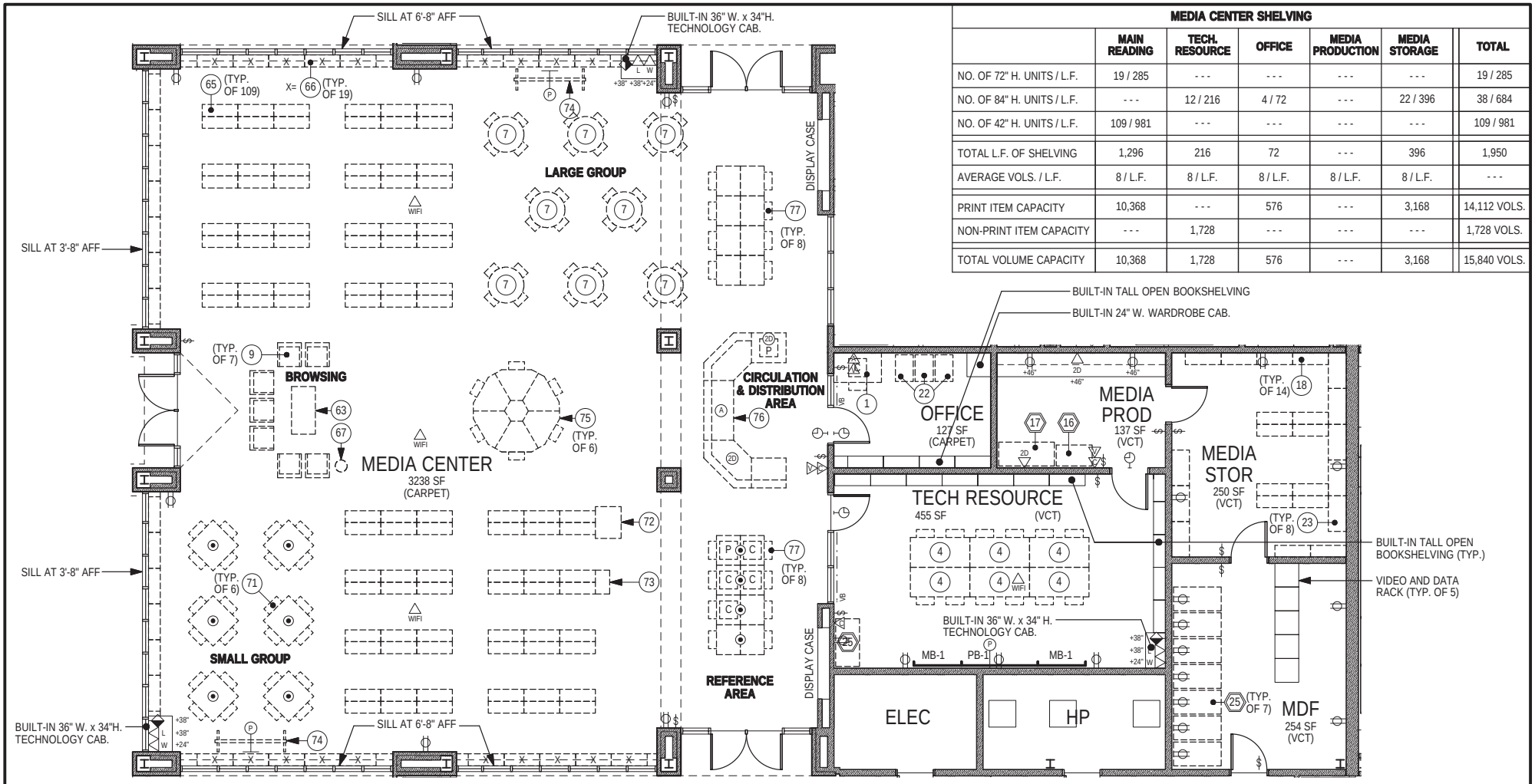

MEDIA CENTER SHELVING

	MAIN READING	TECH. RESOURCE	OFFICE	MEDIA PRODUCTION	MEDIA STORAGE	TOTAL
NO. OF 72" H. UNITS / L.F.	19 / 285	- - -	- - -	- - -	- - -	19 / 285
NO. OF 84" H. UNITS / L.F.	- - -	12 / 216	4 / 72	- - -	22 / 396	38 / 684
NO. OF 42" H. UNITS / L.F.	109 / 981	- - -	- - -	- - -	- - -	109 / 981
TOTAL L.F. OF SHELVING	1,296	216	72	- - -	396	1,950
AVERAGE VOLS. / L.F.	8 / L.F.	8 / L.F.	8 / L.F.	8 / L.F.	8 / L.F.	- - -
PRINT ITEM CAPACITY	10,368	- - -	576	- - -	3,168	14,112 VOLS.
NON-PRINT ITEM CAPACITY	- - -	1,728	- - -	- - -	- - -	1,728 VOLS.
TOTAL VOLUME CAPACITY	10,368	1,728	576	- - -	3,168	15,840 VOLS.

MEDIA CENTER NOTE:

MEDIA CENTER SEATING CAPACITY = **85 STUDENTS**

Media Center
Equipment Plan

Scale: 1/8" = 1'-0"

(New) Wilde Lake Middle School
Howard County Public School System

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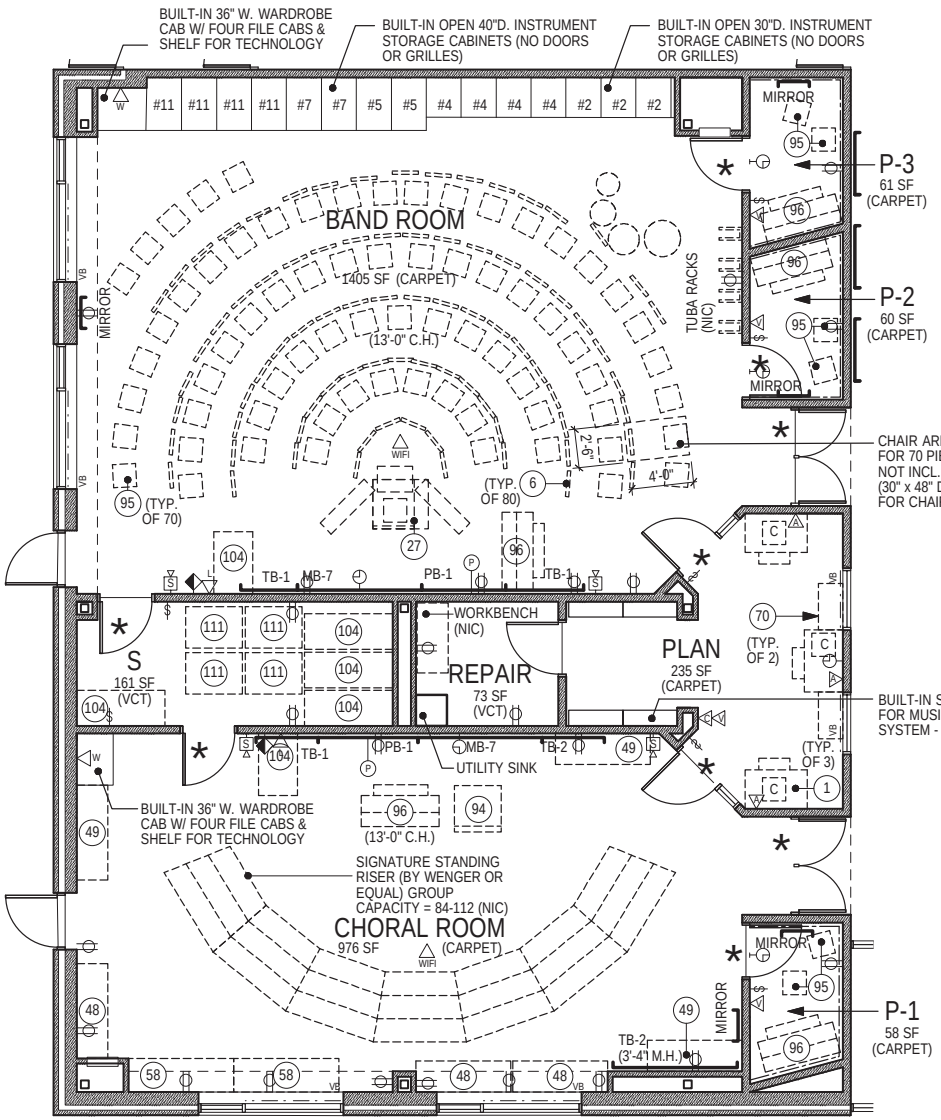
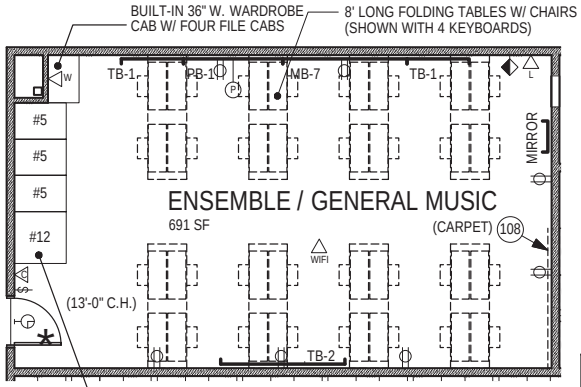
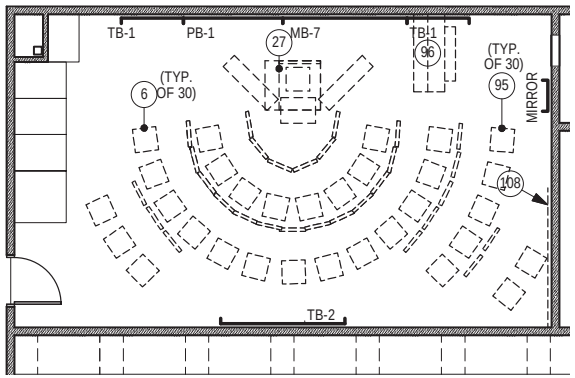




ALTERNATIVE LAYOUT FOR ENSEMBLE GENERAL MUSIC



MUSIC SUITE SOUNDPROOFING NOTES:

ACOUSTICAL NOTES FOR CHORAL, PRACTICE RMS, INSTRUMENTAL, ENSEMBLE RM:

PROVIDE ACOUSTICAL TREATMENT ON CEILING AND WALLS FOR APPROPRIATE ABSORPTION AND DIFFUSION WITH APPROPRIATE REVERBERATION TIME AND TO AVOID ANY FLUTTER ECHO.

PROVIDE ACOUSTICAL WALL PANELS AT WALLS WHERE INDICATED WITH A DASHED LINE - - - - - IN PRACTICE ROOMS.

WALLS TO EXTEND TO ROOF DECK

DOORS SHALL HAVE INSULATED DOUBLE GLAZING WITH SOUND SEALS WHERE INDICATED BY *

MECHANICAL NOTE FOR CHORAL, PRACTICE RMS, INSTRUMENTAL, ENSEMBLE RM:
DUCTWORK SHALL BE DESIGNED TO PREVENT SOUND TRANSMISSION.

MECHANICAL NOTE FOR STORAGE:
PROVIDE THERMOSTAT TO CONTROL TEMPERATURE FOR STRING INSTRUMENTS

ELECTRICAL NOTE FOR PRACTICE ROOMS:
NO SWITCHES, OUTLETS ETC. WILL BE LOCATED ON WALLS BETWEEN PRACTICE RMS. FOR ACOUSTICAL INSULATION.

Music Suite
Equipment Plan

Scale: 1/8" = 1'-0"

(New) Wilde Lake Middle School
Howard County Public School System

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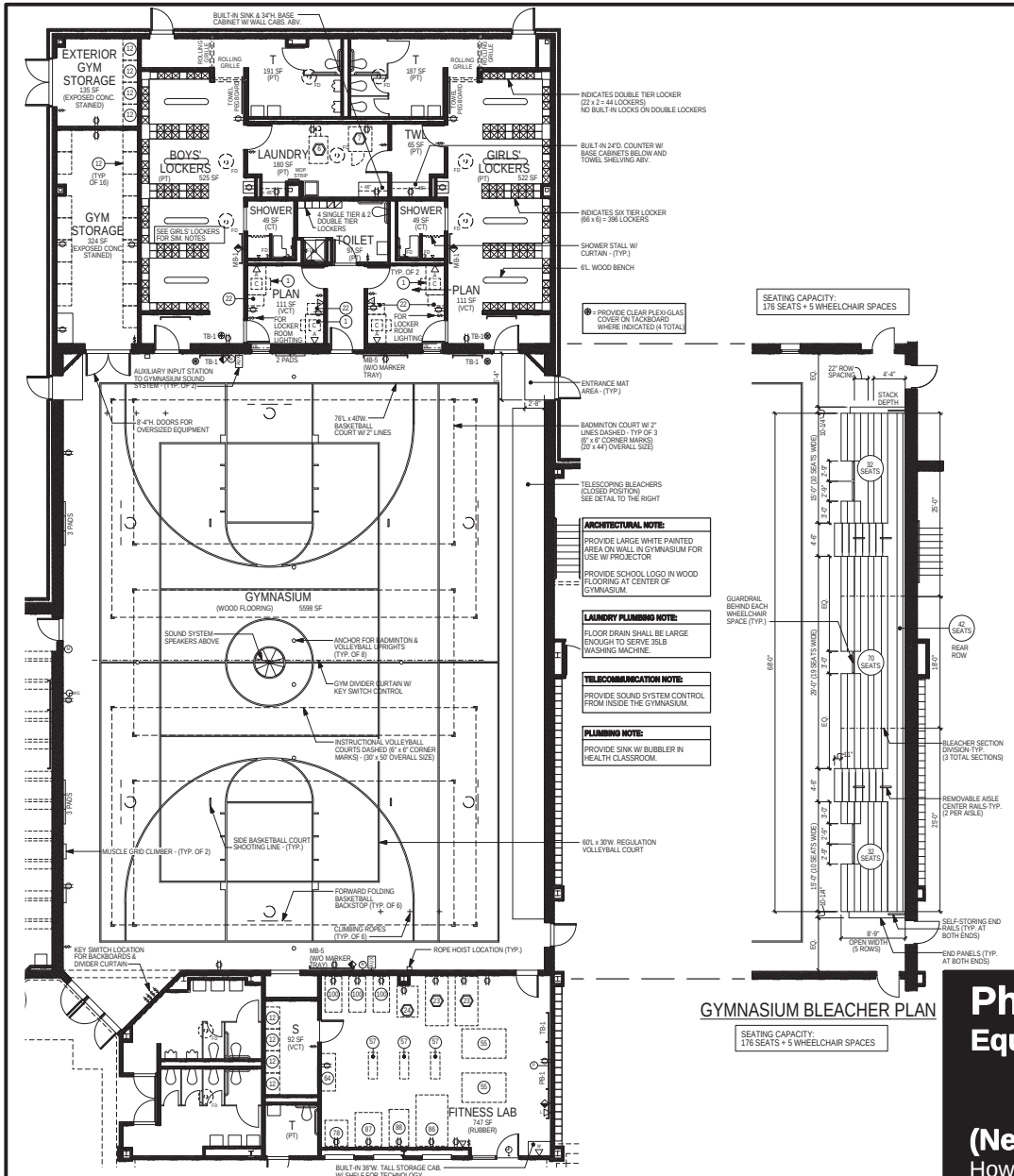
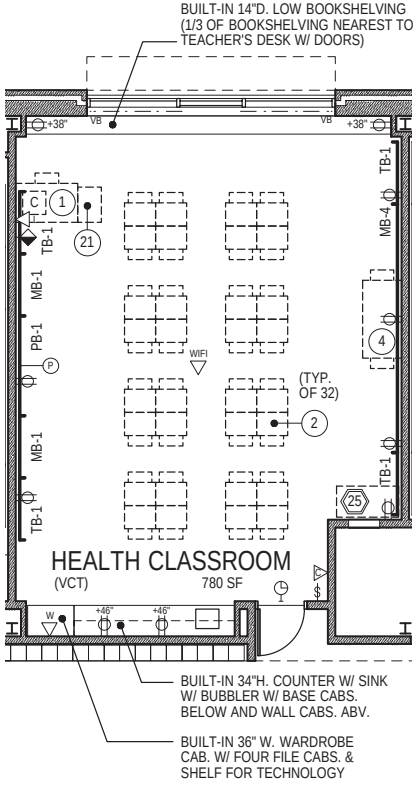


GYMNASIUM BLEACHER PLAN

SEATING CAPACITY:
176 SEATS + 5 WHEELCHAIR SPACES



HEALTH CLASSROOM
SCALE: 1/8" = 1'-0"

Physical Education
Equipment Plan

Scale: 1/16" = 1'-0"

(New) Wilde Lake Middle School
Howard County Public School System

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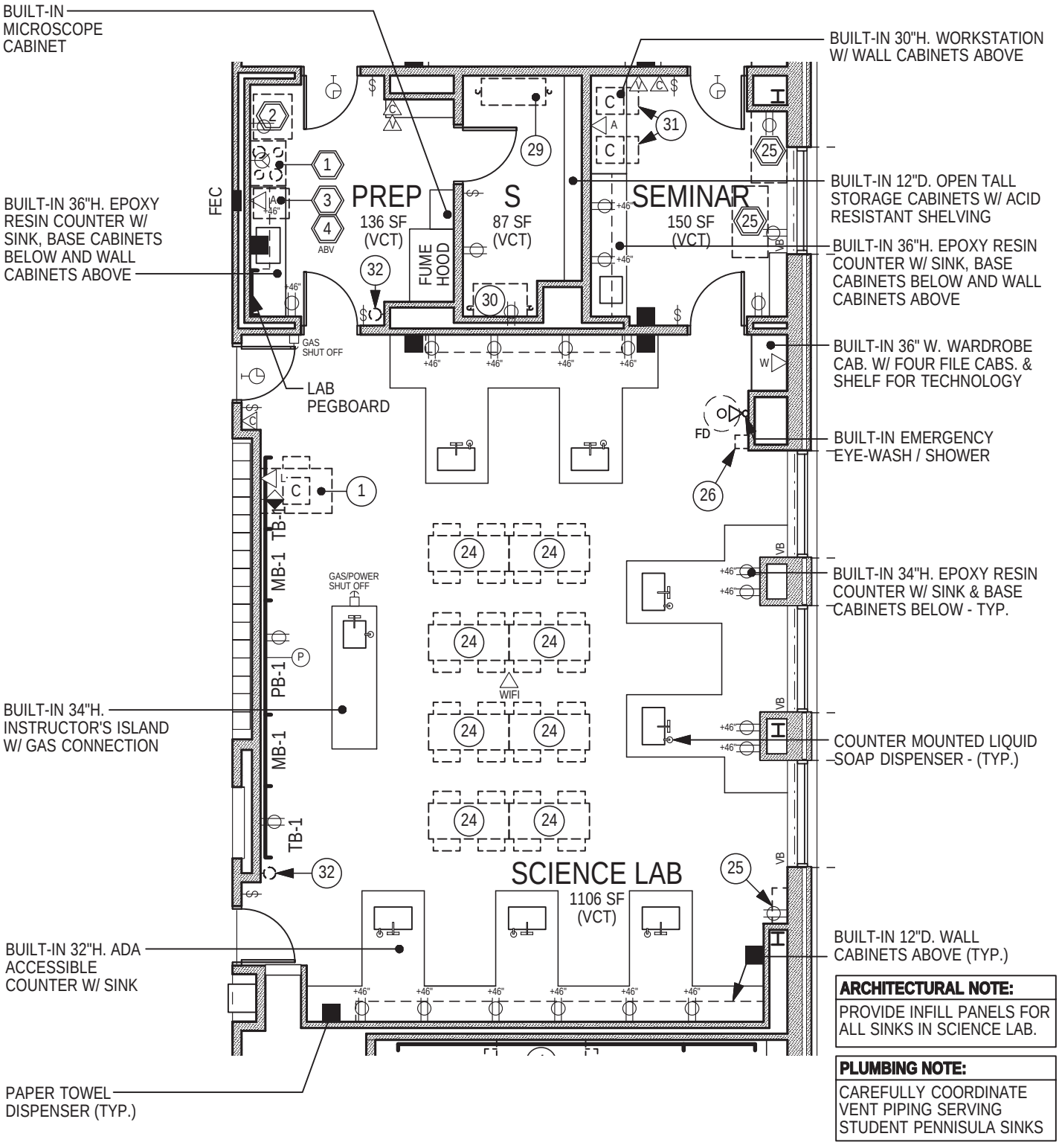

ARCHITECTURAL NOTE:

PROVIDE INFILL PANELS FOR ALL SINKS IN SCIENCE LAB.

PLUMBING NOTE:

CAREFULLY COORDINATE VENT PIPING SERVING STUDENT PENNISULA SINKS

Science
Equipment Plans

Scale: 1/8" = 1'-0"

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Howard County Public School System

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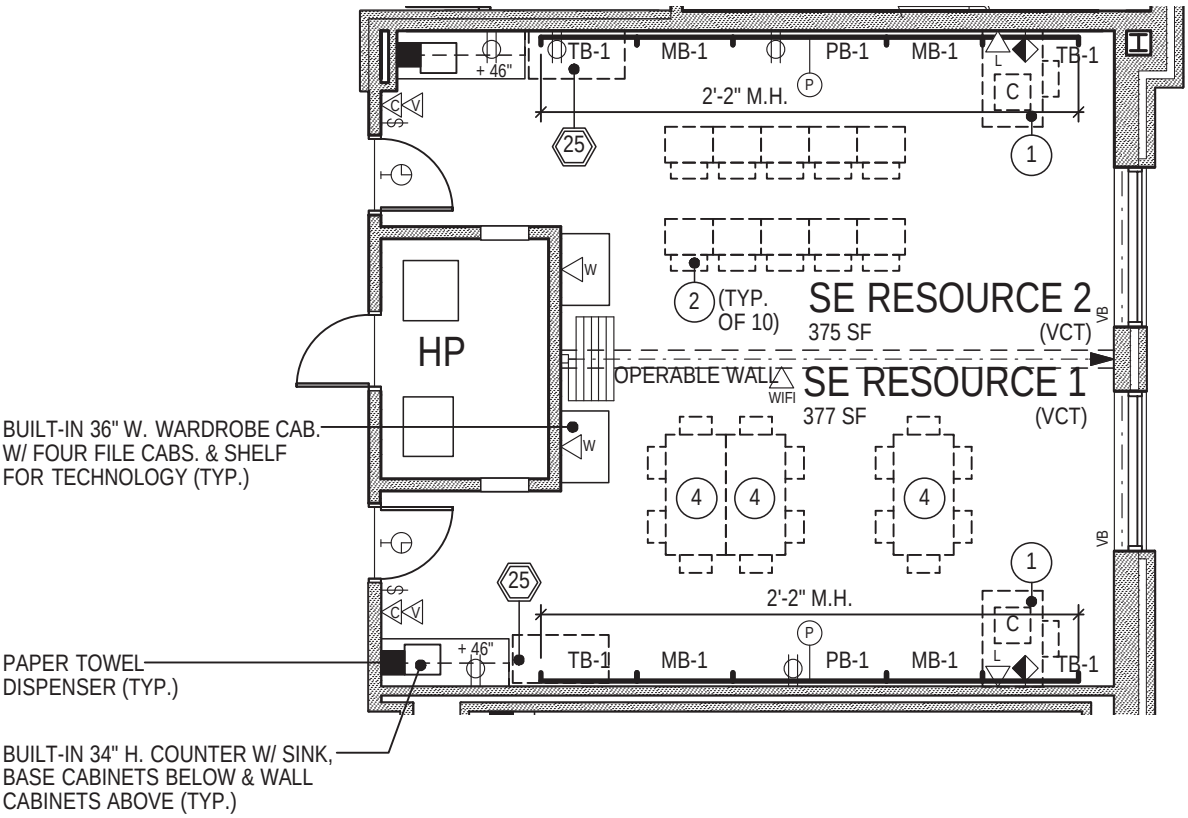

Special Education Resource
Equipment Plan

Scale: 1/8" = 1'-0"

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Howard County Public School System

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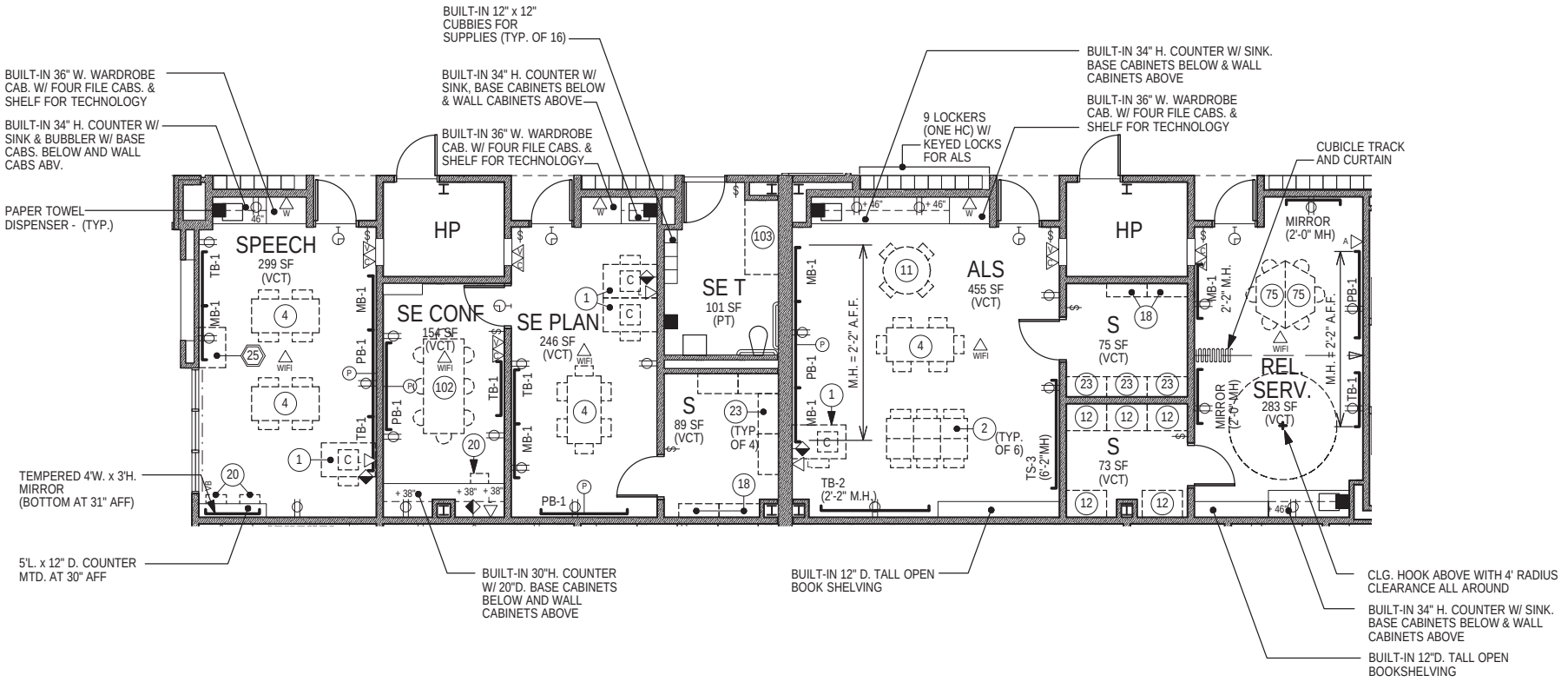

Special Education Support Spaces
Equipment Plan

Scale: 1/8" = 1'-0"

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Howard County Public School System

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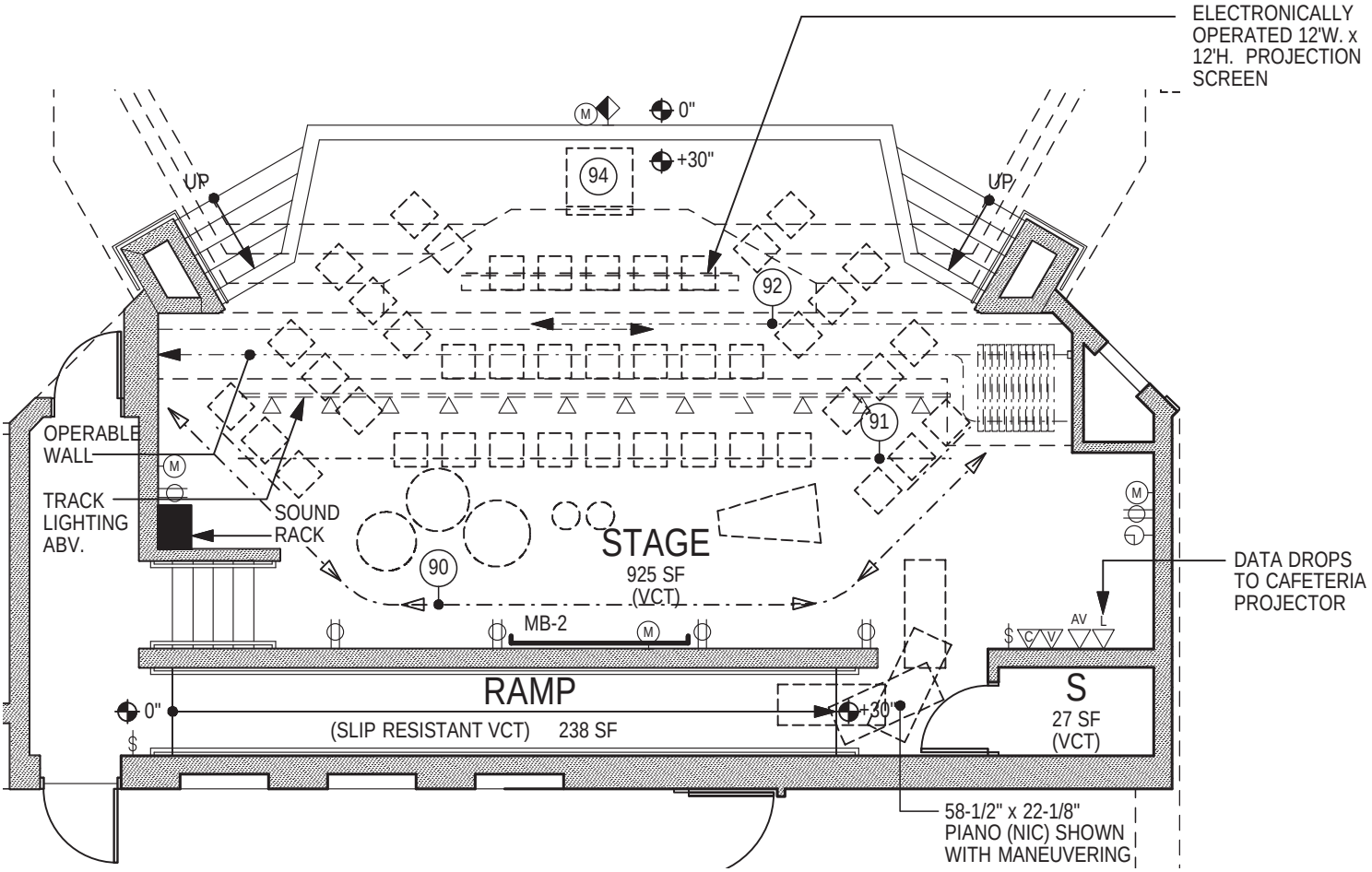

Stage
Equipment Plan

Scale: 1/8" = 1'-0"

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Howard County Public School System

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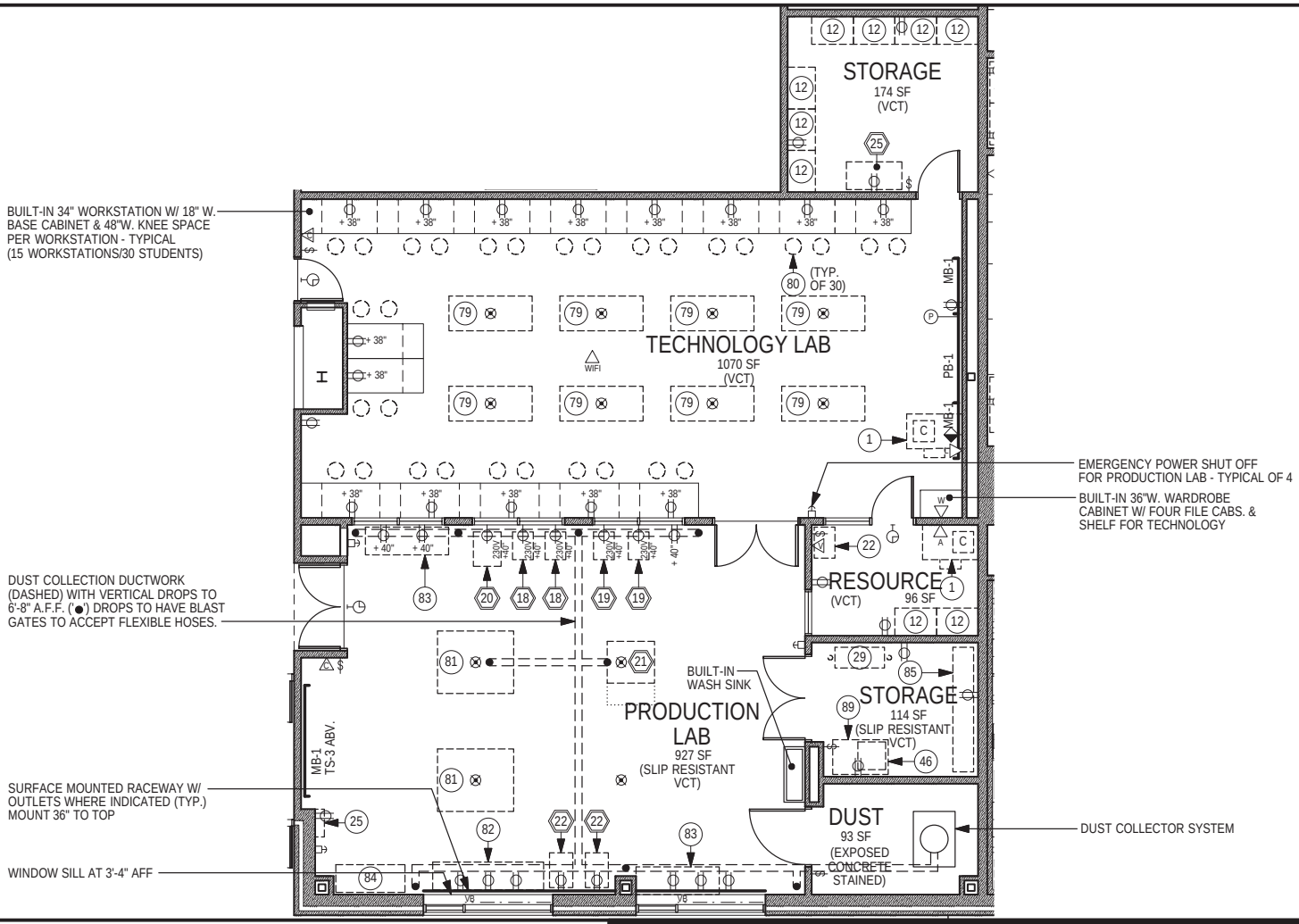

Technology Education
Equipment Plan

Scale: 1/8" = 1'-0"

(New) Wilde Lake Middle School
Howard County Public School System

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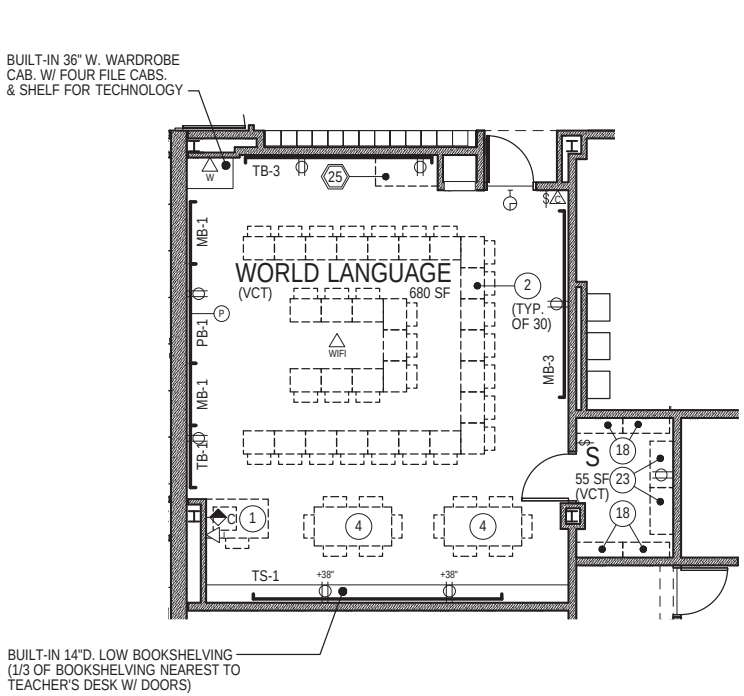

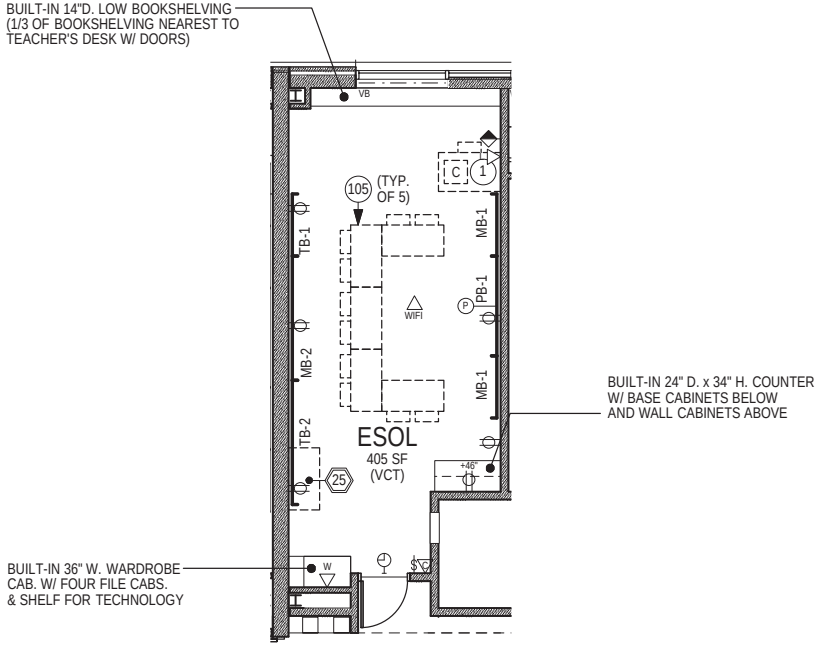

World Languages and ESOL
Equipment Plan

Scale: 1/8" = 1'-0"

(New) Wilde Lake Middle School
Howard County Public School System

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Architectural Design Narrative

The new Wilde Lake Middle School will be an adaptation of Howard County's current prototype middle school design and will be constructed on the existing Wilde Lake Middle School site. The prototype middle school plan is a two-story building design based on the "General Educational Specifications for New Howard County Middle Schools" and is designed to accommodate a population which includes 712 students in Grades 6 thru 8, plus 40 full-time equivalent special education students, for a total of 752 students.

The prototype design was reviewed and modified in 2012 for both changes in curriculum and the implementation of geothermal mechanical system before construction began on the latest prototype middle school scheduled to be occupied in August 2014.

Upon completion of the new Wilde Lake Middle School, the existing middle school building will be demolished and replaced with a new bus loop and car parking lot/parent drop-off area. This will allow bus and vehicular traffic to be separated providing pedestrian safety.

The new middle school features major support spaces including the administrative area, health suite, gymnasium, cafeteria and media center that are centrally located near the intersection of two major circulation spines running north-south and east-west. The north-south corridor connects on both ends to vertical circulation stairwells and elevator, effectively maximizing building circulation efficiency. New construction will allow for all the latest HCPSS technology specifications to be fully integrated into the design.

The prototype middle school floor plan lacks some educational programs found at the existing Wilde Lake Middle School, such as ALS, BSAP, AEPS, and ESOL. Therefore, design modifications will be made to the prototype design in order to incorporate these educational programs into the prototype building footprint.

It is the intent that the design and construction of this new middle school achieve a LEED 'Gold' designation making this facility yet another 'Green' school for the Howard County Public School System. The 2009 version of 'LEED for Schools' released by the USGBC will provide the necessary goals and requirements to obtain LEED Certification.

Project Facts

Total size of existing site	± 15 acres
On-site car parking provided with new site design	108 cars (existing = 68 cars)
On-site bus parking provided	15 busses (existing = 15 busses)
Building Square Footage	106,221 gsf (existing = 70,530 gsf)
Student Capacity (712 + 40 special education students)	752 students (existing = 506 students)

Net-Zero Energy School Design

The MEA will be providing grant money for the new Wilde Lake Middle School to offset the additional design and construction costs necessary to construct a net-zero energy school. Simply stated, a net-zero energy building is a building with greatly reduced energy needs through efficiency gains such that the balance of energy needs can be supplied with renewable technologies.

Given the project goal to construct a net-zero energy school, modifications to the prototype design will be necessary to significantly reduce energy consumption and to provide the balance of energy required for the school by way of solar PV panels on the school's roof and at grade as necessary.

For this reason, the following upgrades or revisions will likely be necessary to achieve significant energy use reductions:

1. Unitary geothermal design for each room of the building with outside air RTU's and recovery wheels. Energy Usage Index goal of 25 kBTU/sf. (Thomas Viaduct Middle School = 38.3 kBTU/sf).

2. Domestic hot water system will consist of four heat pump type water heaters distributed in four small loops throughout the school.

3. Redesign building lighting plan to minimize lighting power density (LPD) by way of careful LED light fixture selection and placement. LPD goal of 0.50 Watt/sf. (Thomas Viaduct Middle School = 0.76 Watt/sf).

4. Utilize exterior LED lighting for building and site.

5. Utilize occupancy sensors and photocell dimming in response to daylighting.

6. Maximize natural daylight opportunities in conjunction with photocell dimming.

7. R-30 roof design.

8. Goal for exterior walls should be a minimum of R-25 [effective] by way of increased wall insulation, double-glazed windows utilizing Solarban 70XL glazing with Sungate 600, and the use of thermally broken exterior doors and door frames.

9. Modify roof structure design for roof mounted PV panel loads. (estimated load is 10 lbs/sf).

10. Energy efficient food service design. Food service equipment would need to be the most energy efficient equipment available.

Sustainable 'Green' Design Goals

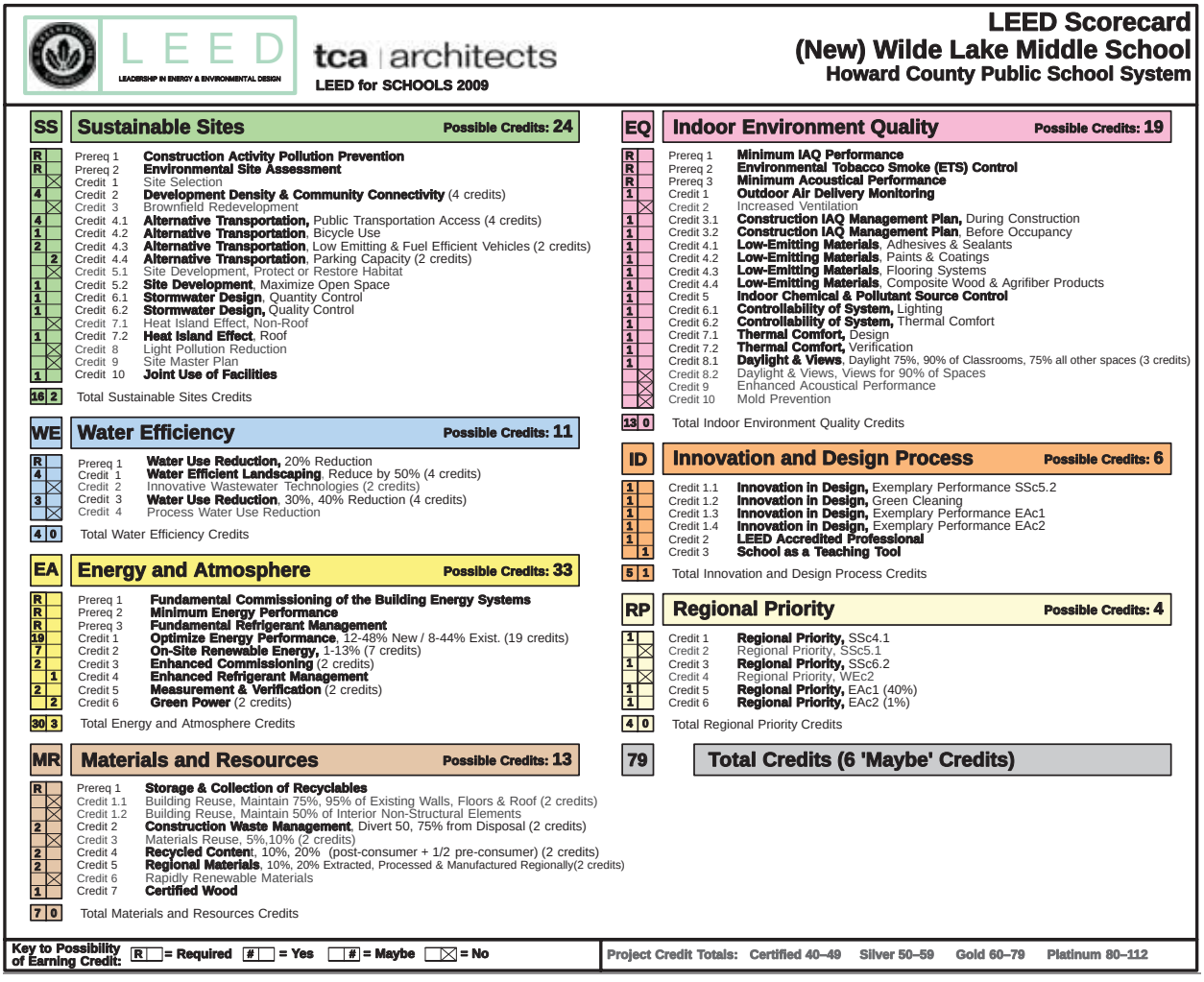
It is the intent that the design and construction of the new Wilde Lake Middle School achieve a LEED 'Gold' certification, making this facility a 'Green' school.

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, enhanced classroom acoustics, improved indoor air quality, thermal comfort, and opportunities to integrate green features into the school's curriculum.

In order to measure and compare how 'Green' a building is, the USGBC, founded in 1993, has developed industry standards with design and construction rating systems and guidelines for many different building types.

One such rating system is the USGBC 2009 Edition of "LEED for SCHOOLS" to which the design and construction of the new Wilde Lake Middle School will closely adhere. Final LEED certification levels are based on the number of credit points obtained in the "LEED for SCHOOLS" rating system. The four levels of certification from lowest to highest are: Certified, Silver, Gold, and Platinum.

We have included an 'in progress' LEED scorecard below which summarizes the credits 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 79 likely credits (with an additional '6 possible credits') allowing for the loss of some and still complying with the goal of a LEED 'Gold' Building with a remote chance of achieving a 'Platinum' level.



LEED
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

tca | architects
LEED for SCHOOLS 2009

LEED Scorecard
(New) Wilde Lake Middle School
Howard County Public School System

SS — Sustainable Sites — Possible Credits: 24

R		Prereq 1	**Construction Activity Pollution Prevention**
R		Prereq 2	**Environmental Site Assessment**
	☒	Credit 1	Site Selection
4		Credit 2	**Development Density & Community Connectivity** (4 credits)
	☒	Credit 3	Brownfield Redevelopment
4		Credit 4.1	**Alternative Transportation,** Public Transportation Access (4 credits)
1		Credit 4.2	**Alternative Transportation**, Bicycle Use
2		Credit 4.3	**Alternative Transportation**, Low Emitting & Fuel Efficient Vehicles (2 credits)
	2	Credit 4.4	**Alternative Transportation**, Parking Capacity (2 credits)
	☒	Credit 5.1	Site Development, Protect or Restore Habitat
1		Credit 5.2	**Site Development**, Maximize Open Space
1		Credit 6.1	**Stormwater Design**, Quantity Control
1		Credit 6.2	**Stormwater Design,** Quality Control
	☒	Credit 7.1	Heat Island Effect, Non-Roof
1		Credit 7.2	**Heat Island Effect**, Roof
	☒	Credit 8	Light Pollution Reduction
	☒	Credit 9	Site Master Plan
1		Credit 10	**Joint Use of Facilities**
16	2		Total Sustainable Sites Credits

WE — Water Efficiency — Possible Credits: 11

R		Prereq 1	**Water Use Reduction,** 20% Reduction
4		Credit 1	**Water Efficient Landscaping**, Reduce by 50% (4 credits)
	☒	Credit 2	Innovative Wastewater Technologies (2 credits)
3		Credit 3	**Water Use Reduction**, 30%, 40% Reduction (4 credits)
	☒	Credit 4	Process Water Use Reduction
4	0		Total Water Efficiency Credits

EA — Energy and Atmosphere — Possible Credits: 33

R		Prereq 1	**Fundamental Commissioning of the Building Energy Systems**
R		Prereq 2	**Minimum Energy Performance**
R		Prereq 3	**Fundamental Refrigerant Management**
19		Credit 1	**Optimize Energy Performance**, 12-48% New / 8-44% Exist. (19 credits)
7		Credit 2	**On-Site Renewable Energy,** 1-13% (7 credits)
2		Credit 3	**Enhanced Commissioning** (2 credits)
	1	Credit 4	**Enhanced Refrigerant Management**
2		Credit 5	**Measurement & Verification** (2 credits)
	2	Credit 6	**Green Power** (2 credits)
30	3		Total Energy and Atmosphere Credits

MR — Materials and Resources — Possible Credits: 13

R		Prereq 1	**Storage & Collection of Recyclables**
	☒	Credit 1.1	Building Reuse, Maintain 75%, 95% of Existing Walls, Floors & Roof (2 credits)
	☒	Credit 1.2	Building Reuse, Maintain 50% of Interior Non-Structural Elements
2		Credit 2	**Construction Waste Management**, Divert 50, 75% from Disposal (2 credits)
	☒	Credit 3	Materials Reuse, 5%,10% (2 credits)
2		Credit 4	**Recycled Content**, 10%, 20% (post-consumer + 1/2 pre-consumer) (2 credits)
2		Credit 5	**Regional Materials**, 10%, 20% Extracted, Processed & Manufactured Regionally(2 credits)
	☒	Credit 6	Rapidly Renewable Materials
1		Credit 7	**Certified Wood**
7	0		Total Materials and Resources Credits

EQ — Indoor Environment Quality — Possible Credits: 19

R		Prereq 1	**Minimum IAQ Performance**
R		Prereq 2	**Environmental Tobacco Smoke (ETS) Control**
R		Prereq 3	**Minimum Acoustical Performance**
1		Credit 1	**Outdoor Air Delivery Monitoring**
	☒	Credit 2	Increased Ventilation
1		Credit 3.1	**Construction IAQ Management Plan,** During Construction
1		Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy
1		Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants
1		Credit 4.2	**Low-Emitting Materials**, Paints & Coatings
1		Credit 4.3	**Low-Emitting Materials**, Flooring Systems
1		Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products
1		Credit 5	**Indoor Chemical & Pollutant Source Control**
1		Credit 6.1	**Controllability of System,** Lighting
1		Credit 6.2	**Controllability of System,** Thermal Comfort
1		Credit 7.1	**Thermal Comfort,** Design
1		Credit 7.2	**Thermal Comfort,** Verification
1		Credit 8.1	**Daylight & Views**, Daylight 75%, 90% of Classrooms, 75% all other spaces (3 credits)
	☒	Credit 8.2	Daylight & Views, Views for 90% of Spaces
	☒	Credit 9	Enhanced Acoustical Performance
	☒	Credit 10	Mold Prevention
13	0		Total Indoor Environment Quality Credits

ID — Innovation and Design Process — Possible Credits: 6

1		Credit 1.1	**Innovation in Design,** Exemplary Performance SSc5.2
1		Credit 1.2	**Innovation in Design,** Green Cleaning
1		Credit 1.3	**Innovation in Design,** Exemplary Performance EAc1
1		Credit 1.4	**Innovation in Design,** Exemplary Performance EAc2
1		Credit 2	**LEED Accredited Professional**
	1	Credit 3	**School as a Teaching Tool**
5	1		Total Innovation and Design Process Credits

RP — Regional Priority — Possible Credits: 4

1		Credit 1	**Regional Priority,** SSc4.1
	☒	Credit 2	Regional Priority, SSc5.1
1		Credit 3	**Regional Priority,** SSc6.2
	☒	Credit 4	Regional Priority, WEc2
1		Credit 5	**Regional Priority,** EAc1 (40%)
1		Credit 6	**Regional Priority,** EAc2 (1%)
4	0		Total Regional Priority Credits

79	**Total Credits (6 'Maybe' Credits)**

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

Project Credit Totals: Certified 40–49 Silver 50–59 Gold 60–79 Platinum 80–112

Building Materials

Roofing

'Low-sloped' roofing systems will consist of four-ply asphalt and fiberglass felt built-up roofing membranes with a bright white capsheet over three layers of mechanically attached, flat, rigid roofing insulation on sloped steel roof decks. (It is thought that a PVC roof system will not be robust enough for the traffic associated with the installation of the rooftop solar PV system and subsequent repairs and/or modifications.)

'Steep-sloped' roof system over the main lobby stair will consist of standing seam metal roofing over rigid insulation on sloped steel roof deck.

Roof drains fabricated entirely of cast iron (including domes/strainers) will be used as the primary storm drainage system on 'low-sloped' roofing. Overflow roof drains will be used as the secondary back-up system. A prefinished aluminum gutter with downspout will collect storm water from the 'steep-sloped' metal roof area and outlet the water onto the 'low-sloped' roofing across a splash block.

Prefinished aluminum sheet metal will be specified for use at all gravel stops, wall copings, and other roof flashing locations where aesthetics are a concern. Sheet metal will be specified for flashings at all roof drains and vent pipes. All other roof 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.

Windows

South facing windows will be 6" deep thermally broken 'storefront-type' windows with dual pane Low-E insulated glass and exterior sunshades.
East and west facing windows will be 6" deep thermally broken 'storefront-type' windows with tinted dual pane Low-E insulated glass and exterior sunshades.
North facing windows will be 6" deep thermally broken 'storefront-type' windows with dual pane clear insulated glass.
In general, one operable sash per room will be provided with all other lites being fixed pane.

Doors

Interior doors will be hollow metal with embossed wood grain textured pattern and provided with vision panels where required. All interior door frames will be 16 or 14 gauge hollow metal.
Exterior doors in 4" deep thermally broken storefront will be aluminum doors with insulated glass.
Exterior doors in thermally broken hollow metal frames will be insulated hollow metal doors and provided with insulated glass vision panels where required.
All doors will be provided with handicapped accessible hardware and kick plates. Double doors will be provided with removable center mullions. All classroom doors will be lockable inside and out.

Finishes

Floors and Wall Base

- Epoxy terrazzo finish with vinyl base will be provided on cafeteria and corridor floors.
- Maple wood flooring with vented rubber base will be provided on gymnasium floor.
- Carpet with vinyl base will be provided in administrative and guidance suites, media center, and all music rooms.
- Entrance carpet tile with vinyl base will be provided in all vestibules.
- Quarry tile flooring and base will be provided in the kitchen and associated spaces.
- Slip retardant vinyl flooring with vinyl base will be provided on the stage ramp.
- Stained concrete floors will be provided in mechanical and electrical spaces.
- Precast terrazzo treads with stainless steel grated risers will be provided on main lobby stair.
- All other stairs will have porcelain tile treads and risers.
- All toilet rooms will have porcelain tile floors and base.
- All other spaces will be provided with VCT flooring and vinyl base.

Walls

- All interior walls will be painted concrete masonry units (CMU) except where indicated below.
- Walls in administrative and guidance suites will have painted gypsum drywall finish.
- Single-user toilet rooms will have full height glazed porcelain tile on plumbing fixture walls.
- Multi-user toilet rooms will have full height glazed porcelain tile on all walls.

Painting

- All painting and coating materials, both interior and exterior, will be free of lead and mercury. Materials will have low or no emissions of Volatile Organic Compounds (V.O.C.) and will meet or exceed State and local regulations.

Ceilings

- All multi-user toilet rooms shall have gypsum drywall ceilings.
- All single-user toilet rooms shall have acoustic tile ceilings.
- Low frequency absorbing acoustic tiles and reflective acoustic tiles will be utilized in music rooms.
- Fiberglass panels with an acrylic finish will be provided in all moisture-laden environments such as the kitchen.
- All other ceilings will be standard 2x4 or 2x2 grid with 5/8” sag-resistant acoustical tile or exposed structure which will be painted.

Life Safety & Building Codes

The design of the project shall comply with all applicable statutes, codes, and regulations which are or will be in place at the time the construction documents are reviewed by the Howard County Department of Inspections, Licenses, and Permits. Such statutes, codes, and regulations include, but are not limited to, the International Building Code (IBC) series, NFPA Life Safety Codes, stormwater management and sediment control statutes and regulations, ADAAG, and MSDE technical bulletins. No asbestos or lead containing materials will be specified or used and, its absence in the design, will be certified to the Owner. The entire proposed project shall be accessible to all individuals with disabilities including sight, hearing, and mobility impairment.

Civil Engineering Narrative

ZONING NT (New Town)

DRIVES, WALKS AND PARKING

Access drive to school, which is currently a one-way road, will no longer serve as a drop-off lane for cars and busses. The existing perpendicular parking spaces on the access drive will be removed. The access drive will be re-striped to serve two-way traffic, thus allowing cars to enter and exit the site at both ends of the road. In addition, the new bus loop which will be separate from the new parking lot.

New walkways will be provided to connect all the new site elements with each other and the residential community to the west of the site.

Parking will be provided in a new parking lot, along the service drive and within the bus loop for a total of 110 car parking spaces on site.

UTILITIES

Water - An existing 6" service serves the site. A second service will be extended to the site (at the request of Howard County Planning and Zoning) to create a looped water service.

Sanitary Sewer - Existing and new sanitary lines will serve the new school facility.

Storm Drain - Existing stormwater leaves the site at the southeast corner of the property towards the wooded area and will remain in place to accommodate excess overflow from the new bioretention areas.

Stormwater Management - New bioretention areas will need to be constructed to accommodate the treatment of the water for the new school and new impervious paving.

Gas - Existing gas service will enter the new school at mechanical room near service drive.

ADDITIONAL INFORMATION

Landscape Plan - Proposed planting will consist only of what is necessary to vegetatively stabilize the disturbed areas of the site. Plantings will be necessary for the stormwater management facility in order to meet requirements of the 2000 Maryland Stormwater Design Manual and the 2007 update. Taking this into consideration, additional landscape material proposed for the school site as part of the new building will be kept to a minimum in order to accommodate the school's desire to minimize maintenance.

Grading Permit - Since there will be more than 5,000 square feet of disturbance, a grading permit will be required.

Wetlands/Waterways - An environmental survey has not been performed at this time, but no existing wetlands are known to be on the site.

Forest Conservation - This requirement is not applicable within Columbia.

Columbia Association - A new middle school will require an environmental concept plan showing proposed stormwater management devised for the impervious areas. Upon county approval of the environmental concept plan, a site development plan will be required for county processing. The total process is approximately one year from original submission of the environmental concept plan. The non-credited open space area will be increased from the recorded area in the final development plan documents due to the new site plan, which results in re-recording and amending the final development plan criteria documents. Amending the final development plan criteria will require a meeting with the Howard Hughes Corporation at an early stage in the process. This final development plan process will take approximately one year to complete.

Structural System Narrative

Structural steel framing will be used except for the gymnasium, cafeteria, and adjacent areas which will be masonry wall bearing. Foundation will consist of conventional spread footings. First floor will be reinforced concrete slab on grade. Second floor will be composite steel framing with decking and concrete fill. Exterior walls will consist of brick faced insulated masonry cavity wall construction for one story walls and the first floor of the two story wing. Second floor exterior walls will consist of insulated metal panels fastened to metal furring on concrete block walls. Roof system will consist of steel deck on open web steel joists.

Food Service Design Narrative

The food service facility for the new Wilde lake Middle School will included enhancements to significantly reduce energy consumption by providing the following equipment, options, and features:

- Reach-in refrigerators and freezers will utilize the new R-290 refrigerant (propane) which will reduce energy consumption by 20 percent vs. a traditional energy-star rated refrigerator and freezer.
- Walk-in cooler and freezer walls, floors, and ceiling will have an R-value of 32. There will be a single point of entry into the cooler and freezer maximizing energy efficiency.
- Refrigeration systems for walk-in cooler and freezer utilize “reverse cycle defrost with hot gas” with smart controller reducing energy consumption by 20 percent - 30 percent. The condensing units will be water-cooled scroll compressors tied into the building geothermal water loop system.
- The conveyor dishmachine will have extremely low water usage per rack and utilize a waste heat recovery system that reclaims heat generated by the machine to pre-heat incoming water thereby reducing energy consumption.
- Energy-Star rated electric cooking equipment will be utilized since electric is 100 percent efficient compared to 80 percent with gas.
- The exhaust hood will be a type II hood rated at 109 CFM/FT. The exhaust hood will be reduced to 15’-0” x 109 CFM/ft = 1,635 CFM/ft of exhaust.
- L.E.D. lighting will be provided in the kitchen, walk-in cooler and freezer and reach-in refrigerators and freezers.
- Boiler-less convection steamers will be utilized vs. traditional boiler-base units.

Mechanical Systems Narrative

Design Criteria

Applicable Codes and Standards

- 2012 International Building Code (IBC)
- 2012 International Mechanical Code (IMC)
- 2012 International Energy Conservation Code (IECC)
- 2012 International Fire Code (IFC)
- 2012 National Standard Plumbing Code
- 2012 National Fuel Gas Code
- ASHRAE Standard 55-2007 - Thermal Environmental Conditions for Human Occupancy
- ASHRAE Standard 62.1-2007 - Ventilation for Acceptable Indoor Air Quality
- ASHRAE Standard 90.1-2010 - 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 percent 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 (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 62.1-2007
- Ceiling Supply Air Systems: 1.0 Ez (Zone Air Distribution Effectiveness)

Filtration Criteria:

- Pre-filters: 30 percent efficient (including all heat pump unit systems)
- Final filters: 85 percent efficient (for compliance with LEED IEQc5)

Life Cycle Cost Analysis

A 20-year life-cycle cost analysis was conducted during the design development phase to confirm the final mechanical system selection for the facility. The following mechanical system options were considered as part of this analysis:

- Ground-coupled geothermal heat pump unit system, consisting of vertical extended range type heat pump units for space conditioning and dedicated outdoor air systems with energy recovery for ventilation.
- Vertical four-pipe fan coil units for space conditioning and dedicated outdoor air systems with energy recovery for ventilation. The four-pipe distribution system will be served by gas-fired boilers and an air-cooled chiller.
- Four-pipe rooftop VAV air-handling units with single-duct VAV terminal units for both space conditioning and ventilation. The four-pipe distribution system will be served by gas-fired boilers and an air-cooled chiller.
- Water-source geothermal heat pump unit system, consisting of vertical heat pump units for space conditioning and dedicated outdoor air systems with energy recovery for ventilation. A forced-draft cooling tower and condensing boilers will support the building heat pump unit loop.

The results of this analysis indicated that the ground-coupled geothermal heat pump unit system, consisting of vertical extended range type heat pump units for space conditioning and dedicated outdoor air systems with energy recovery for ventilation, provided the lowest overall cost of ownership. All mechanical system components will be designed in strict accordance with all applicable codes, regulations, and the design standards described previously.

Mechanical Systems

Heating and Cooling System

A ground-coupled geothermal heat pump unit system is provided for Wilde Lake Middle School. 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.

A ground-coupled geothermal borehole field is positioned below the adjacent athletic fields. Geothermal boreholes will be approximately 400 to 500 feet in depth, depending on the thermal properties and ground temperature associated with the project site. Vertical geothermal borehole loop piping is encased in a thermally enhanced grout, promoting good heat transfer between the loop piping and earth. Circuit mains from geothermal boreholes are routed to the first floor geothermal mechanical room, positioned near the western perimeter wall of the building.

A series of base-mounted pumps circulate water between the building and geothermal borehole field. Geothermal pumping systems are provided with redundancy such that the operation of the building can be maintained in the event of a single pump failure. In addition, these pumping systems are equipped with variable frequency drives for reduced energy consumption during periods of reduced system demand. Major mechanical infrastructure components, including distribution pumps, incoming geothermal piping, associated headers, an air separator, and expansion tank are located within the first floor geothermal mechanical room.

Chilled water and heating water for dedicated outdoor air systems is generated by a modular water-to-water heat pump unit. A series of inline pumps distribute either chilled water or heating water between this heat pump unit and dedicated outdoor air system coils. Pumping systems are provided with redundancy such that the operation of the building can be maintained in the event of a single pump failure. Major mechanical infrastructure components, including distribution pumps, the water-to-water heat pump unit, an air separator, expansion tank, and buffer tank are located within the second floor mechanical room area.

HVAC Systems

- Classroom Areas (Including General, Science, Tech Ed, Family and Consumer Sciences, and Music Classroom Areas)

  Extended range vertical heat pump units are utilized for space conditioning within classroom areas and located within support closets positioned near the area served. Doors for support closets are accessed from the corridor for routine maintenance. Heat pump units for classroom areas are equipped with two-stage type compressors, helping to extend compressor life and improve the overall energy efficiency of these systems under part load operation.

  Conditioned outdoor air is supplied to classroom areas through a series of indoor modular air-handling unit type dedicated outdoor air systems, complete with chilled/heating coils and enthalpy wheel energy recovery devices for pre-conditioning of outdoor air. A total of three dedicated outdoor air systems are provided for meeting the overall building's ventilation requirements, with all three units located within the second floor mechanical room area. The supply and exhaust air connections between all three units are connected through a pair of common header ducts, allowing all three units to function as one central ventilation system. Each dedicated outdoor air unit is provided with two direct-drive type supply and exhaust fans, along with isolation dampers at the inlet of each fan. Supply and exhaust air fans are equipped with variable frequency drives and provided with static pressure control, reducing fan energy during periods of reduced ventilation demand.

Airflow supplied from the central dedicated outdoor air system is dehumidified, conditioned, and delivered to a series of variable air volume (VAV) retrofit-type air terminal units, installed within the ductwork systems. Each classroom is provided with a dedicated VAV air terminal unit, regulating the quantity of outdoor air delivered to each space based on the actual room carbon dioxide levels. A design conditioned air supply temperature ranging between 60 and 65 degrees F is anticipated, with a maximum supply air dewpoint temperature of 60 degrees F anticipated. Classroom heat pump units will provide additional space cooling and dehumification to meet each rooms design indoor temperature and humidity conditions. 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.

- Administration and Administrative Support Areas

  The administration and administrative support areas (including the guidance and health suite areas) are provided with space conditioning through a variable refrigerant flow (VRF) system. This system is complete with heat recovery type water-cooled compressors connected to the geothermal heat pump loop. The use of ceiling cassette type VRF units is anticipated, promoting good access for filter replacement.

  Conditioned outdoor air is supplied to the administration and administrative support areas by the central ventilation system described previously for the classroom areas. A single VAV retrofit-type air terminal unit is anticipated for maintaining a constant ventilation airflow rate within these areas. Exhaust airflow from the health suite area will be routed to a stand-alone rooftop exhaust fan and independent of the dedicated outdoor air systems.

- Media Center

  A single-zone indoor heat pump unit will support the space conditioning requirements for the media center area. This heat pump unit is located within the second floor mechanical room and provided with two-stage water-cooled compressors connected to the geothermal piping system. The heat pump unit supply air fan is equipped with a variable frequency drive for reducing airflow quantities during periods of reduced cooling demand. The media center support areas are provided with space conditioning from a series of vertical extended range type heat pump units, located within support closets positioned near the areas served. Conditioned outdoor air is supplied to the media center and associated media center support areas by the central ventilation system described previously for the classroom areas. A room carbon dioxide sensor will reduce minimum outdoor air quantities during periods of reduced space occupancy.

- Cafeteria

  A single-zone indoor heat pump unit will support the space conditioning requirements for the cafeteria and stage areas. This heat pump unit is located within the second floor mechanical room and provided with a variable-speed water-cooled compressor connected to the geothermal piping system. The heat pump unit supply air fan is equipped with a variable frequency drive for reducing airflow quantities during periods of reduced cooling demand. Conditioned outdoor air is supplied to the cafeteria and stage areas by the central ventilation system described previously for the classroom areas. 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 air make-up.

- Kitchen

  Space conditioning for the kitchen area is accomplished primarily through transfer airflow from the adjacent serving line and cafeteria areas. The use of a type II kitchen hood is anticipated, reducing the hood's exhaust airflow requirements and overall energy usage of the kitchen area. In addition, the use of variable-speed water-cooled condensing units for walk-in coolers and freezers are anticipated. Condensing units will be connected to the geothermal piping loop for improved energy efficiency. The mechanical systems supporting the kitchen hood are subject to the final kitchen equipment design provided for the facility. Refer to the kitchen design portions of this narrative for additional information on these systems.

- Gymnasium

  A single-zone indoor heat pump unit will support the space conditioning requirements for the gymnasium area. This heat pump unit is located within the second floor mechanical room and provided with a variable-speed water-cooled compressor connected to the geothermal piping system. The heat pump unit supply air fan is equipped with a variable frequency drive for reducing airflow quantities during periods of reduced cooling demand. Since the existing Wilde Lake Middle School gymnasium is provided with both heating and air-conditioning, both heating and cooling is provided for the new facility. Conditioned outdoor air is supplied to the gymnasium area by the central ventilation system described previously for the classroom areas. 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 locker room areas for exhaust air make-up.

- Locker Rooms

  Space conditioning for the locker room areas is accomplished primarily through transfer airflow from the adjacent gymnasium area. Localized heat pump units are provided for additional heating, as well as heating and cooling within the locker room office areas. Exhaust airflow from the locker room areas is ducted to the second floor mechanical room and routed through the dedicated outdoor air unit's enthalpy wheels for pre-conditioning of outdoor air.

- Stairwell Areas

  Space conditioning for the stairwell areas is accomplished through a series of heating-only console-type heat pump units.

Building Automation Control Systems

A building automation system, consisting of direct digital control (DDC) components, is provided for the facility. Damper and valve components are provided with electric or electronic actuation. Direct digital control components are utilized for all heat pump units and dedicated outdoor air systems. Manufacturers packaged controls are only utilized for compressor operation, including manufacturer's safety functions. Direct digital control interface with the room occupancy sensor provided for lighting control is anticipated, allowing "occupancy based" space temperature reset and room ventilation control throughout each zones occupied mode of operation.

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 are designed to meet the HCPSS automation standards and naming conventions.

Plumbing Systems Narrative

Storm Water Piping Systems

Storm water drainage, including roof drains, overflow drains, and storm water piping systems are provided for the school. Above and below-grade piping will be constructed from cast-iron, with no-hub piping connections provided only for above-grade piping components. All storm water piping systems will exit the building at various locations, in accordance with the storm water management plan developed for the facility.

Sanitary and Vent Piping Systems

Sanitary waste and vent piping systems are provided for support of plumbing fixtures within the school. Similar to the storm water piping, above and below-grade sanitary and vent piping are 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 will be coordinated with available site connections provided for the building.
The following special sanitary and vent piping systems are anticipated:

- Equipment and sinks that may discharge grease into the sanitary system from the kitchen are piped to an underground concrete grease interceptor located adjacent to the kitchen area. The discharge from this interceptor is connected to site sanitary piping system.

- Acid-resistant piping systems are provided for sanitary and vent piping serving science classrooms and laboratory areas. A below-grade acid neutralizer tank is provided for neutralizing sanitary waste from science areas, prior to connecting to the site sanitary piping system.

- Sinks within the art classrooms are 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 enters the building within the eastern mechanical room area, located adjacent to the kitchen area. This service is capable of supporting both the fire and water service demands of the new facility. A new domestic water service, complete with basket strainer and dual reduced pressure zone backflow preventers, separate the domestic water and fire services prior to distributing water throughout the facility. Domestic water piping is distributed from this mechanical room area to plumbing fixtures and equipment located throughout the school.

Domestic hot water can represent a significant energy source for any facility. Energy usage associated with domestic hot water is comprised of three distinct components, which include production, storage, and distribution. All three factors must be considered when evaluating the overall energy usage of this system.

To minimize the hot water energy consumption of the facility, a series of heat pump type water heaters are provided. These water heaters have an extremely high level of production energy efficiency. A total of four independent water heaters are anticipated, with the capacity and storage of each water heater to be sized to support the connected fixtures. Water heaters will be located within close proximity of the fixtures served, reducing or eliminating pump energy associated hot water recirculation.

Natural Gas Piping Systems

A natural gas service will be provided for the school. The gas service meter and pressure reducing station will be located at the rear of the building and adjacent to the kitchen area. Gas piping will serve the emergency generator systems prior to entering the building. Gas distribution piping will be located at the roof level and extend to the science lab areas.

Plumbing Fixtures

Institutional grade plumbing fixtures are provided throughout the school. These fixtures include floor-mounted water closets utilizing 1.6 gallon per flush valves, pint flush (0.125 gallon per flush) wall-hung urinals, and wall-hung lavatories with self-closing hot and cold water faucets that supply 0.35 gallons per minute. All plumbing fixtures will comply with the ADA.

Fire Protection Systems

An incoming fire service entrance is provided within the eastern mechanical room located adjacent the kitchen area. The service entrance is complete with a double-check backflow preventer, alarm check valve, and piping connection to the fire department connection. A fire line is routed to zone valve assemblies located throughout the building. Branch sprinkler piping will be configured to accommodate the building's architectural layout, with sprinkler heads provided throughout. All work is specified to conform to standards of the National Fire Protection Association (NFPA) and will include requirements for performance verification through hydraulic calculations.

Electrical Systems Narrative

Design Criteria

Applicable Codes and Standards

- ADA Standards for Accessible Design, 2010
- ASHRAE Standard 90.1, Energy Standard for Buildings, 2010
- IEEE Standards, Power and Telecommunications
- IESNA Lighting Handbook, 10th Edition
- International Building Code (IBC), 2012 Edition
- International Energy Conservation Code (IECC), 2012 Edition
- Life Safety Code, NFPA 101, 2012 Edition
- Maryland Occupational Safety and Health Act (MOSH Act)
- National Electrical Code (NEC) with local amendments, NFPA 70, 2011
- National Electrical Manufacturers Association (NEMA), standards
- National Fire Alarm and Signaling Code, NFPA 72, latest edition

General

The electrical systems will include work associated with the power, electrical provisions for the solar photovoltaic (PV) system, emergency power, lighting, lighting controls, classroom technology, data and video, telephone, intercom/public address/master clock, sound, building security, and fire alarm systems. 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 Gold certification.

Electrical Service

There will be an outdoor BGE pad-mounted utility transformer located in the service yard adjacent to the loading dock 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 8 ducts) will be run from the utility transformer to the CT section of the main switchboard in the main electrical room.

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, electrical equipment to support

the photovoltaic (PV) system, and generator-connected equipment. Generator-connected equipment will consist of automatic transfer switches, dry-type transformers, and branch circuit panelboards.

The main switchboard will be a 2500-ampere, 277/480-volt, 3-phase, 4-wire, switchboard with a CT section, main section with 2500-ampere (100 percent rated) electronic-trip main circuit breaker, and distribution section with molded-case branch circuit breakers. The main switchboard will incorporate ground fault protection and surge protection.

Panelboards will be rated at 277/480 volts and 120/208 volts and serve as distribution, branch circuit, or lighting panels. Panelboards will have a copper bus structure. Panelboards will be sized with approximately 25 percent spare capacity and 25 percent spare breaker space.

There will be dedicated panelboards for lighting, mechanical loads, general receptacle loads, and "clean power" computer receptacle loads.

Computer panels will have a 200 percent rated neutral bus to account for harmonic distortion. A three-phase surge protective device (SPD) will be connected to (and mounted adjacent to) each respective computer panel.

The typical dry-type transformer will have a 480-volt delta primary and 208/120-volt, 3-phase, 4-wire, wye secondary distribution. Transformers serving general receptacle panelboards will be general-purpose, premium energy-efficient type, providing 30 percent less losses (at 35 percent loading) than similar-sized NEMA TP-1 efficiency models. Transformers serving computer panelboards will be either premium energy-efficient UL K-13 type or premium energy-efficient harmonic-mitigating type.

Lighting will be served at 277 volts, single-phase. Mechanical equipment will be served at either 120 volts, single-phase; 208 volts, single-phase; 208 volts, 3-phase; 277 volts, single-phase; or 480 volts, 3-phase, depending upon the load requirements. Motors one horsepower or higher will be connected at 480 volts, 3-phase. Three-phase motor loads will be provided with phase-loss protection. General receptacles will be served 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 insulation installed in metallic conduit. The minimum size conduit will be 3/4 inches. Flexible metal conduit (FMC) will be used to connect to transformers. Liquid-tight flexible metal conduit (LFMC) will be used to connect to motors and other vibrating equipment. FMC and LFMC will be limited to a maximum 6-foot length.

Electrical metallic tubing (EMT) will be used throughout except where flexible conduit is required and as noted above. Polyvinylchloride (PVC) conduit will be used for all exterior underground circuits. Intermediate metal conduit (IMC) will be used on roofs and other damp or wet locations.

Receptacle branch circuits will utilize #12 wiring when the run is 50 feet or less, #10 wiring when the run is between 50 and 100 linear feet, and #8 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 considered in order to reduce construction costs.

Electrical Provisions for Photovoltaic (PV) System

The ± 625 kW solar PV system will consist of 300 watt PV panels on the roof (for a total of ± 428 kW) and at grade near on the sloped hill at the north edge of the property (for a total of ± 197 kW)

The solar PV system will use exterior distributed inverters. The inverters will be grouped together in clusters at several locations. 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 NEC 690.14, so 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 "load side" or "line side" of the main service disconnect of the switchboard, utilizing a circuit breaker or fuse in the switchboard. Connections will be in accordance with 2011 NEC 690.64 and 705.12.

- Line 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 main electrical room will remain on the east side of the building near the loading dock/ service yard.

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 line 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 percent space adder when using lead-acid batteries.)*

Emergency Power

An outdoor natural-gas generator in a weatherproof enclosure will be installed in the service yard adjacent to the loading dock of the school. The generator will be rated at 277/480 volts, 3-phase, 4-wire.

The generator will be sized at 150 kW 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 panelboards. Emergency panelboards will provide power to the fire alarm system, security panels, emergency egress lighting in corridors and classrooms, and exit signs.
- ATS #2 will be the "optional standby" ATS and will serve the ATC/BAS (Building Automation System) panels, kitchen refrigeration equipment, public address system equipment, voice communications equipment, selected data communications equipment, security equipment, heat trace, and other equipment and devices as determined by the HCPSS. The "optional standby" ATS will also serve selected receptacles in the principal's office, main office, corridors, gym, cafeteria, and kitchen.

Provisions will be made in order to connect a temporary portable generator to serve building heating equipment in the school, as well as HVAC, lighting, receptacle, and kitchen loads for areas in the school that may be designated for public shelter by the Maryland Emergency Management Agency (MEMA). Equipment will include an outdoor generator docking station (in order to make connections to the temporary portable generator), a manual transfer switch, and distribution switchboard. Equipment will be sized in order to accommodate the building heating equipment loads and public shelter loads.

Lighting

Building lighting will consist of recessed 2' x 4' luminaires (lighting fixtures) in the classrooms, 2' x 2' luminaires in the corridors, recessed downlights in selected areas, industrial-type luminaires for support spaces with open ceilings, exit signs, exterior perimeter building-mounted luminaires, and exterior pole-mounted luminaires at parking lots.

In order to reduce energy consumption within the building, luminaires within the school will utilize LED technology with LED light engines and LED drivers.

The standard classroom luminaire will be a 2' x 4' recessed full distribution volumetric type LED luminaire, equal to Cooper Lighting/Metalux, Accord Series 24AC specification grade LED troffer.

The standard corridor luminaire will be a 2' x 2' recessed full distribution volumetric type LED luminaire, equal to Cooper Lighting/Metalux, Accord Series 22AC specification grade LED troffer.

Downlights, where used, will be LED type with 6" aperture and open reflector, equal to Gotham Architectural Lighting, Evo Series.

Gymnasium luminaires will be 12" x 30" LED high bay luminaires with wireguard, equal to GE, Albeo Series high bay linear luminaire.

The cafeteria will use a combination of indirect/direct LED pendants (Architectural Lighting Works, LPLUU series) and perimeter LED downlights (Gotham Architectural Lighting, Evo Series).

Media Center luminaires will include direct LED pendants (Architectural Lighting Works, LPL series), recessed LED strip lights (Architectural Lighting Works, LPR series) for the low ceiling area, along with recessed LED square downlights (Gotham Architectural Lighting, Incito Series) for accent lighting.

Lockers and toilets will use vandal-resistant luminaires. Kitchen will use gasketed luminaires with smooth lenses (for easier cleaning). Mechanical and electrical rooms will use industrial-type luminaires. Exit signs will be red LED type. Exterior building-mounted and pole-mounted luminaires and will be full-cutoff, with finish selected by the architect.

Classrooms and offices will have a minimum 40 foot-candles at the task plane, over the primary work areas. Switching of luminaires will be both multi-level and zoned as appropriate for the room's use.

The lighting design will exceed the requirements of ASHRAE/IESNA Standard 90.1-2010. The lighting power density (LPD) will not exceed 0.50 watts per square foot for the entire school. The selection of lighting fixtures for the building will be compliant with the energy standard.

Lighting levels will be designed in accordance with either the recommendations of the HCPSS or the Illuminating Engineering Society of North America (IESNA). Maintained illumination values will be calculated using a total maintenance factor of 91 percent. Horizontal and vertical illumination levels, luminance ratios, and other lighting characteristics shall be appropriate for each location and task.

Lighting Controls

The general control strategy for the building utilizes occupancy sensors wherever possible for interior lighting and lighting relay panels for exterior lighting. The lighting control system will utilize relay-based room controllers equal to Lutron Energi Savr Node, Model QSN-4T16-S (0-10V Control).

Emergency lighting circuits will remain on in public spaces until the building is locked by the security system, at which time they will be shut off via lighting control panels. A manual override switch will be provided adjacent to the security panel to manually activate the emergency lighting in the event of failure of the security panel.

Automatic daylight controls (photocontrol with dimming drivers) for daylight harvesting will be utilized only where required per ASHRAE Standard 90.1-2010, Section 9.4.1.4. Daylight harvesting will be required in rooms where the total square foot area of vertical glazing (or *primary sidelighted area*) in a particular room or enclosed space equals or exceeds 250 square feet. This will include the cafeteria. Also, daylight harvesting will be required in rooms over 900 square feet where skylights are used. This will include the media center.

Automatic daylight controls (photocontrol with dimming ballasts) for daylight harvesting where not required by ASHRAE Standard 90.1-2010, Section 9.4.1.4, will be considered if it is determined that there will be a significant energy savings to allow for less photovoltaic (PV) panels on the roof.

Additional control strategies for specific spaces are listed below.

Lighting within typical classrooms will be controlled by the following devices and programming settings:

- Manual control: Teachers will have access to manual controls in two zones; the row of lights along the teaching wall, and the remaining lights in the room. Both zones will be provided with low-voltage switches to access dimming setpoints at 0 percent, 50 percent, or 100 percent. Additional scenes will be provided for A/V and whiteboard use through controls located at the teacher station.
- Automatic control: Lights must be turned on manually upon entering the room. Ceiling-mounted 360-degree dual-technology occupancy sensors will turn off lights within the room after 15 minutes of inactivity. Occupancy sensors will only be responsible for turning lights off.

Lighting within offices will be controlled by the following devices and programming settings:

- Manual/automatic controls (small offices): Dual-relay line-voltage wall station occupancy sensor will be provided. The sensor will be manual-on by selecting one or both of the "on" buttons, providing flexibility of lighting at 0 percent, 50 percent, and 100 percent relative light output. Sensor will be factory set to turn off lighting when room is unoccupied for 15 minutes.
- Manual/automatic controls (larger offices): Ceiling-mounted 360-degree dual-technology occupancy sensor or sensors will be provided, which will be set to automatically turn off lighting when room is unoccupied for 15 minutes. Wall-mounted low-voltage lighting control station(s) or switch(es) will be provided at the door(s) for control of the lighting at 0 percent, 50 percent, and 100 percent relative light output.

Lighting within the gymnasium will be controlled by the following devices and programming settings:

- Manual control: Low-voltage key switches will be provided at the entry doors to the gymnasiums for control of all of the lighting within each room. Key switch will also allow for change in preset lighting levels.
- Automatic control: Through lighting control panels, a connection to the building security system will be provided to satisfy the automatic control requirements for these spaces.

Lighting within the media center will be controlled by the following devices and programming settings:

- Manual control: Manual switches will be provided to control the lighting in three zones. For the lights surrounding each projection screen, additional low-voltage override switches will be provided on the face of the adjacent column to allow for these lights to be independently turned off during the use of the projection screen.
- Automatic control: Mechanical contactors connected to the building security system will be provided on the line side of the switches to automatically shut off the lighting in case the lighting within the space was left on after hours.

Lighting within restrooms will be controlled by the following devices and programming settings:

- Manual control: There will no manual controls in the group restrooms. There will be a manual override switch within wall station occupancy sensor in private toilet rooms.
- Automatic control: Group restrooms will have ceiling mounted occupancy sensors that will automatically turn lighting on upon entry and automatically turn off after being unoccupied for 15 minutes. Private restrooms will have wall station occupancy sensors which will be programmed to require a manual initiation to turn lighting on, but will automatically turn off after being unoccupied for 15 minutes.

Lighting within storage rooms will be controlled by the following devices and programming settings:

- Manual/automatic control: Small closets and storage rooms will have a single wall station occupancy sensor, programmed to require manual activation to turn the lights on and will automatically turn lights off after being unoccupied for 15 minutes. Larger spaces will have ceiling-mounted occupancy sensors without manual override control stations/ switches. Lighting will turn on and off automatically.

Lighting within mechanical, electrical, and telecom rooms will be controlled by the following devices and programming settings:

- Manual control: Low-voltage toggle switches will be provided at each entrance to the space. Automatic controls will not be provided for these spaces due to concerns for safety during maintenance. Timed setbacks will be programmed to reduce lighting loads after 60 minutes.

Exterior lighting will be controlled by the following devices and programming settings:

- Automatic control: Lighting will be controlled by a signal from the building automation system through mechanical contactors. Contactors will be mechanically-held, electrically-operated, and provided with hand-off-automatic (HOA) control pushbuttons to allow manual override.

Receptacle Control

In order to further reduce energy usage, it is proposed that receptacles will be automatically switched off via the lighting control system, using either a four-relay controller equal to Lutron 20A Energi Savr Node with Softswitch, or a single-circuit 20A relay module equal to Lutron 20A PowPak

Receptacles in classrooms will be controlled as follows:

- Convenience receptacles and computer receptacles in each classroom will be switched off when the room is unoccupied.
- Each classroom will have a receptacle dedicated for connection to a laptop cart (computers on wheels), which will be switched off on a time schedule separate from the convenience receptacles and computer receptacles in classrooms.
- There will be one receptacle in each classroom that will remain unswitched.
- For after hours use, a manual on button will be provided at the teacher's work station. Receptacles will turn off automatically based on the occupancy sensor after hours.

Classroom Technology

Classrooms will be equipped with dedicated computer receptacles connected to a separate "clean-power" computer panels. The teacher's desk receptacles will also be connected to this "clean-power" source.

The general classroom design will include a DVD/Blu-ray player, audio amplifier/mixer, wireless microphone device and audio override relays. All of these devices will be housed in the teacher's wardrobe. The general classroom will also contain a wall-mounted LCD projector, screen, computer hook-ups, speakers, and necessary wiring to connect to the projector, amplifier, mixer, speakers, and wireless microphone as one system. The outlet configurations will be in accordance with the latest HCPSS standards.

Data and Video System

The network system design will include device outlet boxes, conduit and raceways, and conduit sleeves for the installation of network cabling. Cabling will include copper Category 6 UTP station and multimode fiber optic backbone cables. The building will have fully functional wireless connectivity throughout with no dead zones. The system will include the hardware, controllers, switches, transceivers, and cabling.

Ceiling-mounted wireless access points (wireless routers) will be located throughout the school. Category 6 cable run will run from each wireless access point to respective telecom room.

With the advances in wireless technology for data transfer, it is proposed that a significant portion of data cabling be deleted from the project as follows:

- Student outlets in classrooms, totaling four student data jacks (required by Maryland Public School Standards for Telecommunications Distribution Systems) will not be installed.
- Clerical outlets (with two data jacks and one voice jack at each outlet) in storage rooms over 100 square feet (required by Maryland Public School Standards for Telecommunications Distribution Systems) will not be installed.
- Data jacks in the computer lab and the media center will not be installed, if it is not required for Maryland School Assessment (MSA) testing through the Maryland Department of Education.

The data network in the school can be used for video streaming. Therefore, it is recommended that the cable television (CATV) distribution system that includes outlets and broadband coaxial cabling to the teachers' workstation and high/low LCD projector outlets be deleted for this project. This will offer a cost savings to the project if the cable television (CATV) distribution system is not provided.

Telephone System

The telephone system design will include device outlet boxes, conduit and raceways, and conduit sleeves for the installation of cabling and equipment.

The telecommunications system will be provided by an HCPSS-approved information technology contractor.

Intercommunication, Public Address and Master Clock Systems

The intercom system will include device outlet boxes, conduit, and cabling for installation of call switches in each instructional area with ceiling speakers. Speakers will be provided in corridors, workrooms, selected offices and other occupied spaces. The intercom system will have administrative consoles, minimum of four. Cabling will be as recommended by the manufacturer. The system will be integrated with the security, fire alarm, phone, cafeteria and gymnasium sound systems. The master clock portion will be used for system clocks in the corridors, cafeteria, gymnasium, media center, selected offices, and classrooms.

An HCPSS-approved systems contractor will provide the intercom, public address and master clock systems.

Sound Systems

Individual sound systems for the cafeteria and gymnasium with transmitter for hearing impaired will be provided. These systems will be complete with speakers, microphone jacks, auxiliary jacks, and wall mounted equipment cabinets.

An HCPSS-approved systems contractor will provide the sound systems.

Building Security

The security system design will include device outlet boxes, conduit, and raceways for the installation of contact switches, control unit, card readers, connections to electric strikes, override switches, motion detectors, and cameras. DVR, monitors, a 32-inch monitor in main office, and a 26-inch monitor in the principal's office will be provided. The system will be connected to the generator power system. The head-end security equipment will be housed in the main telecom room (MDF room).

An HCPSS-approved security contractor will provide the security system. The HCPSS head administrative and security office will monitor the system.

Fire Alarm 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 (MDF room). The basis-of-design manufacturer will be by 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, in the corridors, 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 corridors, labs, music rooms, activity rooms, lockers, gymnasium, cafeteria, and kitchen. Fire alarm strobe devices will be installed classrooms and toilet rooms. Notification appliance circuit (NAC) power extender panels will be provided where needed for speaker/strobe and strobe devices. Strobe spacing and locations will be per NFPA requirements for rooms and corridors. Candela minimum required light output intensity will be indicated on the drawings.

Energy Statement

Sustainability and energy conservation is a fundamental aspect of the design for Wilde Lake Middle School. Many energy saving techniques are being incorporated into the building to achieve energy efficiency and compliance with LEED energy requirements, along with achieving the project's "net zero" energy usage goals. These techniques include the following:

- Mechanical, electrical, and plumbing systems will exceed the energy efficiency requirements of ASHRAE Standard 90.1-2010 and the 2012 International Energy Conservation Code.
- The use of ground-coupled geothermal technology is anticipated.
- Mechanical systems will utilize decoupled ventilation systems, complete with energy recovery devices for pre-conditioning ventilation airflow.
- Heat pump units will be provided with electronically commutated motors (ECM) and two-stage or variable-speed type compressors, for increased operating efficiencies.
- Mechanical systems will include variable frequency drives to allow systems to operate at lower capacities when building loads are reduced. Premium efficiency motors will be specified for all motors.
- VAV retrofit-type air terminal units will be utilized for demand control ventilation within classroom areas.
- Systems providing outdoor air 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.
- High occupancy 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.
- A distributive hot water system consisting of multiple heat pump type water heaters will reduce hot water production energy consumption and minimize hot water distribution energy.
- Energy meters will be placed in electrical rooms to meter energy (kWh) usage for the following: Main electrical service, lighting loads, receptacle plug loads, HVAC/ mechanical loads, and kitchen loads.
- Photovoltaic solar panels will be installed on the roof and on grade for onsite power generation.
- LED luminaires (lighting fixtures) will be provided throughout, in lieu of fluorescent luminaires, in order to significantly reduce the energy used to light the school.
- Lighting controls will include manual-on in offices, work rooms, instructional areas, and storage rooms. Lights will not automatically turn-on in these spaces, therefore reducing energy usage.
- Occupancy sensors will automatically turn off lighting in areas when unoccupied.
- Daylight harvesting will be incorporated where required in rooms with vertical glazing and/or operable skylights. A daylight monitoring photocell/sensor will automatically reduce the lighting levels in a room when adequate daylight is present, which in turn reduces energy usage.
- Full-cutoff exterior LED luminaires (lighting fixtures) will reduce light pollution to the surrounding areas.