ACTION

HOWARD COUNTY
PUBLIC SCHOOL SYSTEM

BOARD OF EDUCATION OF HOWARD COUNTY
MEETING AGENDA ITEM

TITLE: Laurel Woods Elementary School Design Development Report **DATE:** October 22, 2013

PRESENTER(S): Bruce Gist, Director, School Construction
Tom Terranova, Project Manager, Colimore Architects

OVERVIEW:
The attached design development brochure describes the proposed additions to Laurel Woods Elementary School. Laurel Woods Elementary School opened in 1973 and was expanded with building additions in 1987 and 2008. Systemic renovations and modernizations of the interior spaces, including a complete roof replacement, were completed in 2004 and 2005 respectively.

Due to the predicted increase in student population, as well as the need for reallocated program spaces inside of the school, the design and planning committee agreed on a two-story classroom addition, including an art and music room along with a cafetorium expansion that will increase the classroom capacity by 100 seats and also improve the utilization of the existing academic support spaces. A physical education activity room and new direct digital control (DDC) HVAC control system have been designed and will be bid as project add alternates.

The following updates have taken place since the schematic design report. The design team created a secure entrance vestibule in the main lobby; converted the existing art room into a Pre-Kindergarten classroom; and reallocated and provided additional storage space in the new classroom addition. The type and placement of the new addition lower level windows was changed to provide a more secure classroom environment. As the design progressed, required infrastructure upgrades have been identified and added, including the replacement of the chiller, boiler and emergency generator.

RECOMMENDATION/FUTURE DIRECTION:
It is recommended that the design development report for Laurel Woods Elementary School be approved as submitted.

Submitted by:
Bruce Gist
Director, School Construction

Approval/ Concurrence:
Renee A. Foose, Ed.D.
Superintendent

Susan C. Mascaro
Chief of Staff

Ken Roey
Chief Facilities Officer

ADDITIONS and RENOVATIONS to
LAUREL WOODS ELEMENTARY SCHOOL

FOR

HOWARD COUNTY PUBLIC SCHOOL SYSTEM

DESIGN DEVELOPMENT REPORT

OCTOBER 22, 2013

Colimore Architects, Inc.
1240 Key Highway
Baltimore, Maryland 21230
410-752-3720

HOWARD COUNTY PUBLIC SCHOOL SYSTEM

COLIMORE | ARCHITECTS INCORPORATED

Design Development Report

Additions and Renovations to
Laurel Woods Elementary School

FOR THE BOARD OF EDUCATION OF HOWARD COUNTY

Chairman	Frank J. Aquino Esq.
Vice Chairman	Brian J. Meshkin
Members	Ann De Lacy
	Sandra H. French
	Ellen Flynn Giles
	Janet Siddiqui, M.D.
	Cynthia L. Vaillancourt
	Albert B. Corvah (Student)
Superintendent of Schools	Renee A. Foose, Ed.D.
Chief Facilities Officer	Ken Roey
Director School Construction	Bruce Gist

October 22, 2013

Table of Contents

Planning Advisory Committee

Planning Committee

Susan Brown	Laurel Woods Elementary School, Principal
Rhonda Inskeep	Laurel Woods Elementary School, Assistant Principal
Debbie Gaeng	Laurel Woods Elementary School, Teacher
Janet Yarn	Laurel Woods Elementary School, Teacher
Assunta Vitiello	Laurel Woods Elementary School, Teacher
Judy Wolf	Laurel Woods Elementary School, Principal Secretary
Emily Goudreau	Laurel Woods Elementary School, Teacher
Susie Vitiello	Laurel Woods Elementary School, Teacher
Andrew Ashby	Laurel Woods Elementary School, Teacher
Joshua Griffin	Laurel Woods Elementary School, Teacher
Amanda Faudale	Laurel Woods Elementary School, Teacher
Sarah McGuire	Laurel Woods Elementary School, Teacher
Kelly Miller	Laurel Woods Elementary School PTA, Parent
Julie Brown	Laurel Woods Elementary School PTA, Parent
Scott Washington	Howard County Public School System (HCPSS) Manager of Design and Preconstruction Services, School Construction
Bruce Gist	HCPSS, Director of School Construction
Dan Keiser	HCPSS, Program Manager, School Construction
David Ramsay	HCPSS, Director of Transportation
Marcy Hersl	HCPSS, Assistant/Risk Analyst
Jennifer Bubenko	HCPSS, Planning Specialist
Ken Roey	HCPSS, Chief Facilities Officer
Betsy Zentz	HCPSS, Interagency Specialist
Wayne Crosby	HCPSS, Director of School Facilities
Todd Holmes	Howard County Department of Recreation and Parks, Program Coordinator
Matt Madera	Howard County Department of Recreation and Parks, Facility Director
Raul Delerme	Howard County Department of Recreation and Parks, Bureau Chief
Gloria Mikolajczyk	Maryland State Department of Education – School Facilities, Architectural Supervisor
Dan Hagan	J. Vinton Schafer & Sons, Inc., Construction Manager

Architects

James A. Colimore, AIA	Colimore Architects Inc., Principal in Charge
Meredith Sullivan, AIA	Colimore Architects Inc., Project Director
Tom Terranova	Colimore Architects Inc., Project Manager

Design Team

Owner	Howard County Public School System	Ellicott City, MD
Architect	Colimore Architects Inc.	Baltimore, MD
Civil Engineer	Fisher, Collins & Carter Inc.	Ellicott City, MD
Structural Engineer	Columbia Engineers Inc.	Columbia, MD
Mechanical Engineer	Burdette, Koehler, Murphy and Associates, Inc.	Baltimore, MD
Electrical Engineer	Burdette, Koehler, Murphy and Associates, Inc.	Baltimore, MD
Construction Manager	J. Vinton Schafer & Sons, Inc.	Abington, MD

Howard County Public School System Facilities Group:

Greg Connor	HCPSS, Assistant Manager, Grounds Services
Reny Toledo	HCPSS, Assistant Manager, Audio Visual Services
Larry O'Neill	HCPSS, Building Services, Life Safety
Jim Kramer	HCPSS, Leadman, Electrical Department
Rob Geelhaar	HCPSS, Building Services, HVAC
Andy Stanco	HCPSS, Building Services
Tom Anthony	HCPSS, Building Services, HVAC
Tim Heinrich	HCPSS, HVAC Control Specialist
Jon Naill	HCPSS, Leadman, Painting/Flooring
Robert White	HCPSS, Custodial
Al Mullinix	HCPSS, Hardware
Todd McMahon	HCPSS, Project Management Specialist

Continuation of the School Design Process

The design development report is intended to describe those aspects of the design for the additions and renovations to Laurel Woods Elementary School that have changed or have been added since the schematic design report. Included are updates on all aspects of the project and detailed interior layouts of individual rooms and programmatic spaces which have been developed since the schematic report.

The planning process for Laurel Woods Elementary School, the factors which influenced basic design decisions and the basic organization of the facility were described in detail in the schematic design report submitted to Howard County Public School System (HCPSS) Board of Education and approved on August 15, 2013.

Following approval of the schematic design report, a formal schematic design submittal was sent to the Maryland State Department of Education (MSDE) and approved by them for the continuation of the design process on September 5, 2013.

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

1. The design team met with members of the HCPSS Facilities Group to discuss specific needs of the school with regard to mechanical and electrical systems, information technology and maintenance of the building and grounds. County standards and preferences regarding building materials and finishes were also reviewed. The mechanical and electrical narratives, starting on page 36 are based primarily on these discussions.
2. The design development concept plan was further developed with the participation of the school staff, the HCPSS staff and the design team. The current layout is shown in the proposed floor plan on page 19.
3. The school staff expressed a need for additional Pre-K classroom space. To accommodate this, the scope of the project has been expanded to include the conversion of the existing art classroom at the east end of the building to a Pre-K classroom as illustrated on page 24.
4. Building elevations have been developed for the new construction and presented to HCPSS staff for their comments. These are described and illustrated beginning on page 29.
5. Layouts of individual spaces are found in the 'furniture and equipment plans', beginning on page 31. Key members of the school's faculty and staff were involved in the development, review and approval of these space layouts.
6. The project is proceeding on time with the posted schedule shown on page 9.
7. The cost estimate has been updated by the construction manager based on the proposed design development plans and is found on page 43.

At the request of the Board members, the Design Team looked at the feasibility of re-designing the parking lot to increase the number of available parking spaces. A preliminary plan was developed that provides a net increase of 23 parking spaces. The extent of site work involved will require construction of an additional stormwater retention area. New pole mounted site lighting will also need to be provided.

The additional work associated with this has not been included in the revised construction cost estimate on page 43. The preliminary design is illustrated on page 17 and is provided for informational purposes only. Pending decisions by the Board and HCPSS, the Design Team will move forward with the development of this schematic plan during the Construction Documents phase of the project.

During this Design Development phase of the project, the Design Team was able to do additional on-site surveys of existing equipment and systems to determine their age, capacities and condition. Through these investigations and consultation with members of the HCPSS Facilities Group, decisions were made to invest in certain systemic upgrades described in the mechanical and electrical narratives beginning on page 36. The increase in the project scope and corresponding increase in construction costs are believed to be offset by an increase in energy efficiency and reduction in potentially costly maintenance, repair or replacement of aging equipment.

Project Description

Laurel Woods Elementary School is a single-story masonry structure, Type IIB construction (noncombustible/unprotected) that opened in 1973. The building was expanded with subsequent building additions in 1987 and 2008. The building underwent further renovations in 2004 and the roof was replaced in 2005. Currently there are six (6) portable classrooms located in the front and rear of the school. The building is in good condition with no identified structural deficiencies. The building is one story with egress directly onto grade around the building. The student enrollment, as of May, 2013, is 564 students. The population of the school is continuing to grow, making the need for the expanded space necessary in order to keep pace with the programmatic requirements of the Howard County Public School System (HCPSS).

The school currently has need of the following, which were considered during project design:

- Eight (8) new classrooms
- Dedicated music room
- Dedicated art room
- Restrooms and storage
- New physical education activity room (Add Alternate Number 1)
- Expanded cafetorium
- New secure entrance
- Increased mechanical and electrical infrastructure as needed to support additional spaces

In addition to the above, the school wishes to maintain portable classroom units at the front of the building and remove those at the rear to provide space for the reorganization of the existing outdoor recreational areas.

The proposed classroom addition will be two-stories with two stair towers providing direct egress from the building. New security doors will be provided inside the existing entry doors to create a secure vestibule visible from the main office. Entry after normal opening hours will be remotely controlled by office personnel.

An emergency vehicle access lane will be extended around the south and east sides of the building to the proposed classroom addition. This will also be used as access during construction.

Project Sustainable Intent

The design of these additional spaces will be in accordance with 'Green' practices. The addition and renovated spaces will be reviewed for energy conservation.

The existing energy star rating of the building will be documented. Proposed improvements and/or upgrades necessary to improve by 20 percent will be identified.

The goal of incorporating sustainability practices where it also encourages learning experiences will be a focus of the design.

Project Facts

Existing Building Gross Square Footage:	55,000
Gross Square Footage of New Additions:	16,556
Gross Square Footage of Add-Alternates:	1,892
New Total Building Gross Square Footage:	**73,448**

Project Schedule

Planning Meetings Completed	June 28, 2013
Schematic Design Presented to Board of Education For Review and Approval	August 15, 2013
Schematic Design Submission to IAC For Review and Approval	August 15, 2013
Design Development Submission to Board of Education For Review and Approval	October 22, 2013
Design Development Submission to IAC For Review and Approval	October 24, 2013
Construction Documents Submission to Board of Education For Review and Approval	February 2014
Construction Documents Submission to IAC For Review and Approval	February 2014
Project out for Bids (3 weeks)	April 2014
Bids Received	May 2014
Construction Begins	July 2014
Construction Completed	August 2015

Planning Process

The proposed additions are in response to programmatic needs of the school as outlined by representatives of the HCPSS. Preliminary design exercises quickly identified the challenges presented by the confines of the site and configuration of the existing floor plan. The existing building, portable classroom units and outdoor recreational areas are tightly locked between steep slopes and a parking area already at capacity. Adding to the existing floor plan in a way that will coordinate with the existing circulation pathways will require substantial site grading and reconfiguration of outdoor spaces.

The location selected for the classroom addition will require the least amount of site work compared to other options studied while providing easier access for emergency vehicles. The proposed two-story addition further reduces the required site work while minimizing the impact on the surrounding outdoor areas.

Prior to presenting this initial design concept to committee members for consideration and comment, it was reviewed by civil consultants, Fisher, Collins and Carter for feasibility of construction with respect to site work, grading and stormwater management.

A series of schematic design review meetings were held at the school, each well attended by members of the Planning Advisory Committee. Comments and direction from committee members throughout the course of these meetings were vital in developing the design of the various additions and site.

The design process is outlined below:

- Scope of design provided by the HCPSS
- Preliminary plan developed based on the schools existing floor plan, footprint, site constraints, and input from the HCPSS
- First of three committee meetings in June 2013 – comments were received, documented and incorporated into the preliminary plan
- Second committee meeting – presented revised plan incorporating agreed upon comments from the first committee meeting. Additional comments were received, documented, and incorporated into the preliminary plan
- Plans further developed based on third committee meeting
- Thorough review of each specific space with the appropriate staff will be conducted to further refine the design of each space.

With the involvement of the committee during the June meetings, the design quickly evolved into a viable schematic plan that meets the needs of the school. The following are being taken into consideration throughout the design process and will be addressed

with each submission:

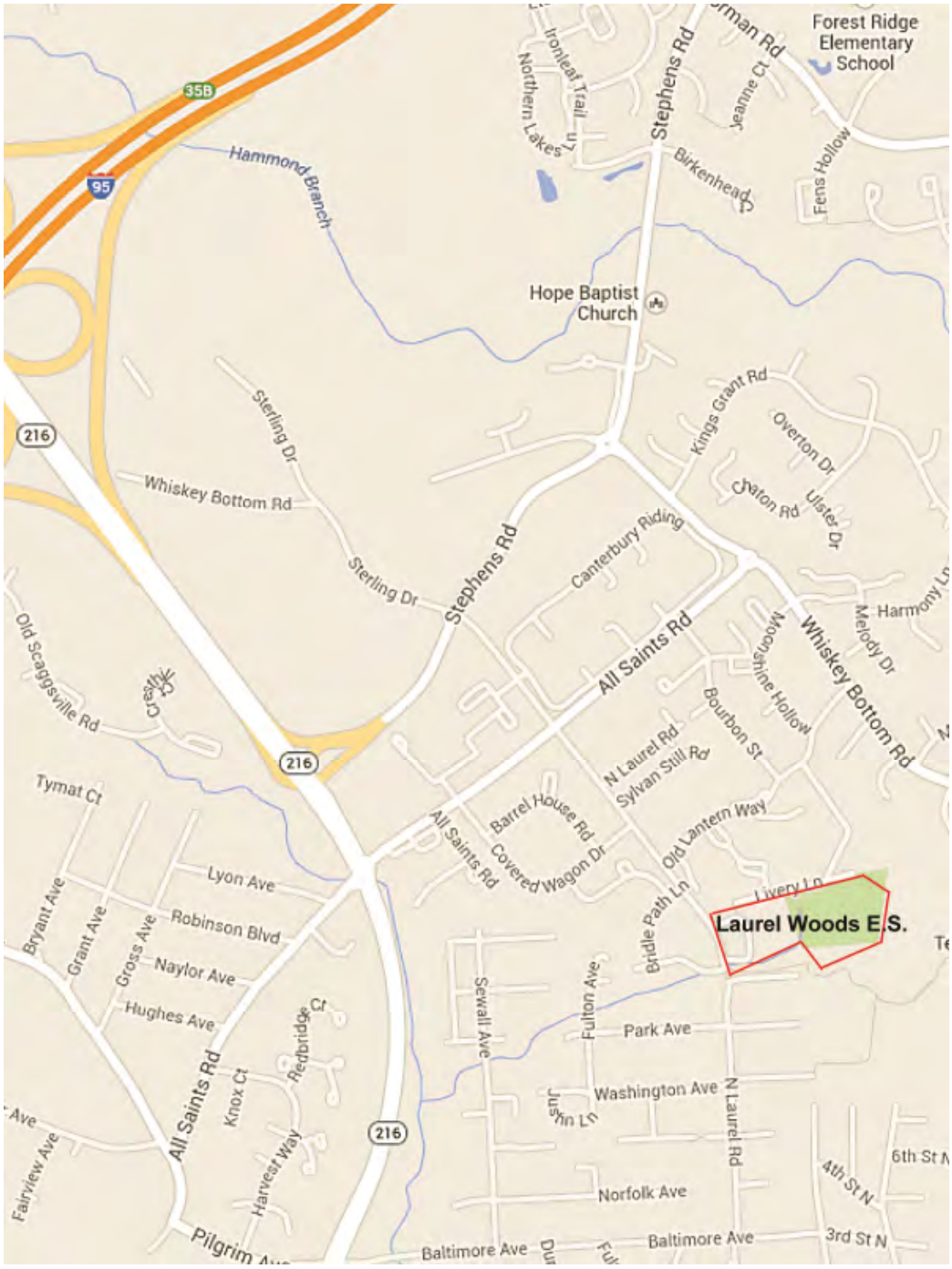
Budget
Sustainability of design, construction and operation
Construction impact on the school while in session
Existing building infrastructure
Communication of existing spaces with proposed additions

J. Vinton Schafer & Sons, Inc. has been involved in the design process from the beginning, providing input on constructability, phasing, and budget considerations. Their involvement will help us achieve an efficient design and construction sequence that will deliver the finished additions on time and within budget.

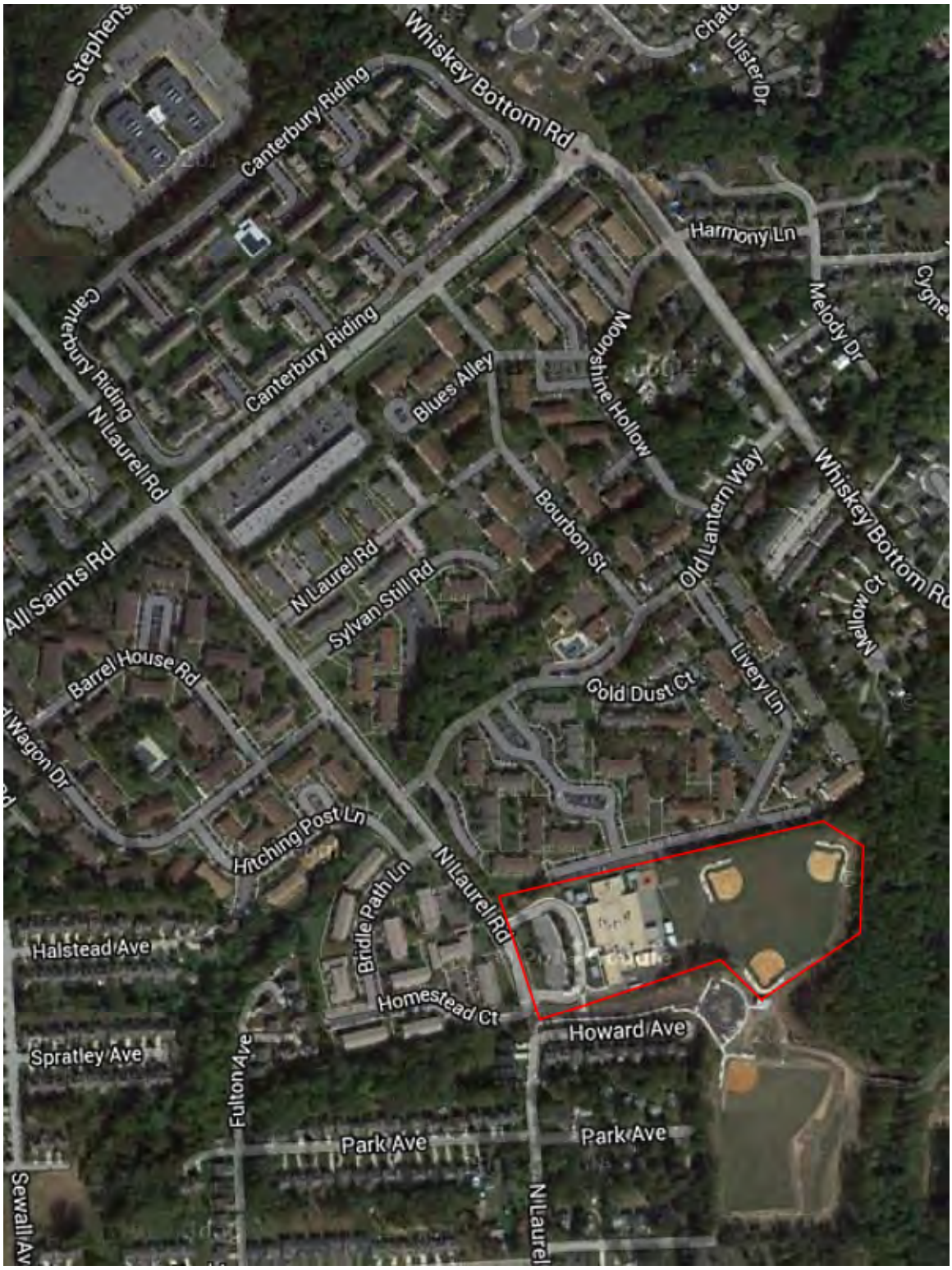
Vicinity Map

Laurel Woods Elementary School is located off North Laurel Road. The school is situated on a 11.5-acre site surrounded by forest and residential developments. It is located about a mile south of Forest Ridge Elementary School.

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



Aerial Site Photo



Existing Site Constraints

Laurel Woods Elementary School is situated on a challenging site, with steep slopes on three sides. The proposed additions will necessitate substantial reworking of existing site grades as shown in the Site Plan on page 16. Outdoor spaces for recreation are also limited. The proposed design has relocated all outdoor play areas affected by the new construction.

Site & Building Plan Notes

Key features of the proposed site and building modifications are listed below and identified with circled numbers on the Proposed Site Plan on page 16.

1. Location of two-story classroom addition – See enlarged plans on page 20
2. Location of cafetorium expansion – See enlarged plan on page 21
3. Location of new secure vestibule entrance – See enlarged plan on page 22
4. Location of a proposed emergency access lane/ construction access road
5. Reconfigured macadam play areas
6. Relocated rubberized play area (See note 2 below)
7. Relocated mulched play area
8. Relocated asphalt play area
9. Location of P.E. activities room – Add Alternate Number 1 – See enlarged plan on page 23

Design Development Site Plan Revisions:

Updated features of the proposed site plan are listed below:

1. The outdoor play areas have been more accurately located at the north end of the site.
2. The mulched play area will be replaced with a rubberized lot over macadam.
3. The proposed access road will be constructed of grass pavers.

4. A new fire hydrant is required on site per the Howard County Fire Marshal (Item 10 on the Proposed Site Plan on page 16)
5. A new emergency generator is required to support the building (Item 11 on the Proposed Site Plan on page 16)

Design Development Building Plan Revisions:

Updated features of the proposed building plan are listed below.

1. The existing art room will be converted to a Pre-K classroom. The kiln will be relocated to the new art room at the classroom addition and the existing kiln room incorporated into the Pre-K classroom area. The adjacent storage room will be incorporated into the boiler room to accommodate new electrical equipment. See the enlarged room plan on page 24.
2. The classroom addition has been adjusted to accommodate the preliminary structural grid. See the enlarged floor plans on page 20.
3. Classroom entry doors are shown recessed off the corridor. See the enlarged floor plans on page 20.
4. The new kiln room and storage room are indicated at the second floor art room on page 20.
5. An additional storage room was added to the second floor plan to replace areas given over to the art room and IT closet. See the enlarged floor plans on page 20.
6. Plans have been revised to properly reflect the windows shown in the proposed building elevations.
7. The storage rooms in the proposed P.E. activities room have been revised as per discussions with school faculty and staff. See enlarged plan on page 23.

Proposed Site Plan

Parking Lot Study – For Information Only

Legend:

- = Administration
- = Cafetorium / Kitchen
- = Circulation
- = Classroom
- = Facilities
- = Fine Arts
- = Gymnasium / P.E.
- = Media Center
- = Special Education

Abbreviations:

CR = Classroom
CC = Custodial Closet
S = Storage
T = Toilet
PR = Project Room
Ki = Kiln
Serv = Server Room
Of = Office

Existing Building = 55,000 g.s.f.

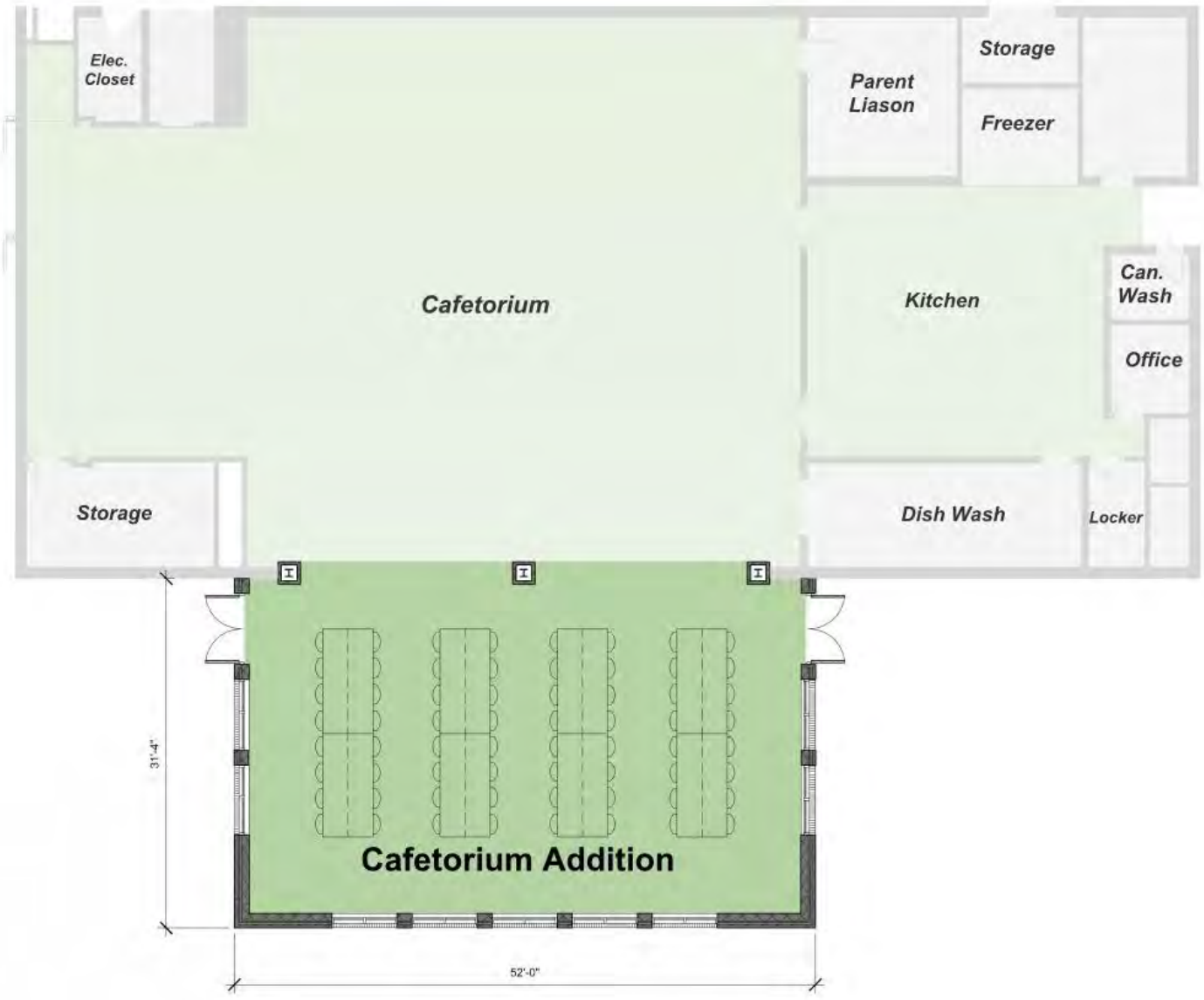
0 4' 8' 16'

NORTH

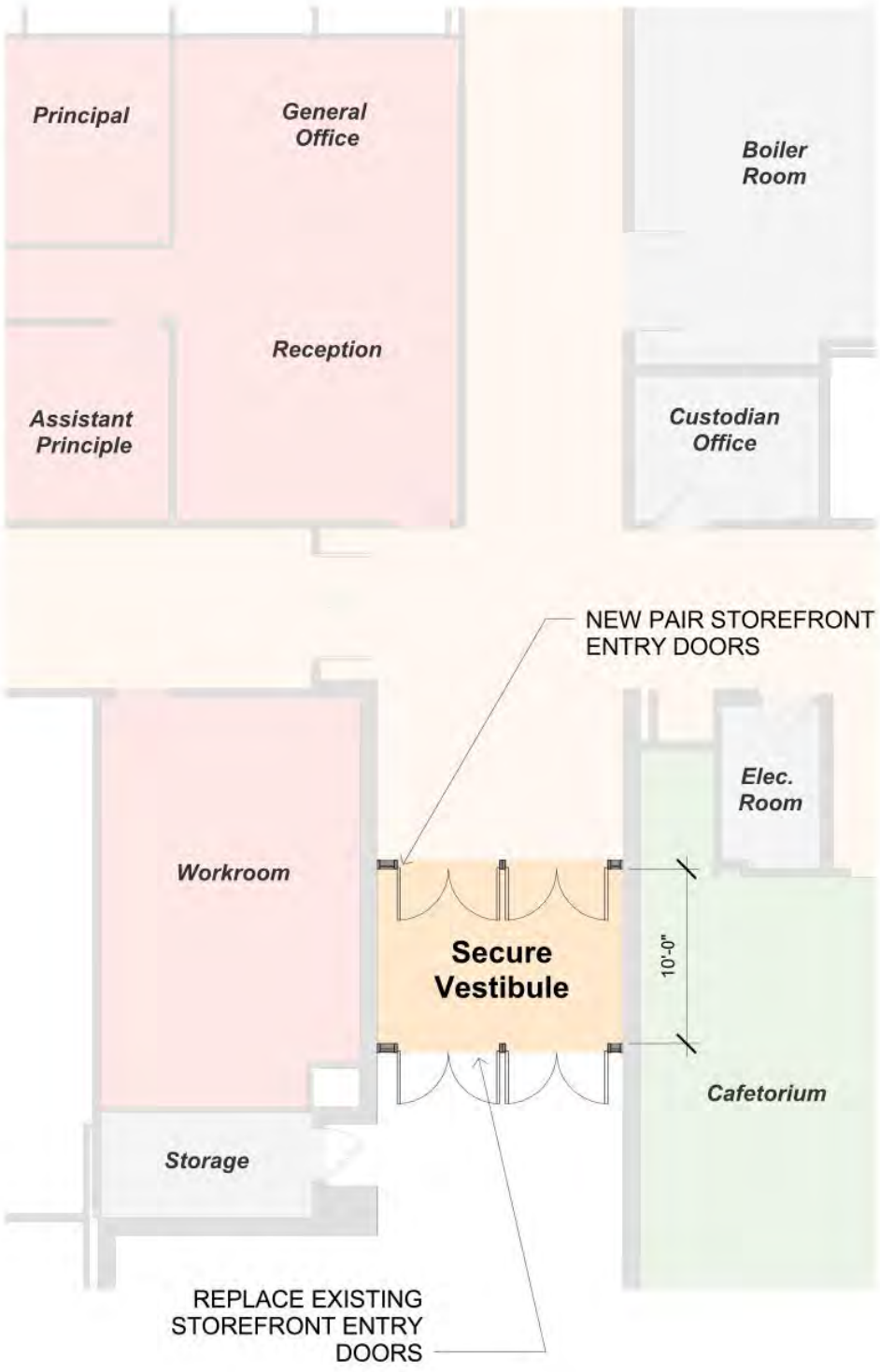
Existing Floor Plan

Proposed Floor Plan

Enlarged Plans at Proposed Classroom Addition

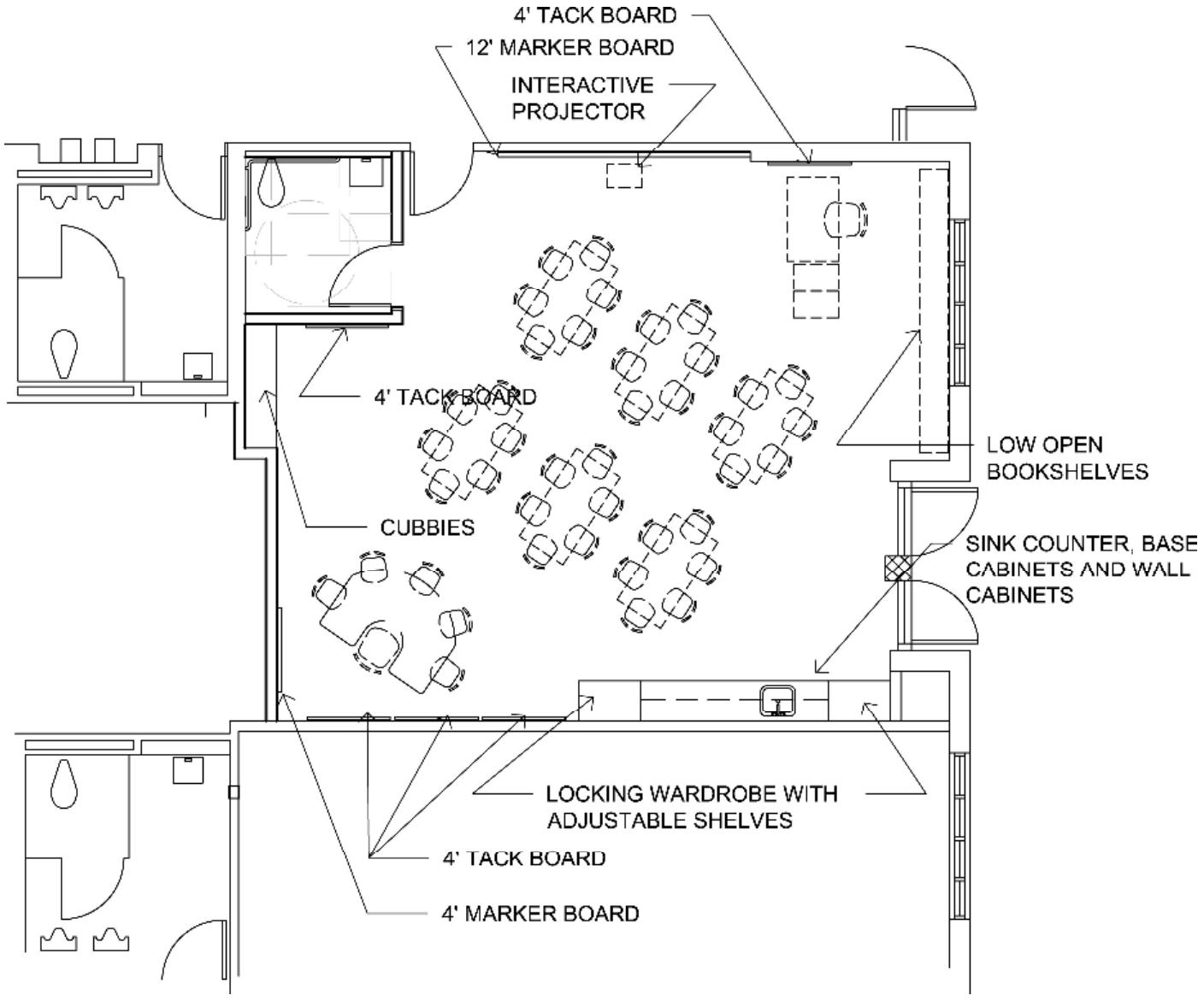


Enlarged Plan at Proposed Cafetorium Addition



Enlarged Plan at Proposed Secure Entry Vestibule

Enlarged Plan at Proposed P.E. Activities Room



Proposed Art Room to Pre-K Classroom Renovation

Proposed Space Analysis

Space	Qty.	Phase	S.F.	Total Net S.F.
Administrative Spaces				**2,368**
Reception	1	Existing	138	138
General Office	1	Existing	282	282
Principal's Office	1	Existing	174	174
Principal's Lavatory	1	Existing	37	37
Assistant Principal's Office	1	Existing	134	134
Testing/Prep Office	1	Existing	38	38
Conference Room	1	Existing	276	276
Work/Prep Room	1	Existing	344	344
Work Room	1	Existing	297	297
Teacher's Lounge	1	Existing	394	394
Parent Liaison Room	1	Existing	188	188
Staff Lavatory	1	Existing	66	66
Cafetorium/Kitchen				**5,792**
Student Dining	1	Existing	2,441	2,441
Cafetorium Addition	1	Proposed	1,480	1,480
Stage	1	Existing	516	516
Chair Storage	1	Existing	180	180
Kitchen	1	Existing	675	675
Dish Wash	1	Existing	226	226
Storage	1	Existing	132	132
Locker	1	Existing	70	70
Janitor's Closet	1	Existing	18	18
Kitchen Office	1	Existing	54	54
Classrooms				**27,289**
Pre-K	1	Existing	965	965
Pre-K	1	Proposed	868	868
Kindergarten	4	Existing	*varies*	3,536
1st Grade	4	Existing	*varies*	2,852
2nd Grade	4	Existing	*varies*	2,730
3rd Grade	4	Existing	*varies*	2,825

Space	Qty.	Phase	S.F.	Total Net S.F.
4th Grade	4	Existing	*varies*	2,832
5th Grade	4	Existing	*varies*	3,145
Proposed Classrooms	7	Proposed	*varies*	5,795
Technology	1	Proposed	817	817
Alternative Education Room	1	Existing	183	183
Computer Lab	1	Existing	645	645
ESOL	1	Existing	96	96
Fine Arts				**2,309**
Music Room	1	Existing	375	375
Music Room	1	Proposed	804	804
Storage	1	Existing	38	38
Art Room	1	Proposed	847	847
Storage	1	Proposed	206	206
Kiln	1	Proposed	39	39
Health Services				**560**
Waiting	1	Existing	100	100
Treatment/Med Room	1	Existing	120	120
Office/Consult/Exam	1	Existing	100	100
Exam/Isolation Room	1	Existing	100	100
Student Lavatory ADA	1	Existing	100	100
Storage Room	1	Existing	40	40
Physical Education				**4,821**
Gymnasium	1	Existing	2,423	2,423
Storage	2	Existing	*varies*	294
P.E. Activity Room	1	Add-Alt.	1,892	1,892
Storage	3	Add-Alt.	*varies*	146
Office	1	Existing	66	66

Space	Qty.	Phase	S.F.	Total Net S.F.
Media Center				**2,196**
Main Reading Room	1	Existing	1,756	1,756
Office/Work Space	1	Existing	297	297
Reading Room	1	Existing	97	97
Storage	1	Existing	46	46
Special Education				**1,246**
Classroom	2	Existing	*varies*	406
Teachers' Offices/ Testing Room	1	Existing	840	840
Total Net Educational S.F.				**46,581**
Miscellaneous Spaces				**4,340**
Staff Toilets	5	Existing	*varies*	284
Student Toilets	15	Existing	*varies*	1,660
Boiler Room	1	Existing	700	700
Electrical Room	1	Existing	50	50
Custodial Storage	2	Existing	*varies*	131
Custodial Office	1	Existing	87	87
Utility/Storage	2	Proposed	320	640
Proposed Staff Toilet(s)	2	Proposed	70	140
Proposed Boys' Toilet(s)	2	Proposed	174	348
Proposed Girls' Toilet(s)	2	Proposed	150	300

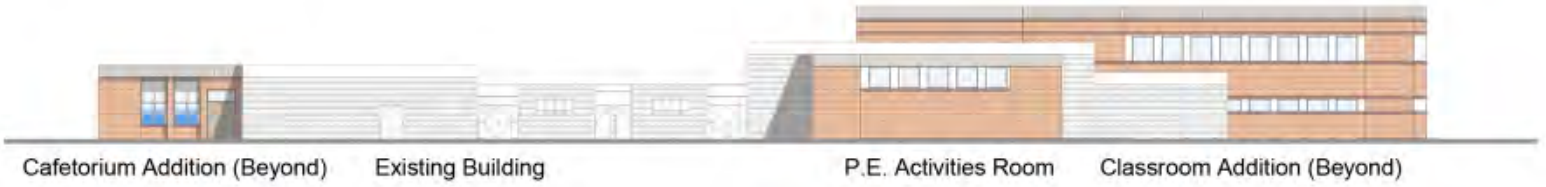
Proposed Space Analysis Summary

Total Net Educational S.F.	**46,581**
Gross Area Factor (Total Bldg S.F.-Total Net Educational S .F.)	**26,867**
(Admin., Classrooms, Cafetorium., etc.)	63.42%
(Walls, Circulation, Toilets, Mech./Elec., etc.)	36.58%
	100.00%
Gross Area of Building	**73,448**

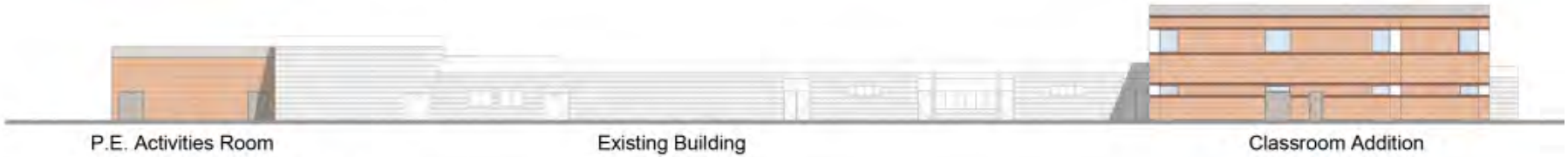
Proposed Exterior Elevations

The exterior elevations for the proposed additions were developed to blend with the existing building while still providing a modern aesthetic with distinct character. The field brick matches the color of the existing brick and a continuous deep cornice of metal panels ties the building masses together. A contrasting soldier course is used just beneath the metal cornice, consistent with some areas of the existing building. This soldier band is repeated at the window heads and sills of the two story addition to break up the expanse of masonry. At the request of the school faculty and staff, a balance was reached between a maximum amount of windows in the classrooms and the extent of interior wall space. High windows at the PE activities room will provide daylight without interfering with room function. Metal panels are used above and between windows for additional texture to minimize the need for brick support lintels. Brick piers, seen at the exterior doors to the existing classrooms, are replicated between the large windows of the cafetorium addition to add texture to the entry façade. See the proposed building elevations on page 30.

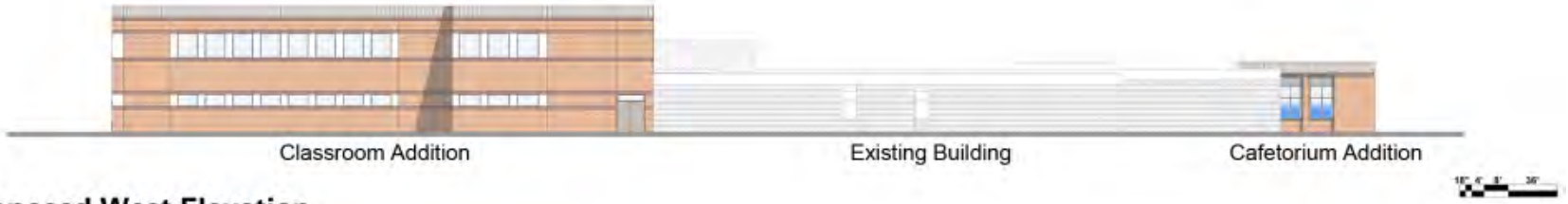
Proposed South (Entry) Elevation



Proposed East Elevation



Proposed North Elevation

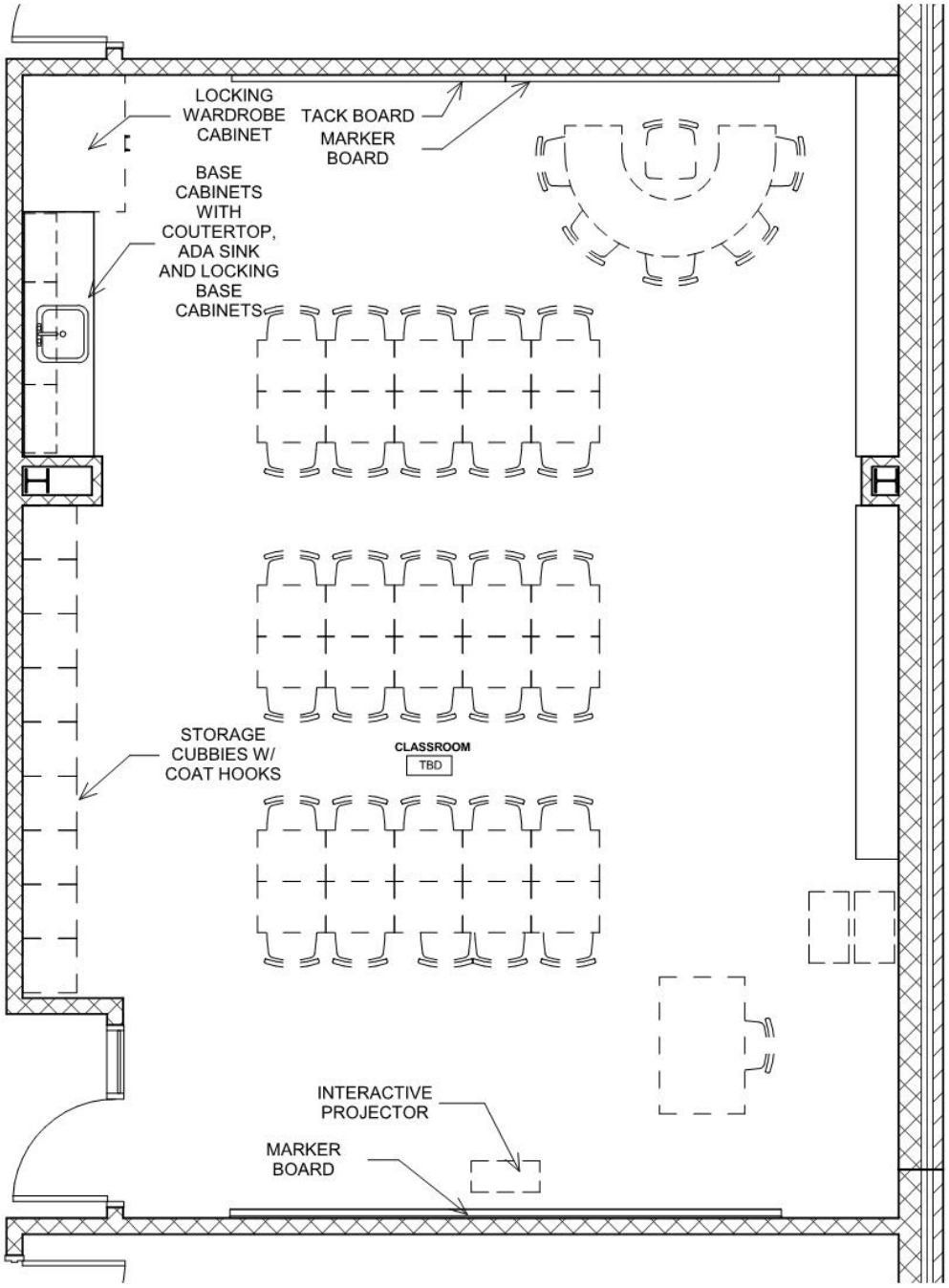


Proposed West Elevation

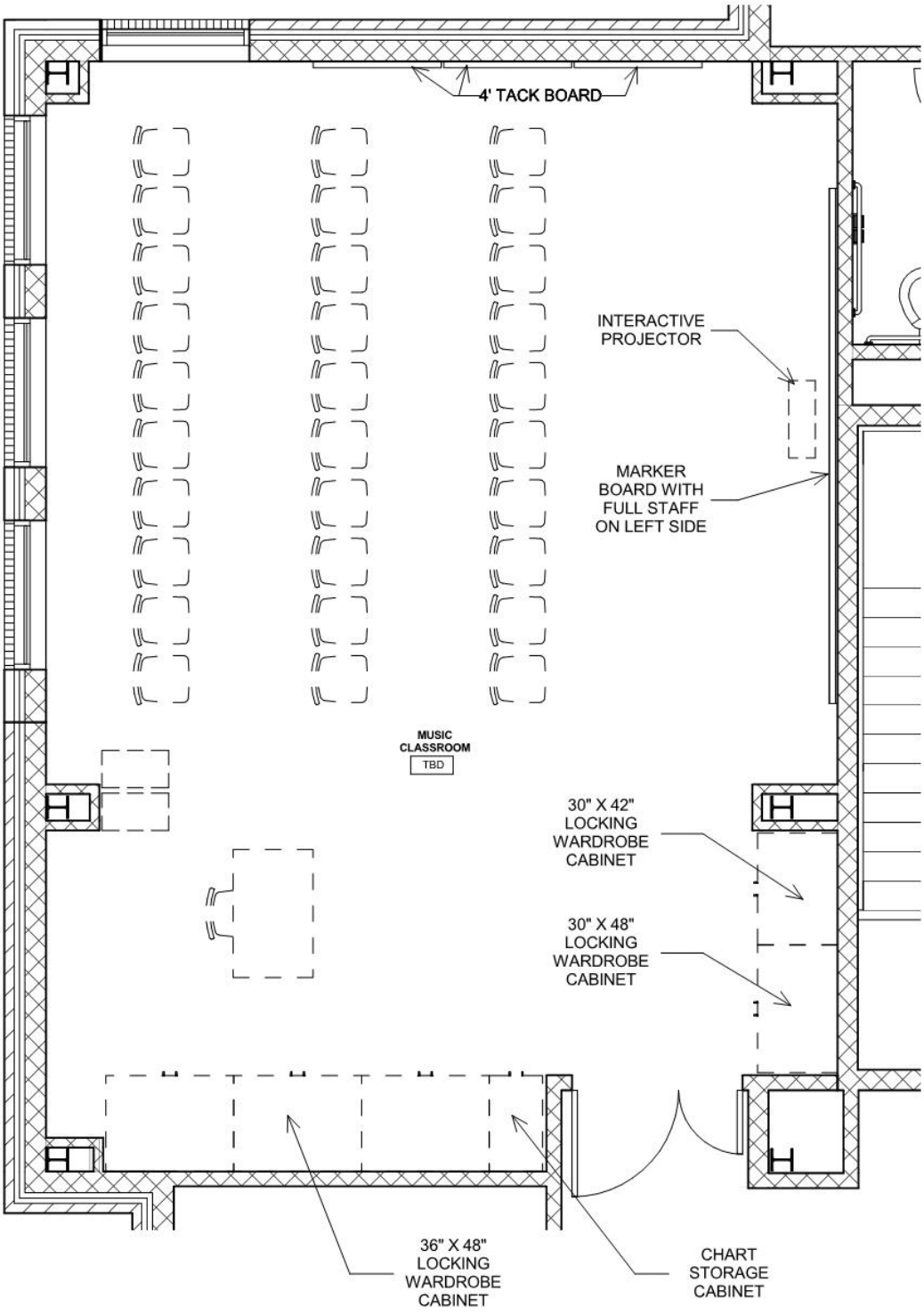
Proposed Exterior Elevations

Design Development Furniture and Equipment Plans

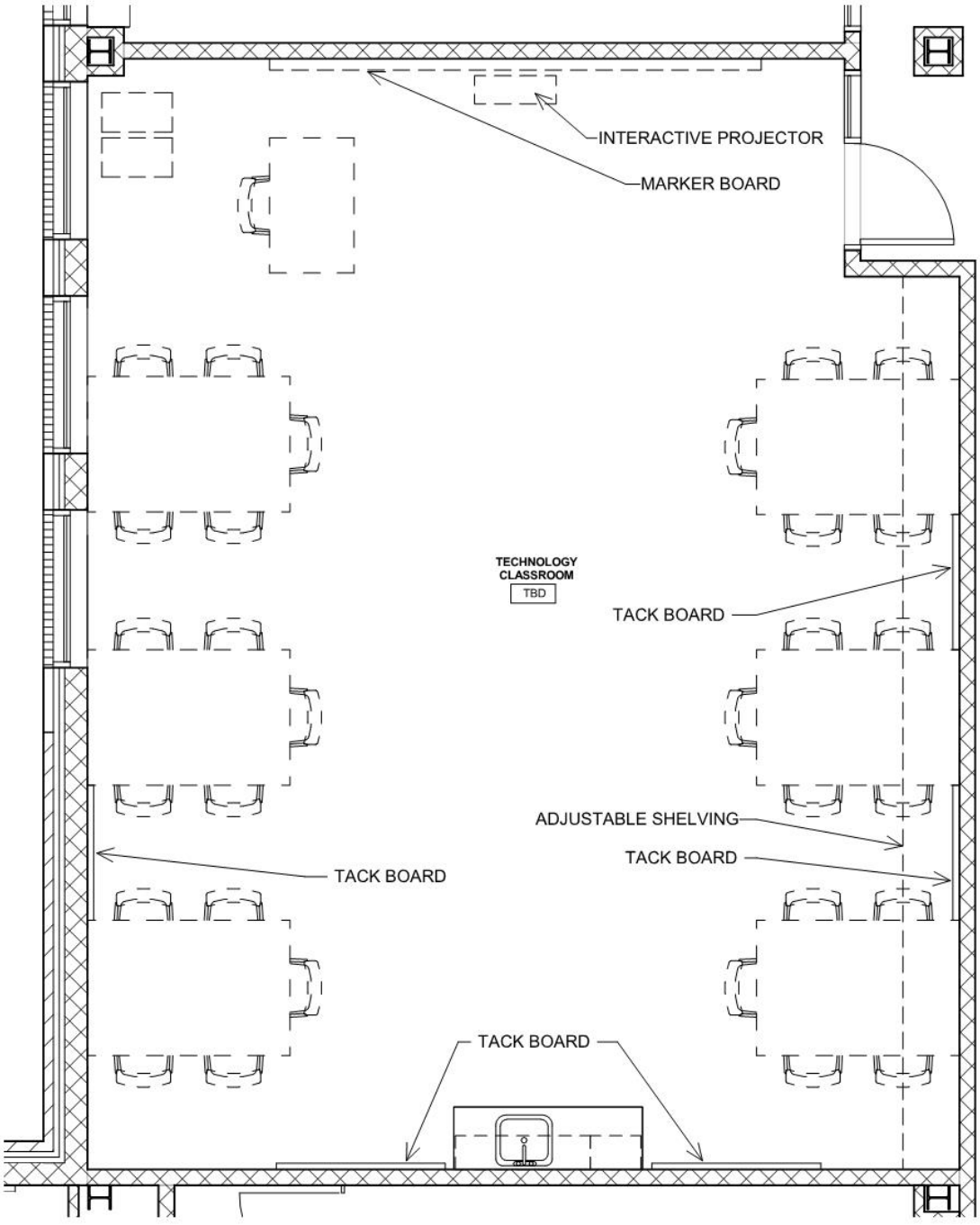
The room plans beginning on page 31 are the result of meetings between the school staff, the design team and the HCPSS staff. These layouts, which include furniture and equipment, will be used as the construction documents are prepared to properly locate electrical outlets, plumbing fixtures and fixed accessories such as cabinetry, projection screens, tack boards and marker boards in each classroom.



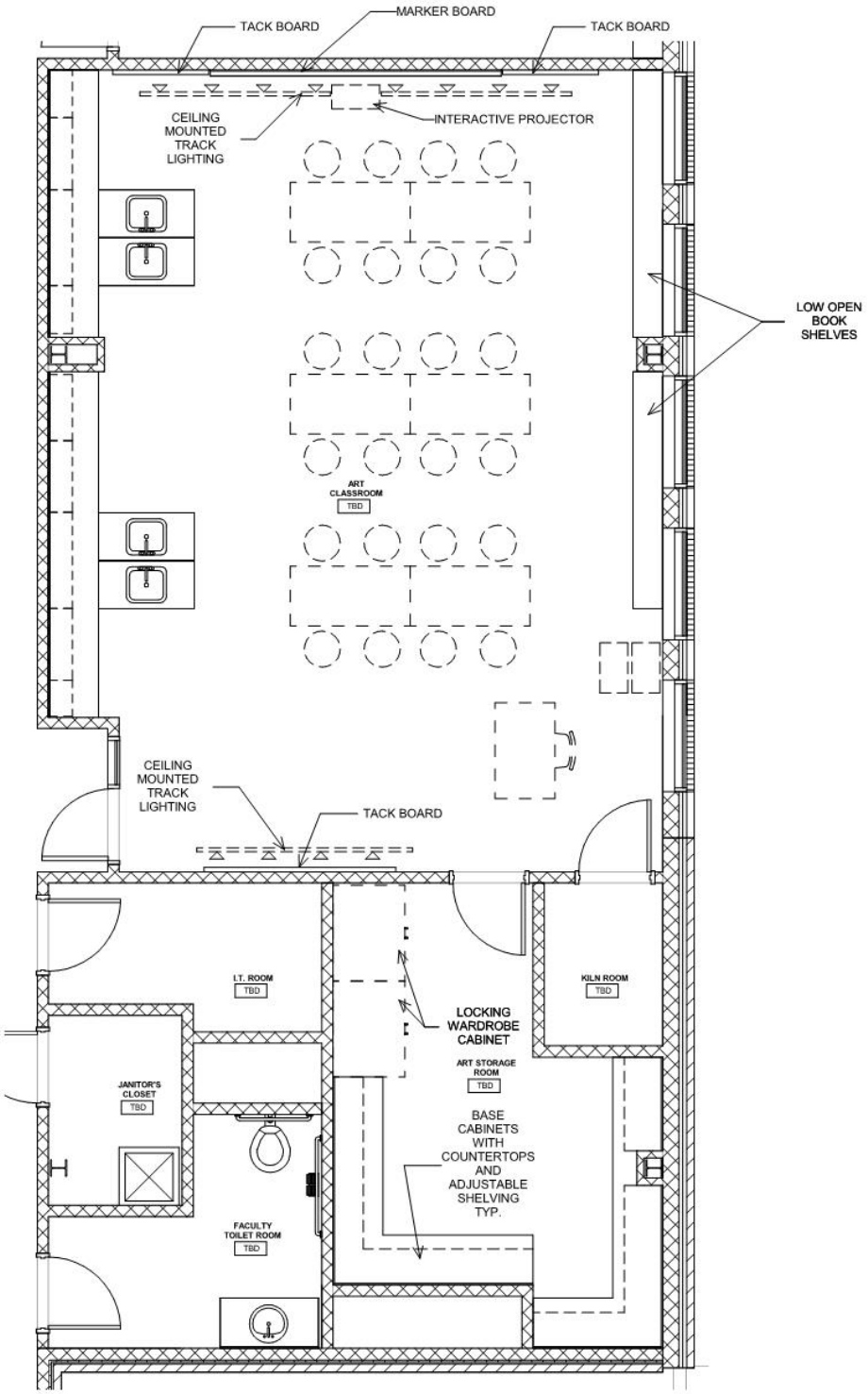
Typical Proposed Classroom Furnishings



Proposed Music Room Furnishings



Proposed Technology Classroom Furnishings



Proposed Art Room Furnishings

Proposed Design Development Mechanical Narrative

The mechanical and fire protections systems will be designed in accordance with applicable local, state and federal codes/standards including the following:

International Building Code
International Mechanical Code
National Standard Plumbing Code
International Energy Code
American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
National Fire Protection Agency (NFPA) Standards
Howard County Public School System (HCPSS) standards

Utilities

Utility work exterior to the building is not anticipated at this time. The following utilities are available for connection within the existing building: chilled water, heating water, domestic hot and cold water, and natural gas. Replacement of the existing boilers will increase the gas load to the building therefore, the gas utility will need to verify that an upgrade to the existing service will not be required.

Heating, Ventilating and Air Conditioning (HVAC)

HVAC Design Criteria

The HVAC system is anticipated to be designed in accordance with the following criteria:

Outdoor Temperature:	Summer	95° F db / 78° F wb
	Winter	0° F db
Indoor Temperature:	Summer	75° F +/- 2° F, max 60% RH
	Winter	70° F +/- 2° F, max 60% RH
Ventilation:	ASHRAE Standard 62.1 compliance	
Building Envelope:	Wall, window and roof U-factors as well as window shading coefficients will meet or exceed ASHRAE Standard 90.1 requirements.	

Cooling System

The existing primary cooling source for the building is an indoor water cooled chiller with a roof mounted cooling tower. The existing system is near maximum capacity and will not be utilized to serve the proposed building additions. In addition to the chilled water system serving the original classroom areas, multiple rooftop direct expansion (DX) units serve the remainder of the building. The recent 2008 kindergarten addition was provided with a rooftop DX unit serving a variable volume distribution system. The three proposed building additions will be provided with similar rooftop DX equipment to meet the cooling requirements.

Heating System

Heating water is currently being generated by two (2) gas-fired cast iron boilers located within an interior mechanical room. While the existing boilers can accommodate the current heating demand with some redundant capacity, there does not appear to be capacity available to serve the proposed building additions and also provide additional redundant capacity. Therefore, the existing boilers are anticipated to be replaced with two (2) gas-fired high efficiency condensing boilers with approximate capacity of 2,760 MBH gross output each. The new boilers are anticipated to be located in the same location as the existing boilers.

The existing heating water pumps will be replaced as well to match the new heating flow requirement. Heating water pumps will be vertical in-line or base mounted end suction type with vibration isolation. The heating water pumps will be controlled by variable frequency drives to maximize energy conservation.

Existing heating water piping will be extended to the air handling units and miscellaneous heating equipment (unit heaters, cabinet heaters, radiant panels, etc.) in the winter. Perimeter heat (ie. radiant panels) will be provided for occupied spaces with windows adjacent to the building exterior. In addition, heating water will be provided to the air volume terminal (VAV) heating coils year around.

Where possible, heating water will be piped for reverse return and will be insulated throughout.

Air Distribution System

Three (3) packaged rooftop DX air handling units (AHU's) are anticipated to be furnished to deliver conditioned and ventilated air to all occupied spaces for each of the proposed additions.

The air handling units serving the cafeteria and classroom additions will be variable air volume type and each will be provided with a hot water heating coil, DX cooling coil, filters, as well as access sections for maintenance access to all coils, filters, etc. Conditioned air will be distributed through medium pressure ductwork to pressure independent air volume (VAV) terminals.

The air handling unit serving the Activities Room addition will be constant volume heating and ventilating unit, and be provided with a hot water heating coil, filters, as well as access sections for maintenance access to all coils, filters, etc.

Automatic Temperature Controls

Automatic temperature controls for all new HVAC equipment will be direct digital control (DDC) type with electric actuation. Each control function and associated control point of all mechanical equipment shall be incorporated into the building temperature control system. All temperature control work will interface with the HCPSS energy management control system.

All existing HVAC equipment is currently provided with pneumatic controls under the base bid, the existing pneumatics are not anticipated to be upgraded to DDC.

Add Alternate No. 2

Under Add Alternate No. 2, the following existing HVAC equipment controls will be upgraded to DDC with electric actuation:

Quantity	Description	Quantity	Description
1	Indoor Water Cooled Chiller	4	Base Board Radiation
1	Cooling Tower	6	Convectors
10	Pumps	1	Unit Heater
9	Air Handling Units	7	Cabinet Unit Heater
25	Fans	12	Duct Mounted Hot Water Coils
3	Air Cooled Condensing Units	9	Air Terminal Units
31	Fan Coil Units		

Plumbing

Plumbing fixture types and flow restrictions will be in accordance with the National Standard Plumbing Code and HCPSS standards. Handicapped requirements will comply with the Americans with Disabilities Act (ADA) and ANSI Standards.

Low water use fixtures will be utilized to maximize water conservation. Low flow fixtures are anticipated to include 1.28 gallon per flush (gpf) water closets, 0.125 gpf urinals as well as 0.5 gpm sinks and lavatories. In addition, manually operated flush valves and faucets are anticipated to be provided.

Domestic hot water is anticipated to be extended from the existing domestic water distribution system.

All domestic water piping will be type L copper. In addition, all piping will be insulated in accordance with ASHRAE 90.1 and a hot water recirculation system will be provided. Isolation valves will be provided throughout the domestic water system to allow maintenance to occur with minimal impact to other areas of the building. Access panels/doors will be provided for all components that require maintenance.

All waste and drainage piping will be cast-iron; plastic and galvanized pipe will not be utilized. In addition, all toilet rooms and shall be provided with floor drains. All drains will include a trap primer.

Fire Protection

A wet pipe sprinkler system will be provided for each of the building additions. The existing sprinkler distribution system is anticipated to be upgraded and extended to each of the proposed additions.

Recessed type sprinkler heads will be utilized in all areas except storage rooms, mechanical rooms, etc. Where piping is exposed, upright heads will be provided.

Proposed Design Development Electrical Narrative

Power Distribution

The existing electrical service to the Laurel Woods ES is provided by BGE at 208/120 volt, 3 phase, 4 wire via underground service entrance conductors. The main service entrance switchboard is rated for 2500 Amp, 208/120 volt with 2500A main disconnect circuit breaker. It contains a utility CT section, main circuit breaker section and distribution section which is used to feed the building branch circuit panelboards. The peak load obtained from BGE for the building is 348 kW at 0.9 power factor or 1,073 Amps. There is spare capacity available at the main switchboard; however, this capacity cannot be utilized for this project because there are no spare circuit breakers or spaces available in the distribution section of the service switchboard. Re-arrangement of the existing spaces adjacent to the location of the existing switchboard will be required in order to install additional distribution section to support additional branch circuit panelboads required for expansion of the existing elementary school. The new distribution section will consist of molded case circuit breakers with electronic adjustable trip setting.

The distribution equipment for the expansion areas will consist of 208Y/120 volt panelboards provided as necessary to serve the lighting and receptacle branch circuits. These panels will be located in electric closets. Individual combination magnetic motor starters and motor circuit protectors will be provided for support of the mechanical equipment. Variable frequency drives (VFD's) with by-pass will be provided for all motors that require adjustable speed operation. The panelboard serving computer load will be provided with 200 percent neutral and transient voltage surge suppressors. All branch circuits and feeders shall be installed in conduits and shall have separate green grounding wire in same raceway. The existing water cooled chiller and associated cooling tower will be disconnected from electrical power source. Removal of the equipment is under Division 23. Power connection to a new air cooled chiller located on the roof (150 ton) water pumps will be provided. A heat tracing system for all exterior chilled water piping will be connected to the emergency power distribution system.

Emergency Power

A new emergency generator in a sound attenuated enclosure with a critical grade exhaust silencer will be located outdoors. The 208/120 volt automatic transfer switches, emergency distribution and branch circuit panelboards and dry type transformers for the life safety and optional branches of the emergency power distribution system will be located in the extension to the boiler room.

The following emergency loads will be connected to the life safety branch of emergency distribution system:

- Egress and exit lighting.
- Fire detection and alarm system (also provided with integral battery backup).
- Security and access control system (also provided with integral battery backup).
- Generator auxiliary systems.

The non-essential emergency load will be connected to the optional branch of the emergency distribution system.

Lighting

The lighting design for the expansion areas will be in accordance with the design requirements and usage of each space. Zonal cavity and/or point by point calculations will be provided for each space utilizing effective reflectances of ceiling, wall, floor, light loss factor and the co-efficient of utilization to maintain the recommended light level at the working surfaces. Coefficient of utilization will be obtained from the particular lighting fixture cuts after the final fixture selections are completed. IES recommended footcandle levels will be maintained throughout the spaces.

In general, 2' x 4' fluorescent troffers with 3500K, T5 and T5HO lamps and electronic ballast, prismatic acrylic lenses will be used. Other energy saving lamp types such as compact fluorescent downlight and HID lights will also be provided for the interior and exterior lighting design. All ballasts will be energy efficient electronic type with 10% THD. As per NFPA Life Safety Code, the proper number of egress lights and exit signs on emergency circuits will be provided.

Lighting controls will consist of digital lighting management (DLM) control system that automatically maximizes lighting energy efficiency. DLM includes room controllers and occupancy sensors, interfaces and accessories that provide convenient energy-saving control of switched loads. DLM will be used for stand-alone control of individual building spaces.

Egress and exit lighting will be provided in accordance with NFPA Life Safety Codes. The branch circuits for the emergency and exit lighting will be connected to the emergency distribution system. The emergency lighting fixture will be switchable by using GTD generator transfer device, which allowing to by-pass lighting fixture switch and transfer to power source to the emergency generator during power outage.

Fire Alarm System

An addressable, electrically supervised, microprocessor based fire alarm and detection system will be provided to replace the existing hardwired system to meet IBC/IFC requirement. The new fire alarm system with voice evacuation shall be provided for the entire school. Initiating devices will include manual stations, smoke detectors, thermal detectors, duct type smoke detectors, interface modules for sprinkler flow switches and OS&Y valve position switches. Indicating devices will include combination speaker/strobe devices and supplementary visual devices. Audible and visual alarm signals will operate throughout entire building. Auxiliary devices will include control modules for remote signaling and control.

Interface with the new elevator for "recall" and power shunt trip shall be provided. The fire alarm control panel will be located in the electrical room. A fire alarm annunciator panel will be provided at the main entrance.

The fire alarm system will be designed in accordance with the state of Maryland Fire Code, International Building Code, and National Fire Protection Association. All audible, visual, and initiating devices will be designed to meet ADA requirements.

Construction Cost Estimate

Additions to Laurel Woods Elementary School

	S/D Phase	D/D Phase
Site Work	$745,139	$938,475
Additions	$4,197,282	$4,958,769
Total for Project	**$4,942,421**	**$5,897,244**
Options:		
Add-Alternate for P.E. activities room addition	$401,655	$438,172
Add-Alternate for upgrade to DDC controls	$297,552	$321,172
Total for Project (including Options)	**$5,641,628**	**$6,656,588**

Notes

- Construction cost estimate was prepared by the construction manager, J. Vinton Schafer & Sons Inc, and assumes that bids will be received in May 2014.
- Estimate includes a design development phase cost estimate contingency of +8%.
- Estimate assumes non-wage rate pricing. (Add 9% for wage rate)
- Estimate does not include a project contingency.