WEST COUNTY ELEMENTARY SCHOOL
DESIGN DEVELOPMENT SUBMISSION

ANNE ARUNDEL COUNTY PUBLIC SCHOOLS
APRIL 7, 2020

ARCHITECTS GWWO

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DESIGN COMMITTEE & DESIGN TEAM

DESIGN COMMITTEE

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PROJECT INFORMATION

PROJECT SUMMARY

AACPS Design Capacity of School:

Base Bid:	506 Students
Alternate Bid with 4 Classroom Addition:	598 Students

BUILDING & SITE CONSTRUCTION ESTIMATE

Building:	$ 27,363,550**
Site Development:	$ 6,317,878
Total:	**$ 33,681,428**

** Construction Management Fees included in Building Estimate

PROJECT SCHEDULE

Schematic Design:	November 2020
Design Development:	April 2021
Construction Documents:	February 2022
Bid Opening:	April 2022
Construction Start:	May 2022
Construction Complete:	August 2024

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SPACE ANALYSIS

Program Spaces		Educational Specification				Schematic Design			Design Development		
		# of rooms	Square footage	Rooms Subtotal	Section Subtotal	# of rooms	Rooms Subtotal	Section Subtotal	# of rooms	Rooms Subtotal	Section Subtotal
1.00.00 ADMINISTRATION					**2,420**			**2,525**			**2,586**
1.01.00	**Main Office**				1,600			1,633			1,646
1.01.01	Reception and Clerical Work Space	1	510	510		1	509		1	485	
1.01.02	Principal	1	200	200		1	200		1	218	
1.01.03	Assistant Principal	1	140	140		1	140		1	137	
1.01.04	Conference Room	1	300	300		1	312		1	314	
1.01.05	Workroom - Administration	1	200	200		1	210		1	237	
1.01.06	Administration Storage	1	100	100		1	105		1	95	
1.01.07	Student Records	1	80	80		1	76		1	83	
1.01.08	Administration Coat Closet	1	10	10		1	21		1	12	
1.01.09	Testing Storage	1	60	60		1	60		1	65	
1.02.00	**Other Spaces**				820			892			940
1.02.01	Itinerant/Volunteer Room	1	120	120		1	107		1	104	
1.02.02	Faculty Lounge	1	600	600		1	672		1	724	
1.02.03	Workroom - Intermediate	1	100	100		1	113		1	112	
2.00.00 STUDENT SUPPORT					**1,030**			**1,156**			**1,210**
2.01.00	**Health**				710			852			885
2.01.01	Health Waiting	1	100	100		1	221		1	246	
2.01.02	Office/Consult/Exam	1	150	150		1	150		1	144	
2.01.03	Examination Room	0	100	-		0	-		0	-	
2.01.04	Rest Area	1	120	120		1	134		1	123	
2.01.05	Student Rest Room	2	90	180		2	202		2	210	
2.01.06	Treatment/Medication	1	120	120		1	109		1	117	
2.01.07	Health Storage	1	40	40		1	36		1	45	
2.02.00	**Guidance**				320			304			325
2.02.01	Counselor's Office	1	200	200		1	190		1	193	
2.02.02	Psychologist Office	1	120	120		1	114		1	132	
3.00.00 CORE INSTRUCTIONAL PROGRAMS					**22,770**			**22,562**			**22,876**
3.01.00	**Classrooms**				19,720			19,705			19,882
3.01.01	Classroom	16	850	13,600		16	13,739		16	13,863	
3.01.02	Early Childhood Classroom	6	1,020	6,120		6	5,966		6	6,019	
3.02.00	**Resource**				2,200			2,042			2,179
3.02.01	General Resource	4	400	1,600		4	1,460		4	1,583	
3.02.02	Special Education Resource	1	400	400		1	365		1	379	
3.02.03	Speech	1	200	200		1	217		1	217	
3.03.00	**Special Education**				850			815			815
3.03.01	Special Education Classroom	1	850	850		1	815		1	815	
4.00.00 SPECIALIZED INSTRUCTIONAL PROGRAMS					**14,615**			**14,593**			**14,473**
4.01.00	**Art**				1,395			1,384			1,381
4.01.01	Art Classroom	1	1,140	1,140		1	1,140		1	1,135	
4.01.02	Art Storage	1	180	180		1	175		1	176	
4.01.03	Kiln Room	1	75	75		1	69		1	70	

WEST COUNTY ELEMENTARY SCHOOL

Program Spaces			Educational Specification				Schematic Design			Design Development		
			# of rooms	Square footage	Rooms Subtotal	Section Subtotal	# of rooms	Rooms Subtotal	Section Subtotal	# of rooms	Rooms Subtotal	Section Subtotal
4.02.00	**Library Media Center**					3,660			3,332			3,582
	4.02.01	Library Reading Room	1	2,800	2,800		1	2,505		1	2,851	
	4.02.02	Library Workroom	1	100	100		1	84		1	175	
	4.02.03	Library Storage	1	180	180		1	185		0	-	
	4.02.04	Library Office	1	180	180		1	169		1	159	
	4.02.05	Library Maker Space	1	400	400		1	389		1	397	
4.03.00	**Music**					2,000			1,943			1,934
	4.03.01	General Music	1	925	925		1	900		1	895	
	4.03.02	Music Storage	1	150	150		1	143		1	144	
	4.03.03	Instrumental Music Classroom	1	925	925		1	900		1	895	
4.04.00	**Physical Education**					4,630			4,599			4,609
	4.04.01	Gymnasium (excludes community use space per 6.01.02)	1	4,000	4,000		1	4,000		1	4,000	
	4.04.02	Teacher Planning	1	80	80		1	85		1	89	
	4.04.03	Gymnasium Storage	1	400	400		1	371		1	369	
	4.04.04	Exterior Storage	1	150	150		1	143		1	151	
4.05.00	**Computer Lab**					1,000			1,273			981
	4.05.01	Computer Lab	1	850	850		1	960		1	815	
	4.05.02	Computer Lab Tech Workroom	1	150	150		1	313		1	166	
4.06.00	**Learning Studio**					1,930			2,062			1,986
	4.06.01	Learning Studio	2	925	1,850		2	1,816		2	1,785	
	4.06.02	Learning Studio Storage	1	80	80		2	246		2	201	
5.00.00 BUILDING OPERATIONS						**11,171**			**11,973**			**11,716**
5.01.00	**Custodial**					1,126			1,318			1,046
	5.01.01	Custodial Closet (3 @ 45, 1 @ 80)	4	54	216		4	384		4	205	
	5.01.02	Building Engineer's Office	1	80	80		1	103		1	89	
	5.01.03	Exterior Can Wash	1	30	30		1	30		1	26	
	5.01.04	Book Storage	1	500	500		1	435		1	435	
	5.01.05	Building Operations Storage	1	150	150		1	150		1	151	
	5.01.06	Exterior Storage	1	150	150		1	216		1	140	
5.02.00	**Food Services**					5,910			5,916			5,906
	5.02.01	Cafetorium	1	3,200	3,200		1	3,160		1	3,020	
	5.02.02	Kitchen	1	1,680	1,680		1	1,664		1	1,815	
	5.02.03	Kitchen Manager's Office	1	80	80		1	80		1	90	
	5.02.04	Food Staff Locker Room	1	100	100		1	100		1	83	
	5.02.05	Chair Storage	1	200	200		1	193		1	196	
	5.02.06	Platform	1	650	650		1	719		1	702	
5.03.00	**Rest Rooms**					2,040			2,508			2,469
	5.03.01	Group Rest Room	6	180	1,080		6	1,367		6	1,339	
	5.03.02	Staff Rest Room	6	50	300		6	386		6	344	
	5.03.03	Student Rest Room (see individual areas)	12	50	600		12	692		14	721	
	5.03.04	Mother's Nursing Room	1	60	60		1	63		1	65	

SPACE ANALYSIS

Program Spaces		Educational Specification				Schematic Design			Design Development		
		# of rooms	Square footage	Rooms Subtotal	Section Subtotal	# of rooms	Rooms Subtotal	Section Subtotal	# of rooms	Rooms Subtotal	Section Subtotal
5.04.00	**Mechanical/Electrical**				1,750			1,789			1,843
5.04.01	Mechanical Room	1	1,100	1,100		1	994		1	1,146	
5.04.02	Electrical Room	1	350	350		1	325		1	342	
5.04.03	Electrical Closet	4	75	300		4	470		4	355	
5.05.00	**Telecommunication**				345			442			452
5.05.01	Telecommunication Room	1	120	120		1	150		1	225	
5.05.02	Telecommunication Closet	3	75	225		3	292		3	227	
5.06.00	**Circulation** (SF included in efficiency adjustment)										
5.06.01	Entrance Vestibule			-			-			-	
5.06.02	Classroom Corridors			-			-			-	
5.06.03	Public Corridors			-			-			-	
6.00.00 COMMUNITY USE PROGRAMS					**4,400**			**4,268**			**4,145**
6.01.00	**Community Use Space in School**				4,400			4,268			4,145
6.01.01	Before/After Care	1	2,400	2,400		1	2,414		1	2,244	
6.01.02	Extended Gym - additional area for community use	1	2,000	2,000		1	1,854		1	1,901	
Subtotal all base bid school building programs					56,406			57,077			57,006
Efficiency adjustment					21,152			23,813			23,762
GROSS SCHOOL BUILDING SQUARE FOOTAGE					77,558			80,890			80,768
12 CLASSROOM ALTERNATE ADDITION					**3,400**			**3,541**			**3,649**
	Alternate				3,400			3,541			3,649
3.01.01	Classroom	4	850	3,400		4	3,439		4	3,522	
	Restrooms (First Floor - per Oct 6, 2020 meeting)					2	102		2	127	
Subtotal all school building programs w/ alternate					59,806			60,618			60,655
Efficiency adjustment					22,427			26,916			24,742
GROSS SCHOOL BUILDING SQUARE FOOTAGE W/ ALTERNATE					82,233			87,534			85,397

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BACKGROUND

The proposed site for West County Elementary School is located at 2694-2734 Conway Road in Odenton, Maryland. The site is approximately 10 acres and is the southern portion of a 36.32-acre parcel of land divided by a BGE high power transmission line right-of-way. The site is bound by Conway Road to the south, the BGE right-of-way to the north, private property to the west, and forested land to the east. The eastern portion of the site is forested, while the central portion contain a vacant structure with forested areas and grasslands.

The West County Elementary School Educational Specification, dated April 15, 2020, provides for an elementary school with an estimated Design Capacity of 506 students in grades pre-K through 5. The Educational Specification accounts for the possibility of an add alternate 4 classroom addition, which would bring the Design Capacity to 598 students.

DESIGN GOALS

- Accommodate the intent of the Educational Specification requirements in a new state-of-the-art facility.
- Provide a building plan which utilizes adjacencies and basic design principles established in the typical AACPS elementary school prototype design while developing a concept that adapts to the current site.
- Provide natural light throughout the new building to the greatest extent possible.
- Provide the new building with an easily recognizable main entry.
- Allow for maximum visual supervision and security of entry and open spaces.
- Provide an enhanced building envelope which complies with current energy codes.
- Provide a LEED Silver facility.
- Develop a relationship between core instructional spaces and specialized instructional programs.
- Provide separation between noisy and quiet curriculum, between public and private spaces, and between evening and school-day use spaces.

Additional information about the new elementary school and site design can be found in the following narratives.

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NARRATIVE DESCRIPTIONS

EXISTING SITE INFORMATION

SITE DESCRIPTION - EXISTING

The property is located at 2694-2734 Conway Road in the rural area of Odenton, Maryland. It consists of one 36.32-acre parcel divided by a BGE high power transmission line into two non-contiguous areas of land. The northern portion is completely forested while the southern portion contains a vacant structure with forested areas and grasslands. The southern portion, approximately 10.26 acres, is the subject site for West County Elementary School and will be the only portion analyzed in this narrative.

The property is owned by Anne Arundel County and officially known as Map 36, Grid 15, Parcel 29.

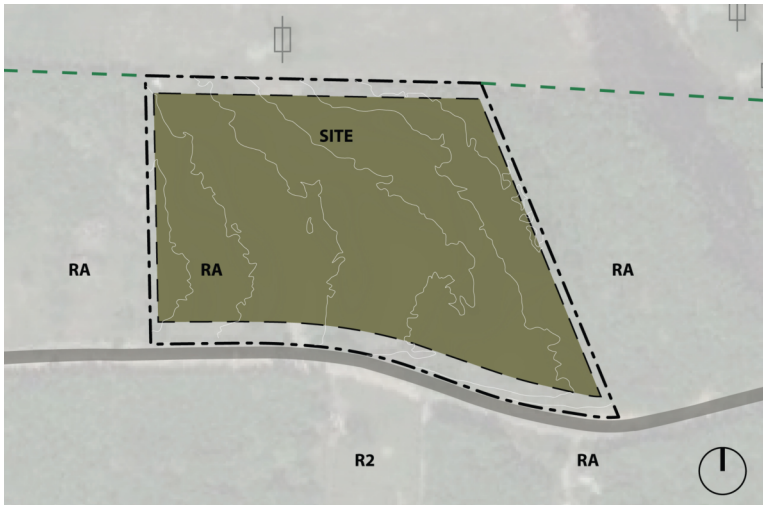
South of the property across Conway Road are forested areas and single-family detached homes. Bordering the property to the east is forested area, to the north is a BGE high power transmission line right-of-way, and to the west is forested area and a single-family detached home.

SITE CIRCULATION AND PARKING

Located approximately 1,400 feet west of the Patuxent Road and Conway Road traffic circle, the only access point to the site is a gravel driveway extending into the parcel. There is no existing sidewalk or shoulder along Conway Road. Additionally, there are no parking areas or sidewalks throughout the site.

ZONING INFORMATION

The site is currently zoned as RA (Rural Agricultural) and schools with less than 125 onsite parking spaces are permitted as a conditional use. The properties to the west, north, east, and across Conway Road to the south east are zoned as RA (Rural Agricultural) as well. The property across Conway Road to the southwest is zoned as R2 Residential.



The following specific development standards for the RA zone of the Anne Arundel County zoning code are provided for guidance only.

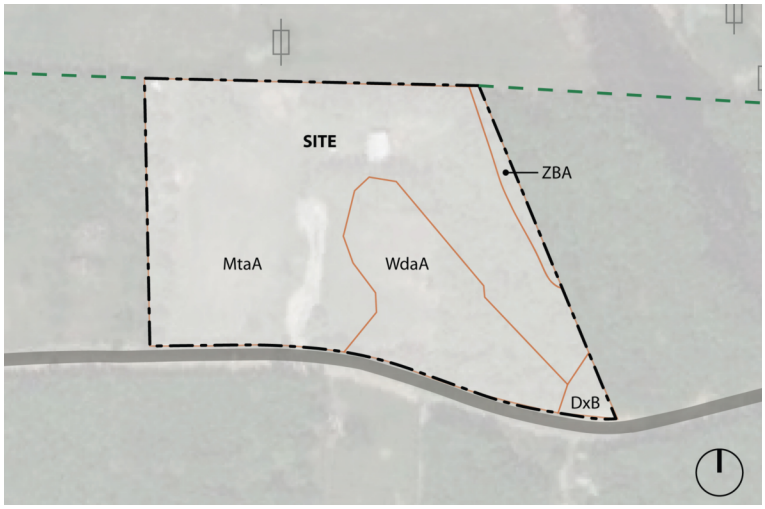
Bulk Zoning Regulations in an RA zone is as follows:

Minimum lot size	40,000 square feet
Maximum coverage by structures	25% of gross area
Minimum width at front building restriction line	150 feet
Minimum setbacks for principal structures:	
Front lot line	40 feet
Rear lot line	35 feet
Side lot lines	15 feet
Corner side lot line	40 feet
Principal arterial or higher classification road	50 feet
Minimum setbacks for accessory structures other than sheds that do not exceed 64 square feet in area and eight feet in height:	
Front lot line	50 feet
Side and rear lot lines	15 feet or, for structures less than 8 feet in height (other than swimming pools, tennis courts, basketball courts, and similar private recreational facilities accessory to single-family detached, duplex, or semi-detached dwellings), 10 feet
Corner side lot line	40 feet
Maximum height limitations:	
Principal structures	45 Feet
Accessory structures	45 feet if all setbacks are increased by one foot for each foot of height in excess of 25 feet

SITE SOILS

According to information obtained from the United States Department of Agriculture Natural Resources Conservation Service, the site falls into four (4) distinct soil groups:

- MtaA: Mattapex silt loam, 0 to 2 percent slopes.
- WdaA: Woodstown sandy loam, 0 to 2 percent slopes.
- DxB: Downer-Phalanx complex, 2 to 5 percent slopes.
- ZBA: Zekiah and Issue soils, 0 to 2 percent slopes.



Additional information regarding these soils is identified in the table below:

Map Unit	Percent of Site Area	Hydrologic Soils Group	AASHTO Classification	Hydric Soils
MtaA	73%	C	A-4	Yes
WdaA	22%	C	A-2-4	Yes
DxB	2%	A	A-2-4	No
ZBA	3%	B/D	A-4	Yes

SITE TOPOGRAPHY

The site generally slopes from west to east toward a nearby unnamed Patuxent tributary stream. The high spot, at an approximate elevation of 106', is along the center portion of the western property line. The eastern property line is at approximate elevation 93' and slopes down to the east. The southern quarter of the site drains away from the site and towards a swale that runs along the northern edge of Conway Road. With an elevation difference of 13 feet, slopes across the site are minimal and provide for favorable site design and a low cut/fill ratio.

UTILITIES

Water

Public road and storm drain as-built plans for Conway Road show a 16-inch main running along the northern edge of Conway Road. This main also serves fire hydrants along Conway Road, one of which is approximately 375 feet southeast of the existing driveway onsite. The next closest hydrant is approximately 160 feet west of the southwestern corner of the site.

Sanitary Sewer

Public road and storm drain as-built plans for Conway Road show a 16-inch HDPE force main running along the southern edge of Conway Road.

Storm Drains

According to public road and storm drain as-built plans for Conway Road, there are no storm drain networks on or nearby the property. Two inlets located approximately 815 feet west along Conway Road are the closest storm drain structures.

Site Lighting and Security

Currently, there is no onsite lighting or security measures. There are street lights spaced approximately 300 feet apart along both sides of the Conway Road right-of-way.

Gas, Electric, Cable, and Telephone

Record drawings have been requested from BGE. However, there are overhead electrical lines, and possibly underground electric lines, running along Conway Road.

Refer to the mechanical, electrical, and plumbing section for additional information regarding gas, electric, and data utilities.

STORMWATER MANAGEMENT

There are no existing stormwater management facilities on the West County Elementary School site. Any new construction that occurs will be required to meet the requirements established by the Maryland Stormwater Act of 2007. These guidelines establish a process by which new construction needs to utilize sustainable or Environmental Site Design (ESD) to the maximum extent practicable to satisfy water quality requirements. ESD facilities include but are not limited to micro-bioretentions, dry and/or wet swales, rain gardens, etc. Attempts should be made to provide for impervious disconnects and to allow for adequate open space to construct multiple smaller facilities throughout the site to satisfy these requirements.

FLOODPLAINS, WETLANDS, AND WATERWAYS

The site is not located within the 100-year floodplain as delineated on FEMA flood insurance rate map 24003C0138E (effective 10/12/2012) and map 24003C0139E (effective 10/16/2012). The site is located in Zone X which signifies an area of minimal flooding.

A review of the MERLIN (Maryland Environmental Resources and Land Information Network) mapping indicates that no wetlands or streams exist onsite. Additionally, the site is not within 1,000 feet of the Chesapeake Bay and therefore is not located with the Chesapeake Bay Critical Area.

LANDSCAPE, TREES, AND FOREST CONSERVATION

Overgrown grass and light brush exist in the center and western half of the property. Forested area covers the center and remaining eastern portion of the property. A treeline abuts the Conway Road right-of-way and trees of various size speckle the grassland areas. There appear to be three specimen trees onsite, two located near the existing structure and one in the northeastern corner.

This site is located within a Department of Natural Resources (DNR) Targeted Ecological Area (TEA). These areas are defined as “lands and watersheds of high ecological value that have been identified as conservation priorities by the Maryland DNR for natural resource protection.” Additionally, portions of the site are located within a Tier 4 area of Maryland’s Biodiversity Conservation Network (BioNet). Tier 4 represents areas that are moderately significant for biodiversity conservation.

A Forest Stand Delineation and conservation plan will be required for any development that exceeds 40,000 square feet on the site. Any specimen tree removal that may be required will require a modification request as well as mitigation as part of any design that impacts any of these trees that are determined to meet specimen tree requirements.

CIVIL DESIGN

SITE DESCRIPTION

The site will be developed to maximize the proposed programming for the school. A new building will be constructed in addition to a staff and visitor parking lot, a bus drop-off loop, a full-size multi-purpose playing field, multiple small play areas, and a service drive for deliveries and emergency vehicle access. An access road will also be constructed from Conway Road to the BGE easement in order to provide a future connection to the northern piece of the property.

SITE CIRCULATION AND PARKING

The proposed parking lot will provide both staff and visitor parking, as well as a parent drop off loop around the outside. The parking lot will have two curb cuts off of the proposed access road to provide efficient circulation at drop-off and pick-up times. A dedicated bus loop is proposed off of Conway Road in order to separate bus traffic from parent drop-off and staff traffic. Sidewalks will be provided throughout the site to ensure seamless connectivity and ease of maneuverability. They will be designed as required by ADA accessibility guidelines to ensure accommodation.

ZONING INFORMATION

The new construction will be in compliance with the Anne Arundel County Zoning Ordinance.

SITE SOILS

Most soils onsite are hydrologic group C, which means infiltration is unlikely and any stormwater management facility proposed on site will be required to have an underdrain system.

SITE TOPOGRAPHY

Effort will be taken to try and match the existing topography as much as possible when moving through the design phases of this project. The site, having roughly 13 feet in elevation change, is fairly flat. As mentioned previously, ADA accessibility will be provided as required throughout the site.

UTILITIES

Water

A new connection to the existing 16-inch water line in Conway Road will be required for the new building. It is not anticipated the project will require any alterations to this water service.

Sanitary Sewer

A new sanitary sewer system will be constructed for the new buildings on the site. It is anticipated that approximately 600 linear feet of force main sewer will be required to be installed in Conway Road to connect the new building to the existing public gravity sewer in Conway Road. The new sewer sizes will range from 4- to 8-inch pipe.

Storm Drains

New storm drains will be installed in the parking and bus loop areas to convey runoff to new stormwater management devices. Pipe sizes will range from 4 to 24 inches in size and primarily be high density polyethylene pipe.

Gas, Electric, Cable, and Telephone

Refer to the mechanical, electrical, plumbing narrative descriptions for additional information regarding gas, electric and data.

STORMWATER MANAGEMENT

Environmental Site Design (ESD) will be utilized to the maximum extent possible. ESD facilities such as rain gardens, micro-bioretention, and bio-swales will be utilized within the green spaces that are located near the parking bays, within the bus loop, and near other paved surfaces. We anticipate the construction of 12-15 separate ESD facilities.

FLOODPLAINS, WETLANDS, AND WATERWAYS

There will be no impacts to any existing floodplains, wetlands, or waterways.

LANDSCAPE, TREES, AND FOREST CONSERVATION

Landscaping will be provided in accordance with the Anne Arundel County Landscape Manual where feasible and will consist of species native to the area. Plantings will be coordinated with Anne Arundel County Public School's staff as the design progresses. Approximate plantings for the project currently consist of 80 deciduous trees, 60 flowering trees, 60 shrubs, and 170 perennials/ornamental grasses. The stormwater management facilities will be planted with a mixture of grasses and shrubs.

The project will disturb more than 40,000 square feet of area and therefore forest conservation may be required. Additionally, afforestation and mitigation may be required if there are specimen trees, forest, and/or wooded areas impacted within the limits of the project. Any reforestation that will not fit on the site due to the program spaces will be required to be planted on another site or a fee-in-lieu paid. The Forest Stand Delineation is currently in progress and will be provided once completed.

PLAY / ATHLETIC AREAS

A new multi-purpose field will be constructed on the eastern portion of the site. In the northeastern corner of the site, basketball courts as well as elementary and intermediate play areas will be constructed.

ARCHITECTURAL DESIGN

GENERAL DESCRIPTION

The proposed new West County Elementary School is approximately 85,400 gross square feet (including the add alternate classroom addition; 80,800 gsf without the add alternate) and will accommodate an estimated Design Capacity of 598 students (including the add alternate classroom addition; 506 without the add alternate). All programmatic and area requirements of the Educational Specifications will be met in the new building. Design of the new building will comply with current life safety, building, energy, and accessibility codes. The site design will provide the required number of play fields and provide site safety and circulation by separating bus traffic from parent and staff vehicular traffic.

Floor plans of the proposed design are included at the end of this document. The following are highlights of the proposed design development.

BUILDING DESIGN

The plan of the new West County Elementary School utilizes adjacencies and basic design principles established in the current AACPS elementary school prototype design while developing a concept that adapts to the Educational Specification and the current site. The building will be two stories and 'C' shaped around an open courtyard. The central core will house large functions such as the Gymnasium, Cafetorium, and Media Center. Two classroom wings will attach to this core. The wing at the front of the building will house Early Childhood classrooms on the first floor. A three-sided open courtyard occupies the space between the core and two wings, allowing the opportunity for outdoor educational space.

The main entrance is located adjacent to the bus loop, also near the parking lot and drop-off loop. The main lobby is adjacent to the entrance and the Administration Suite.

Administration and Student Support

The Administration Suite is located immediately adjacent to the main entry. Visitors will only be permitted to enter the school by checking in at Reception adjacent to the entry vestibule.

Adjacent to the Administration Suite is the Health Suite. This close proximity will allow parents to quickly pick up students from the Health Suite after checking in at Reception. The Guidance Suite is centrally located adjacent to the Early Childhood classrooms and the Administration Suite.

The Faculty Lounge and a staff Workroom are located on the second floor, allowing for supervision on both levels of the building.

Core Instructional Programs

Core instructional programs are located on both floors of the building in each of the two classroom wings. Special Education and Speech/Hearing are located on the first floor. Two General Resource rooms are located at each level.

In general, classroom spaces will be designed as flexible spaces to allow for future curriculum changes.

Specialized Instructional Programs

The Media Center is centrally located on the first floor along the main corridor. The Media Center is also easily accessible for community members by entering through the main entrance. A Computer Lab is located on the second floor near the primary corridor for easy access by students and flexibility for future curriculum changes.

Art is located on the first floor facing north for optimal daylight.

The Gymnasium is located on the west side of the building with direct access to the exterior.

Music spaces are consolidated on the first floor near the Cafetorium and Platform for easily moving equipment between the Platform and classrooms. They are located in a single-story part of the building for optimal acoustic separation.

One Learning Studio is located on the first floor with courtyard access, and one is located on the second floor.

Building Operations

The Cafetorium is located on the west side of the building close to the service entry for deliveries.

Staff and student toilet rooms are evenly distributed on each floor. A pair of public toilet rooms are provided for the Gymnasium and the Cafetorium to facilitate activities or events occurring in those spaces.

Telecommunication and IT rooms are evenly distributed throughout the building for efficient systems layout.

The Mechanical and Electrical Rooms are located on the first floor at the northwest end of the building along with the receiving area.

BUILDING MATERIALS

Roofing

All roofs shall have sufficient pitch and drains to assure that rainwater will not accumulate. In many areas, the roof structure will have a low slope to facilitate a consistent thickness of rigid insulation. Roofs shall comply with Maryland Department of General Services roof requirements. Typical roofing material will be four-ply built-up roofing with a high-albedo cover sheet.

Exterior

Exterior walls are anticipated to be a combination of brick, glazed curtainwall, and thermally-broken aluminum storefront systems. Parapet conditions will be capped with standing seam metal copings.

Typical exterior walls will be CMU back-up with brick veneer.

Windows & Doors

All exterior windows will be thermally broken aluminum frame systems. Exterior glazing will be clear insulated glazing. Classrooms and office spaces will have operable units. The secure entry vestibule will be exterior laminated security glazing.

An aluminum curtainwall system with insulated glazing will be installed at the main entry, at the ends of corridors, the Media Center, and the second story of the primary corridor. An aluminum storefront system will be used at the Gymnasium and Cafetorium clerestories.

Interior glazing will typically be set in painted hollow metal frames. An aluminum storefront system is anticipated to be used at the main reception, the Media Center, the second floor learning studio, and the second floor interior side of the primary corridor.

Interior doors will be solid core wood doors equipped with accessible hardware, kick plates, and a vision panel. Double doors will be provided with removable mullions. Classroom doors will be lockable from both sides. Exterior doors will be painted hollow metal doors. All door frames, interior and exterior, will be painted hollow metal and grouted solid.

Floors and Wall Base

Floor and base finishes will be provided as required in the Board of Education approved educational specifications.

Walls

Corridor walls will typically be painted CMU.

Toilet rooms will be provided with full height ceramic tile over moisture resistant gypsum board or CMU on the wet walls. The other wall surfaces will be painted.

Gymnasium, Cafetorium, and Kitchen walls will be painted CMU.

Paint

All interior and exterior paint materials will be free of lead and mercury and be V.O.C. compliant with state and local regulations. No and Low V.O.C. paints and finishes will meet the requirements set forth by the USGBC LEED credit Indoor Environmental Quality Credit 2: Low-Emitting Materials.

Ceilings

Toilet rooms will have 5/8-inch thick painted moisture resistant gypsum board ceilings.

Almost all other interior ceilings will be a standard suspended grid and acoustical panel. A 5/8-inch thick moisture resistant gypsum board panel, or exposed painted structure will be provided where required.

Acrylic finishes will be provided in high-moisture environments.

Specific ceiling acoustic treatments will be provided in the Music, Gymnasium, and Cafetorium spaces.

ACCESSIBILITY

The entire facility will be accessible to all individuals with disabilities including sight, hearing, and mobility impaired.

LIFE SAFETY / BUILDING CODES

Design of the new facility will comply with all applicable statutes, codes, or regulations which are or will be in place at the time the construction documents are reviewed by Anne Arundel County code officials and the Interagency Committee on School Construction. Such statutes, codes, or regulations include but are not limited to the International Building Code series as implemented by Anne Arundel County, NFPA Life Safety Codes, storm water management and sediment control regulations, ADAAG, MSDE technical bulletins, and the design guidelines contained in the Anne Arundel County Public Schools Indoor Air Quality Management Plan. No asbestos or lead containing materials will be specified or used, and its absence in the design will be certified to the Owner.

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STRUCTURAL DESIGN

The following section outlines the structural systems and components proposed for the new West County Elementary School building. All new construction will be designed and built using conventional engineering and construction practices.

STRUCTURAL SYSTEMS

Foundations

Foundations are expected to be shallow spread footings. The allowable soil bearing capacity will be determined by geotechnical investigation.

Elevated Floors and Slabs-on-Grade

The floor structure will consist of K-series joists spaced at 5 feet O.C. below classrooms and 4 feet O.C. below corridors. Joists will support a 2 1/2-inch reinforced normal weight concrete slab on 1 1/2-inch composite metal deck (4-inch total thickness). The floor framing will bear on reinforced masonry walls or wide-flange girders connected to HSS columns spaced at approximately 30 feet O.C.

Interior slabs-on-grade will be 4 inches thick and exterior slabs-on-grade will be 5 inches thick. Both will be reinforced with welded wire reinforcement and poured over a crushed stone base. Slabs-on-grade may be thickened to support heavy concentrated loads.

Wall Construction

Exterior and interior walls will be reinforced load bearing masonry. Typical foundation walls will be reinforced, solid grouted masonry.

Roof

The roof structure will consist of K-series and LH-series joists spaced at approximately 6 feet O.C. and will support 1 1/2-inch or 3-inch roof deck. Acoustical cellular deck will be provided as required. The joists will bear on reinforced masonry walls or wide-flange girders connected to HSS columns spaced at approximately 30 feet O.C. The roof structure for the building will be designed to accommodate future solar panels based on IBC 2018 requirements.

LATERAL RESISTING SYSTEMS

The lateral load resisting system will be intermediate reinforced masonry shear walls.

CODES AND STANDARDS

Applicable Codes and Standards:

- International Building Code 2018 with Anne Arundel County Amendments

DESIGN LOADS AND CRITERIA

Superimposed Dead Loads

Suspended Ceiling	1 PSF
Sprinkler System	TBD
Partitions	15 PSF
Mechanical and Electrical Systems – At framed floors and roofs above mechanical rooms, the mechanical and electrical superimposed dead load will be increased to 15 psf.	4 PSF
Masonry wall loads will be added to specific locations as required.	TBD (to be continuous where possible)

Live Loads

Slab on Grade	100 PSF
Classrooms	40 PSF plus partition
Corridors on Main Entrance Level (First Floor)	100 PSF
Corridors Above First Floor	80 PSF
Toilet Rooms	60 PSF
Storage Rooms	125 PSF
Gymnasium	100 PSF
Stairs and Exit Ways	100 PSF
Kitchen/Cafetorium	100 PSF
Media Center (Library Stacks)	150 PSF
Mechanical and Electrical Rooms	150 PSF (or Actual Equipment Weight)
Roof	20 PSF
Roof with Future Photovoltaic Panels	40 PSF

Consideration of drifting, sliding, and unbalanced snow loads as required by the local building code.

Snow Loads

Applicable ground, flat, and drifting snow loads based on section 1608 of the 2018 International Building Code and Chapter 7 of ASCE 7-16.

Importance Factor I_s	1.1
Ground Snow load, p_g	25 PSF
Snow Density	TBD
Exposure Factor, C_e	1.0

Thermal Factor, C_t	1.0
Flat Roof Snow Load, p_f	19.3 PSF
Minimum Load for Low-Slope Roof, p_m	22 PSF

Wind Loads

Applicable wind pressure coefficients established using section 1609 of the 2018 International Building Code and Chapters 26-30 of ASCE 7-16. Components and cladding at walls and roof to be calculated separately with the appropriate code-required factors.

Ultimate Wind Speed, V_{ult}	120 MPH (3 second gust)
Nominal Wind Speed, V_{asd}	93 MPH (3 second gust)
Exposure	B
Internal Pressure Coefficient, GC_{pi}	+/- 0.18

Seismic Design Criteria

Applicable seismic loads based on section 1613 of the 2018 International Building Code and Chapters 11-12 of ASCE 7-16.

IBC Risk Category	III
Seismic Importance Factor	1.25
Spectral Response Coefficients	TBD by Geotechnical Study
Site Class	TBD by Geotechnical Study
Seismic Design Category	TBD by Geotechnical Study
Seismic Force Resisting System – Ordinary Reinforced Masonry Shear Walls – Concentrically Braced Steel Frames	TBD

Concentrated Loads

Floor slabs will be designed for the indicated uniform live loads or a minimum concentrated load of 1,000 pounds, whichever produces the greater stress.

In areas supporting heavy MEP equipment, the floor system will be designed for the actual operating weight and concentration of the equipment.

CONSTRUCTION MATERIALS

Concrete (Minimum Strength at 28 Days)

Foundations	4,000 PSI
Foundation Walls	TBD
Slab on Grade	3,500 PSI
Elevated Concrete Floors	3,500 PSI
Concrete Exposed to Weather	4,000 PSI
Precast Elements	TBD

Reinforcing Steel

Reinforcing Bars	ASTM A615	Grade 60
Welded Wire Fabric	ASTM A185	

Structural Steel

Wide Flange Shapes	50 KSI
Channels, Angles, and Accessory Steel	36 KSI
HSS Tube Shapes	50 KSI
Pipe Shapes	35 KSI
Metal Deck	50 KSI
Headed Studs	TBD
High Strength Bolts	ASTM A325
Anchor Bolts	ASTM F1554 Grade 36
Welding Electrodes	E70XX (SMAW)

Masonry

Hollow Concrete Units	ASTM C90	Grade N
Mortar	ASTM C270	Type S (1,800 PSI), M (2,500 PSI), & N (750 PSI)
Grout	ASTM C476	3,000 PSI

MECHANICAL DESIGN

DESIGN CRITERIA

Applicable Codes and Standards:

- 2018 International Building Code (IBC)
- 2018 International Mechanical Code (IMC)
- 2018 International Energy Conservation Code (IECC)
- 2018 International Plumbing Code (IPC)
- 2018 National Fuel Gas Code
- ASHRAE Standard 55-2017 - Thermal Environmental Conditions for Human Occupancy
- ASHRAE Standard 62.1-2013 - Ventilation for Acceptable Indoor Air Quality
- ASHRAE Standard 90.1-2013 - Energy Standard for Buildings
- NFPA 90A: Standard for the Installation of Air Conditioning and Ventilating Systems, latest edition
- Maryland Building Performance Standards 2015 – COMAR 05.02.07
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Handbooks
- ASME A17.1 Safety Code for Elevators and Escalators, 2013 Edition

GENERAL

The project consists of a two-story approximately 80,800 square foot new elementary school (85,400 including the add alternate classroom addition). The new, standalone facility will include the following spaces: general classrooms, Early Childhood classrooms, a Special Education classroom, Learning Studios, Media Center, Computer Lab, Art room, Music rooms, Gymnasium, Cafetorium, Before/After Care, and the Administration and Health Suites.

The mechanical systems will be designed in accordance with applicable local, state, and federal codes/standards including the International Mechanical Code (IMC), International Plumbing Code (IPC), International Fuel Gas Code (IFGC), NFPA 13, and the requirements of Anne Arundel County Public Schools (AACPS). The International Energy Conservation Code (IECC) will be used for energy code compliance.

This project will be designed to achieve LEED Silver certification. Mechanical LEED design components will be implemented where possible and in accordance with AACPS Planning, Design and Construction requirements.

UTILITIES

The building will be connected to a BGE medium pressure gas main located adjacent to the project site. A new BGE gas meter assembly will be provided for the building. The BGE provided gas meter will reduce the gas pressure from medium to low pressure, as required for the generation of heating and domestic water services. Connection will be made to the low-pressure side of the gas meter. Service from the medium pressure main to the gas meter assembly will be provided by BGE.

Domestic water, sanitary and storm water systems will be extended five (5) feet past the building wall. Connection to the existing water, sanitary and storm water mains will be provided under the Civil Division.

HVAC SYSTEM OPTIONS

A life cycle cost analysis (LCCA) was performed to determine the most cost-effective HVAC system for this building. Per discussions with the AACPS Planning, Design, and Construction staff, the following four (4) systems were evaluated as part of the analysis:

Option 1: Geothermal System

The heating/cooling source equipment includes multiple heat pump types utilizing geothermal heat exchange (via vertical wells) as the heat rejection for the heating/cooling system. A condenser water loop will serve individual water-to-air heat pumps located in each classroom. The classrooms will also be served by dedicated outside air (DOAS) units to provide code required tempered ventilation air. The DOAS units are anticipated to be heat pumps tied into the condenser water loop and will be equipped with energy recovery wheels. The Media Center, Computer Lab, Gymnasium, and Cafetorium are anticipated to be served by geothermal heat pump rooftop units. It is anticipated that the Administration Suite and Before/After Care will be de-coupled from the geothermal loop and provided with an independent heating/cooling source.

Option 2: Two-pipe Fan Coil Units (FCUs located in closets)

This option will include an outdoor air cooled chiller and gas fired condensing boilers as the main cooling and heating sources for the building. Chilled and heating water will be circulated throughout the building to serve FCUs in each classroom. The FCUs, which will be located in mechanical closets adjust to the classrooms, will be re-circulating units providing heating and cooling to each occupied space. Ventilation air will be provided through rooftop DOAS units with energy recovery wheels. These units will have direct expansion (DX) cooling and hot water heat. The Gymnasium, Computer Lab, and Cafetorium will be served by rooftop units and will both have a chilled water and DX coil to allow for space usage flexibility. The Administration Suite, Before/After Care, and the Media Center are anticipated to be equipped with an independent form of DX cooling as well to allow for summer operation without the chiller.

Option 3: Two-pipe Fan Coil Units (FCUs located above ceiling)

This option will include an outdoor air cooled chiller and gas fired condensing boilers as the main cooling and heating sources for the building. Chilled and heating water will be circulated throughout the building to serve FCUs in each classroom. The FCUs, which will be located above the ceiling, will be re-circulating units providing heating and cooling to each occupied space. Ventilation air will be provided through rooftop DOAS units with energy recovery wheels. These units will have DX cooling and hot water heat. The Gymnasium, Computer Lab, and Cafetorium will be served by rooftop units and will both have a chilled water and DX coil to allow for space usage flexibility. Similar to the other options, the Administration Suite, Before/After Care, and the Media Center are anticipated to be equipped with an independent form of DX cooling to allow for summer operation without the chiller.

Option 4: Four-pipe VAV with Air Cooled Chiller

The heating/cooling source includes an air cooled chiller and gas-fired condensing boilers to provide four-pipe heating and chilled water to central air handling unit equipment. Central station rooftop air handling units serving all-air variable air volume (VAV) systems will condition the classroom spaces. The Gymnasium, Computer Lab, and Cafetorium will be served by rooftop units and will both have a chilled water and DX coil to allow for space usage flexibility. Similar to the other options, the Administration Suite, Before/After Care, and the Media Center are anticipated to be equipped with an independent form of DX cooling to allow for summer operation without the chiller.

The Life Cycle Cost Analysis was performed over a twenty (20) year life cycle period. AACPS provided utility rates, building usage summary, and temperature setpoints for use in the analysis. The results of the LCCA indicated that the two-pipe fan coil unit system with horizontal fan coil units located above the ceiling (i.e. option 3) was the most cost-effective solution for the school. The results were discussed and approved by AACPS.

DESIGN STANDARDS

HVAC system design will be in accordance with the following criteria:

Outdoor Design Temperatures:

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

Indoor Design Temperatures:

- Summer: Cooling Setpoint: 78°F DB / 50% Relative Humidity (Maximum)
- Winter: 68°F DB

Ventilation Rates:

- International Mechanical Code compliant

HEATING SYSTEM

The heating plant will consist of high efficiency gas fired condensing boilers with stainless steel heat exchangers. The boiler arrangement will be sized for the total heating load as well as to provide N+1 boiler capacity. Heating water supply temperatures will be in the range of 120–160 degrees F. Heating water will flow through a two-pipe dual temperature piping system to serve air handling equipment (see air distribution section below) throughout the building. Change over valves will be located in the main Mechanical Room to allow for heating water flow during the heating season and chilled water flow during the cooling season.

Two (2) dual temperature water pumps (primary and standby) will circulate heating water supply throughout the building. The pumps will be base mounted end suction type with inertia pads and vibration isolation to minimize vibration transmission to the building structure. The dual temperature water pumps will be controlled by variable frequency drives to maximize energy conservation.

COOLING SYSTEM

The cooling source will include an outdoor air-cooled high efficiency chiller. The outdoor machine is anticipated to utilize scroll compressors and will be located in an enclosure on grade adjacent to the Mechanical Room. Glycol water will flow through the chiller for freeze protection purposes. In order to de-couple the glycol water from the main building distribution, a flat-plate heat exchanger and a set of two (2) glycol water pumps (primary and standby) will be provided. The glycol water pumps will circulate the glycol water through the “source” side of the heat exchanger and back to the chiller.

Two (2) dual temperature water pumps (primary and standby) will pump fresh water through the “system” side of the heat exchanger to produce chilled water which will be circulated to cooling coils within each air handling unit (see “Air Distribution System” description). The pumps will be base mounted end suction type with inertia pads and vibration isolation to minimize vibration transmission to the building structure. The dual temperature water pumps

will be provided with variable frequency drives to maximize energy conservation. Change over valves will be located in the main mechanical room to allow for heating water flow during the heating season and chilled water flow during the cooling season.

The Gymnasium and Cafetorium will be served by rooftop units and will both have a chilled water and DX coil to allow for space usage flexibility. The Administration/Health Suites, Before/After Care, and the Media Center will be equipped with an independent cooling source so that they can operate when the chiller is de-energized. This will likely be in the form of an air-cooled heat recovery VRF system or packaged RTUs.

AIR DISTRIBUTION SYSTEM

Each classroom will be equipped with a fan coil unit located above the classroom ceiling. Supply ductwork will be extended from each unit above the ceilings into the classrooms. Return ductwork will extend from the unit to a wall register mounted low in the classroom space. Chases will be required in the classroom to achieve the low return register. All ductwork will be lined to help reduce sound levels in the classroom.

Re-circulating air handling units will provide conditioned and ventilated air to the Gymnasium, Cafetorium, Computer Lab, Before/After Care, Media Center, and Kitchen (as an alternate). Conditioned supply air will be distributed through low pressure ductwork to each space. In areas without a ceiling (i.e. exposed ductwork), double wall spiral / flat oval ductwork will be utilized. In areas with a ceiling, rectangular ductwork will be extended to louvered type supply air diffusers. The use of flexible ductwork will be limited to three (3) feet in length.

The Administration/Health Suites will be served by a VRF system, likely in the form of ceiling mounted cassette units in each space. Supplemental perimeter heat (i.e. finned tube radiation) will be provided for administrative spaces located along the exterior.

DOAS units will be provided to meet the ventilation needs of the classrooms and administration area. These units will be located on the roof and equipped with supply/exhaust fans, heating / cooling coil, filters, as well as access sections for maintenance accessibility to all coils, filters, etc. These units will also be equipped with energy recovery, likely in the form of an energy recovery wheel. The DOAS units will distribute tempered ventilation air directly to each space through low pressure ductwork.

Roof mounted, direct drive exhaust fans will be provided to ventilate the toilet rooms and janitor's closets within the facility. Electrical and telecommunications rooms will be provided with dedicated DX cooling units as required to maintain temperature requirements.

CONTROL SYSTEM

The school will be provided with a direct digital control (DDC) type system with electric actuation. Each control function and all associated control points of all mechanical equipment shall be incorporated into the building temperature control system.

All temperature control work shall be provided by EASI and will interface with the current AACPS open protocol Tridium front end system located at the Fort Smallwood facility.

Each learning space (classrooms, etc.) will be considered a temperature control zone and will be provided with independent temperature controls. The DOAS and rooftop air handling units will be provided without packaged controls. EASI will provide independent controls on the DOAS units so that it can be controlled and monitored from the central EMCS.

All major mechanical equipment items (DOAS units, air handling units, fan coil units, heat pumps, etc.), as well as, all temperature sensors, filter status, etc., will be capable of being controlled and/or monitored locally at the building and through the central EMCS.

PLUMBING SYSTEMS

A minimum 6-inch combination domestic/fire service will be extended to the new school. This service will enter the building in the main Mechanical Room or dedicated water room. The domestic water service will be provided with a reduced pressure backflow preventer assembly. A flow test will be performed to confirm that adequate pressure is available.

As mentioned previously, a new gas service will be provided for this building to accommodate the heating and domestic hot water requirements. Connection will be made to the low-pressure side of the gas meter to be provided by BGE.

Domestic hot water will be generated from a gas-fired condensing water heater located in the main Mechanical Room. Domestic hot water distribution temperature will be set for 110^{o}F (adjustable).

All plumbing fixtures will be low water use fixtures 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 0.35 gpm sinks and lavatories. In addition, manual operated flush valves and faucets are anticipated to be provided.

All domestic water piping will be type L copper. In addition, all piping will be insulated in accordance with the current energy code and a hot water recirculation system will be provided with a dedicated pump.

All waste and drainage piping will be cast-iron. PVC piping may be used below slab within the building perimeter and 10 feet outside building perimeter per AACPS design standards.

Roof drains and the associated storm water distribution system will be provided. A secondary storm water drainage system will be provided parallel to the primary system to meet the secondary drainage requirements. The secondary system will discharge through the exterior wall above grade at locations to be determined.

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ELECTRICAL DESIGN

DESIGN CRITERIA

- Applicable Codes and Standards:
- AACPS Classroom Technology, standards
- IESNA Lighting Handbook, 10th Edition
- International Building Code (IBC), 2018 Edition
- International Energy Conservation Code (IECC), 2018 Edition
- National Electrical Code (NEC) with local amendments, NFPA 70, 2017 Edition
- National Electrical Manufacturers Association (NEMA), standards
- National Fire Alarm and Signaling Code, NFPA 72, 2016 Edition

GENERAL

The project consists of a two-story approximately 80,800 square foot new elementary school (85,400 including the add alternate classroom addition). The new, standalone facility will include the following spaces: general classrooms, Early Childhood classrooms, a Special Education classroom, Learning Studios, Media Center, Computer Lab, Art room, Music rooms, Gymnasium, Cafetorium, Before/After Care, and the Administration and Health Suites.

The electrical systems will be designed in accordance with applicable local, state, and federal codes/standards including the National Electric Code (NEC), NFPA 101, NFPA 72, as well as the requirements of Anne Arundel County Public Schools (AACPS). The International Energy Conservation Code (IECC) will be used for energy code compliance.

This project will be designed to achieve LEED Silver certification. Electrical LEED design components will be implemented where possible and in accordance with AACPS personnel requirements.

LOAD CALCULATIONS

<u>Normal Power</u>

Preliminary electrical load calculations were made in order to determine the approximate capacity of the electrical service. The proposed elementary school building load requirement is based on VA/S.F. considerations for this type of building. The following data summarizes these calculations:

Approximate gross area of the building: 85,400 S.F.

Lighting	-	(S.F.) x (.81.0 VA/S.F.) x (100% demand)	=	69.2 kVA
HVAC (General)	-	(S.F.) x (12.0 VA/S.F.) x (85% demand)	=	871.1 kVA
Receptacle	-	(S.F.) x (4.0 VA/S.F.) x (60% demand)	=	205.0 kVA
Elevator	-	1 @ 40 HP	=	43.0 kVA

Kitchen	- (1,700 S.F.) x (50.0 VA/S.F.) x (65% demand)	= 55.3 kVA
Miscellaneous	- (S.F.) x (2.0 VA/S.F.) x (70% demand)	= 119.6 kVA
		= 1,363.2 kVA

Total Load: 1,363.2 kVA, 1,640 amperes @ 480/277 volts, three phase, four wire.

Service Capacity: Allowing for AACPS thirty percent spare capacity requirement (30% additional electrical capacity for future relocatable classrooms and additional technology implementation and expansion), the service will be rated for 2,500 amperes at 480/277 volts, three phase, four wire.

SHORT CIRCUIT CALCULATIONS

A short-circuit, coordination, and arc-flash study will be performed as part of the contractor requirements based on the short circuit capacity available at the proposed building pad mount transformer. The maximum available short circuit capacity at the main service points will be calculated based on the available utility short circuit capacity and any notable contributions from motor loads. Arc-flash hazard warning labels will be provided on electrical equipment in accordance with applicable codes.

MARYLAND EMERGENCY MANAGEMENT AGENCY REQUIREMENTS

IAC regulations require that this project be coordinated with the Maryland Emergency Management Agency (MEMA) to determine if areas of the building will be designated for public shelter use in the event of an emergency. This will generally require provisions be included into the electrical system for the connection of a temporary generator to power designated portions of the school. A waiver has been requested by AACPS to not require MEMA provisions for this building and the response is pending. The current electrical system design does not include MEMA provisions.

PRIMARY SERVICE

A new BGE electrical service entrance will be provided for the proposed building consisting of a BGE primary feeder, BGE pad mounted transformer located adjacent to the building, and secondary ductbank and conductors. The secondary of the transformer will provide a building system voltage of 480/277 volts, three phase, four wire. A concrete encased secondary ductbank for lateral secondary service conductors will be extended from the transformer to the current-transformer (CT) compartment located within the building main electrical room. All service secondary conductors will be provided by BGE.

MAIN SERVICE EQUIPMENT

A 480Y/277 volt service entrance switchboard will be provided in the main electrical room of the proposed elementary school building to distribute power throughout the building. The switchboard will be provided with the following components:

- BGE approved CT cabinet.
- 2,500A main circuit breaker.
- 2,500A breaker to allow the connection of a temporary generator connection (if needed for MEMA requirements).
- 2,500A tie breaker to provide separation between the main circuit breaker and temporary generator breaker (if needed for MEMA requirements).
- Distribution section with group mounted molded case circuit breakers.

- Digital power monitoring device.
- Surge protective device (SPD).

FEEDER AND BRANCH CIRCUITS

All conductors/circuits will be installed as follows:

- Interior concealed branch circuit wiring located in dry locations will be installed in electrical metallic tubing (EMT). Liquid-tight flexible metal conduit will be used for final connections to vibrating equipment such as motors and transformers. Metal-clad (MC) cable will be allowed for final connections to light fixtures.
- Exposed interior branch circuits will be rigid galvanized steel where subject to physical damage and EMT elsewhere.
- All EMT fittings (where allowed) will be steel compression fittings with insulated throats.
- Wiring installed in exterior and wet locations will be installed in rigid metal conduit with liquid-tight flexible metal conduit used for final connections.
- Underground conductors will be installed in direct buried PVC conduit except as noted below.
- Underground service conductors and generator conductors will be installed in concrete encased PVC ductbanks.
- All interior conductors will be copper conductor with type THHN, THHW, or XHHW insulation.
- All exterior underground conductors will be copper with type RHW insulation.
- All feeders and branch circuits will be provided with a separate green insulated equipment grounding conductor. Conductor sizes #10 and smaller shall be solid; conductor sizes #8 and larger shall be stranded.
- Electrical provisions will be made for a future solar photovoltaic (PV) system in order for the new school to be solar PV ready.

GROUNDING

A complete grounding electrode system and equipment grounding system will be provided in accordance with NFPA 70, National Electrical Code, and local codes and regulations. A grounding electrode system will be provided at the building service entrance, pad mounted transformer and the generator location.

DISTRIBUTION EQUIPMENT

The main switchboard will supply branch circuit panelboards located within electrical rooms and spaces throughout the building. These panelboards will consist of 480/277 volt lighting and power panelboards and 208/120 volt panelboards for receptacle and small mechanical equipment loads. Dry type transformers complying with current Department of Energy (DOE) energy standards will be used in all locations to step down the voltage from 480 volts to 208/120 volts. All panelboards will be equipped with an internal surge protective device (SPD). All panelboards will be provided with copper bus bars, equipment ground busses, bolt-on molded case circuit breakers, and door-in-door cover with piano hinge. 208/120 volt panelboards serving areas with a high density of computers will be specified with two-hundred percent neutral bus bars.

The building distribution system will generally be separated to supply dedicated load types to panelboards as follows:

- HVAC and mechanical systems.
- Interior lighting.
- Exterior site lighting.
- Receptacle and general load circuits.
- Kitchen equipment.

A 2,500A conduit and conductor feeder will be provided from the main switchboard 2,500A temporary generator breaker to a 2,500A temporary generator termination box located outdoors (if needed for MEMA requirements).

A power monitoring system consisting of a building-level energy meter will be provided at the building main service switchboard to monitor the total building electrical energy power consumption and electrical demand data.

Motors will be controlled using individual full voltage, non-reversing, combination motor starters with NEMA rated contactors and motor circuit protector disconnects. Localized disconnect switches will be provided for all motor-driven equipment. Motors rated 3/4 horsepower or greater will be 480 volt, three phase and motors rated less than 3/4 horsepower will be 120 volt, single phase. Manual motor starters will be provided for all 120 volt single phase motors. All three phase motor starters will contain a solid state overload protection device with integral single phase protection.

A local stand-alone power factor correction device will be provided for all large three phase motors (assumed to be 5 horsepower or larger at this time pending final coordination) not equipped with a variable frequency drive (VFD).

VFDs will be provided for all motors that require adjustable speed operation. VFDs will be required to meet harmonic limits as specified in IEEE 519. VFDs will contain bypass capability except for redundant equipment. VFDs will be integral to associated equipment for external equipment.

All current carrying conductors for all equipment will be copper.

Solar ready provisions will be included in the electrical design including future conduit access from the roof to the main electrical room and spare breaker space in the main switchboard for future connection to roof-mounted photovoltaic (PV) system(s).

EMERGENCY POWER

A 300kW, 480/277 volt permanent generator (approximate size, final size to be determined during design) will be located outdoors in a sound attenuated weatherproof enclosure. AACPS personnel have requested to use a natural gas powered generator if possible. This will be coordinated with the Authority Having Jurisdiction (AHJ). The generator will be used to supply power to emergency and optional standby distribution systems located in the building. The generator will supply two (2) automatic transfer switches (ATS) located in the building, one for the emergency system and one for the optional standby system. Loss of normal power at either ATS will result in the automatic starting of the generator. A permanent switch and exterior connection point will be provided to connect a temporary generator to the emergency system in accordance with NEC requirements.

The following loads will be connected to the generator-supplied emergency system and must be operational within ten (10) seconds after a power outage:

- Egress and exit lighting.
- Fire detection and alarm system (also provided with integral battery backup).
- Public Address System.
- Telephone System.
- Receptacles adjacent to fire and security panel.
- Generator auxiliary systems.

AACPS personnel have requested additional equipment be connected to the generator that will be connected to the generator-supplied optional standby system:

- Kitchen refrigeration and freezer equipment.
- Student Health Suite receptacles.
- Sewage pump station (if applicable).
- ATC system.
- One (1) boiler.
- One (1) heating water pump.
- HVAC split system(s) serving telecom rooms.
- IT room receptacles serving rack equipment.
- Security monitors in Principal and Assistant Principal offices.

LIGHTING

The lighting design for the building will be in accordance with the design requirements, AACPS requirements and usage of each area. Zonal cavity and/or point by point calculations will be performed for each space or representative space utilizing effective reflectance of ceiling, wall, floor, light loss factor, and the coefficient 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 and AACPS recommended footcandle levels will be maintained throughout the building.

All interior and exterior light fixtures will contain LED lamps. Lighting types in major areas will be as follows:

- General areas with hung ceilings including classrooms, corridors, storage, Reception, Administration areas, and Cafetorium: Recessed 2 X 4 LED flat panels.
- Office and Computer Lab areas: Recessed 2 X 4 direct/indirect fixture.
- Media Center: Recessed 2 X 4 LED flat panels.
- Gymnasium: 22-inch round aluminum high bay fixture with acrylic prismatic lens, wire guard, and safety chain.

- Mechanical/Electrical/Utility spaces: 4-foot linear fixture with acrylic diffuser.
- Exterior site lighting (pedestrian and parking lot): Square luminaire mounted on aluminum pole with 24-inch high (above finished grade) foundation with recessed side mounted junction box located in foundation.

As per NFPA Life Safety Code, the proper number of egress lights and exit signs on emergency circuits will be provided.

Lighting control in major areas will be as follows:

- Classrooms, Reception, Faculty Lounge, Resource Rooms, select Offices, Gymnasium, Cafetorium, and Media Center: Controlled by the central building wide lighting control system tied into a central computer. System will generally include one local control panel for each room that will be interconnected via communication cable throughout the entire building. System will provide local and remote control including room zoning, automatic/manual on/off, occupancy sensor(s), and day light control (where applicable). Lighting system basis of design is Cooper Controls, Model CK4A (Greengate Control Keeper 4A).
- Corridors: Controlled by occupancy sensors and time function tied into the central building wide lighting control system.
- Storage Rooms, Workrooms, Restrooms, Janitor's Closets, and select Offices: Controlled by stand-alone local occupancy sensor/switch not connected to the central building system.
- Mechanical and Electrical Rooms: Local toggle switch.
- Exterior/Site: Controlled by the central building wide lighting control system.

All lights requiring variable illumination control will operate on 0–10V control input received from the associated lighting control system.

Egress and exit lighting will be provided in accordance with NFPA Life Safety Codes. Select lighting fixtures in corridors and stairs and exit signs will be served from the generator supplied emergency power system during power outages of the normal power system.

Exterior lighting will be provided by a combination of building mounted and pole mounted lighting fixtures. Locations and fixture types will be selected to illuminate building entrances, walkways, signage, and façades. Exterior lighting design will address personal security, while minimizing light pollution of surrounding areas.

RECEPTACLES

General convenience receptacles will be specification grade, duplex, NEMA 5-20R, installed in flush mounted wall boxes. Tamper resistant receptacles will be used throughout the building. Receptacle spacing will be adjusted to coordinate with office equipment locations. General convenience receptacles for cleaning will be spaced approximately forty feet on center throughout all corridors and lobbies.

Ground fault circuit interrupter (GFCI) receptacles will not be used. GFCI circuit breakers will be provided for receptacles needing this protection in the following locations:

- Adjacent to sinks.
- Elevator machine room (as applicable).

- Elevator pit (except sump pump).
- All wet locations.
- Receptacles with weatherproof while-in-use covers will be provided for all exterior locations.
- Vending machines.
- Kitchen receptacles.

Special receptacles for appliances and equipment will be provided in NEMA configurations as required to coordinate with the appliance or equipment being served.

Device plates will be provided for all outlets in quantity of gangs to accommodate associated device. All device plates in finished areas will be brushed stainless steel with a Type 302 finish. Device plates in unfinished areas will be galvanized steel.

Receptacles supplied by the generator will have “EMERGENCY POWER” engraved on the faceplate per AACPS Electric Design Standards.

Receptacles will be color coded as follows:

- General power: Brown.
- Generator power (both emergency and optional standby): Red.

The use of applicable energy codes will require automatic on/off switching of 50% of receptacles in private offices, open offices, and computer classrooms. This will be controlled through the lighting control system for each associated room. Final switching sequencing will be coordinated further in the Design Development Phase as computers in computer classrooms are required to be on for PM updates.

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INFORMATION TECHNOLOGY AND AUDIO/VISUAL DESIGN

DATA NETWORK GENERAL DESCRIPTION

The school-wide computer network will be an implementation of 10/100/1000 Mbit Ethernet over Category 6 copper UTP cable and Gigabit Ethernet over singlemode/multimode fiber, complying with the Institute of Electrical Engineers' (IEEE) 802.3 standards for Ethernet. Backbone cabling between the Telecommunications Equipment Room (TER/"head end") and all telecom rooms (TRs) shall be a singlemode/multimode fiber optic cable (6/18 Strands). All horizontal data cables shall be terminated in Category 6 rack-mounted patch panels in the telecom rooms, and in communication network outlets (CNOs) at the workstation. Horizontal cables shall not exceed 90 meters in length. The data infrastructure will support implementation of a wireless LAN system and potential convergence of voice and video onto the data distribution network. AACPS shall provide a Wireless Access Point map during the design phase of the project for implementation into the construction documents.

An owner provided core switch shall be located at the Telecommunications Equipment Room (TER) to manage the distribution of fiber, as well as managing UTP distribution for the service area of that room. Intermediate TR's will be managed through owner provided stackable switches with no more than three switches sharing a gigabit uplink to the core switch located in the TER. Each terminated data outlet shall be cross-connected to an active switch port. Data outlets intended for owner provided wireless access points shall be cross-connected to owner provided inline powered switch ports. These outlets shall be left/mounted above the drop ceiling, have a male RJ-45 termination and a 15-foot service loop for exact location. The ceiling grid must be tagged and a 15-foot service loop must be allocated. The number of data drops in all types of instructional and non-instructional spaces will be coordinated to ensure that it complies with Anne Arundel County Public School standards and guidelines.

TELEPHONE DISTRIBUTION INFRASTRUCTURE DESCRIPTION

The Telephone cable plant will consist of Category 5e UTP cables extended from TR's to the workstation. Horizontal voice cables shall not exceed 90 meters. These cables will be terminated in wall mounted 110 blocks and will be cross-connected to 100-pair Category 5e wall mounted 110 blocks. Multipair Cat 5e cables shall interconnect intermediate telecom rooms with the TER (head end). Cables shall be terminated in wall-mounted 110-blocks at the TER and connected to owner provided telephone electronics. The school will use the Category 5e cable described above for voice distribution to offices and classrooms. The infrastructure will allow owner provided telephone electronics to communicate via analog, digital, or IP methods. The facility will also maintain a minimum number of separate incoming analog telephone lines for elevator, fax, fire, and security connections throughout the facility.

The installed telephone infrastructure shall meet the following requirements:

- Capability to connect to multiple types of incoming service (Analog, T1, Fiber, etc.).
- Connectivity to centralized phone system management.
- Capability to connect to centralized telephone service.
- Automatic call routing configured for maximum efficiency and cost savings to the district.
- Capability to interconnect with 911 emergency services.
- Capability to interface with devices on multiple platforms (Analog, Digital, IP-based).
- Call logging, tracing, and caller ID availability.
- Allow for handsets to be located in all classrooms, administrative areas, and other critical spaces.

- Capability to interconnect with separate dedicated incoming analog lines for fire, security, and emergency situations.
- Failover of the facility telephone system to the separate, dedicated, incoming analog lines in emergency situations.
- Phone system served by UPS equipment and dedicated electrical receptacles in the TER.
- Full compatibility and interconnectivity to building-wide intercom and public address systems.
- Fully programmable auto attendant features.
- Voicemail and messaging capabilities for all users.
- Programmable restriction levels for each handset.

VIDEO DISTRIBUTION DESCRIPTION

The IP data network shall allow for video distribution via the Category 6 UTP and Fiber distribution network through streaming media.

A small number of homerun coaxial outlets shall be included in the project, with specific locations being determined by the owner during the design phase of the project. These typically include the main Reception Area, main Conference Room, Principal's Office, Security Resource Area, and Control Room. The coaxial cable plant is capable of supporting traditional analog distribution as well as digital and IP signals in all standard formats including NTSC, ATSC, QAM, 8VSB, and IP. The owner supplied IP video head end will consist of a distribution cabinet holding rack mounted video distribution equipment and be located in the TER. The head end will receive signals from external and internal sources and establish channels to display images on displays.

The coaxial distribution system is a sub-split, bi-directional, broadband distribution system operating over the range of 5 to 1000 MHz and using tap and drop technology. System RG-11 trunk cable will be run in the cable tray to taps attached to the cable tray in strategic locations. To accommodate the trunk cable, all changes in direction of the cable tray should be at a minimum bend radius of 6 inches. RG-6 Drops to room outlets will utilize coaxial cable run on the same path as the data/voice cabling serving the room in which the video outlet is located.

The teacher's desk/teaching station will have a cable harness assembly that will allow the teacher's computer to display to a wall-mounted LCD projector and/or electronic whiteboard. Every video outlet will be capable of two-way signal distribution with the addition of a camera and signal modulator.

CLASSROOM A/V SYSTEMS

AACPS currently includes a Light Speed sound enhancement amplifier/mixer in all learning spaces with a wall mounted Epson 585wi projector. The purpose of the sound enhancement system in classrooms and laboratories is to equalize sound levels throughout the classroom to ensure that students hear the presentation, regardless of proximity to the speaker. The system allows a presenter's voice to be amplified via a lanyard or a hand-held infrared microphone. The system typically includes four ceiling mounted speakers that can also be integrated with other classroom equipment such as the wall mounted LCD projector, DVD player, or television tuner to amplify sound from those sources as well. The system has the ability act as a mixer to switch audio sources and control volume levels on multiple inputs. AACPS is currently using the Lightspeed 955 unit with Page First Clip intercom shunt integration.

The basic components of the classroom A/V system are:

- Wireless infrared collar microphone emitter with transmitter for the instructor.

- Receiver/amplifier located in room at instructor's station.
- Four ceiling mounted speakers.
- Intercom Shunt Relay cable to the sound enhancement equipment.
- Audio wiring for speakers.
- Wall mounted Epson 585wi LCD projector.
- Two Cat 6 cables from the instructor's low station to the wall mounted projector for HDMI video transmission.
- One Cat 6 cable from the instructor's low station to the wall mounted Interactive White Board for USB control.

INTERCOM AND MASTER CLOCK DESCRIPTION

The intercommunication system shall utilize a copper cable infrastructure to distribute multiple, simultaneous conversations on separate channels throughout the facility through telephones, call-in switches, and loudspeaker assemblies. In addition, the system must be scalable to meet the user's future expansion needs and be programmable from a computer terminal located at the facility. AACPS currently uses Telecor as their vendor for intercom systems.

A programmable master clock with correction of secondary clocks shall also be included as part of the overall system. The system shall be sized for the building and connected to the facilities IP network. Installation of IQ site sync clock interface must be coordinated with AACPS IT department for IP address setup. An Ethernet jack shall be installed at location of site sync transmitter. Project clocks shall be electric. The American Time signal IQ site sync master clock shall control the Intercom/PA time and tone schedule. If Ethernet cannot be provided, GPS shall be utilized.

The facility intercommunication system shall be capable of meeting the following requirements:

- Capability to fully interconnect with the facility telephone system.
- Announcement distribution from a central location to zones, individual classrooms, groups, or all facility speakers.
- Broadcast of user defined input (radio signal, compact disc, aux input, etc.) to zones, individual rooms, groups, or all facility loudspeakers.
- Emergency cut-in to all speakers during an emergency situation from a central location.
- Two-way intercommunication between the central rack, any call-in location, or any selected speaker location.
- Hands free communications by means of a loudspeaker used as a transducer or speaker/microphone combination.
- Visual and audio monitoring of all intercommunication system activity.
- Volume and level controls for all centrally located intercommunication system equipment.
- Adjustment and correction of building-wide clocks relative to a centrally located master clock.
- Tone distribution based off the master clock that can be partitioned into zones.
- Capability to tie into any auxiliary sound system throughout the facility.
- High priority call-in from any telephone/call-in switch in an emergency situation.

AUXILIARY SOUND SYSTEMS

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

A typical auxiliary sound system shall include rack or cabinet mounted electronics consisting of pre-amplifiers, mixers, program sources, equalizers, amplifiers, wireless microphone inputs, assistive listening stations, and storage space for microphones. Each system should be connected to the facility's intercom system and fire alarm to allow for system override in the event of an important or emergency announcement. The specific locations for each system will be determined with input from AACPS staff during the design phase of the project.

Emergency Radio System (DAS)

A two-way radio communications enhancement system will be installed to help ensure the safety of building occupants and first responders by extending the coverage of the public safety communications system to the interior areas of the building. The system shall be comprised of donor antennas, 50-ohm coaxial cabling, bi-directional amplifiers (BDAs), battery backup system, and a network of indoor antennas strategically located to provide reliable public safety radio system coverage throughout the interior of the building. The system shall be capable of operating in the 700/800 MHz frequency range. The system shall provide better than -95 dBm for no less than 95% of the structure. All work shall be coordinated with the Anne Arundel County IT Department and the Authority Having Jurisdiction (AHJ).

Video Surveillance System (CCTV)

Closed Circuit Television shall provide visual surveillance of the school, internally and externally, 24 hours per day. The CCTV will utilize owner procured and installed IP based cameras that are connected to the data network through switching equipment in Telecom rooms. Each camera location shall have a Cat6 UTP cable, identical to other data infrastructure at the facility, terminated with a 15-foot service loop. Only camera locations that have a cable distance greater than 90 meters shall receive fiber for signal transmission.

AACPS currently uses an outside vendor (LenSec) to supply and install the CCTV cameras and associated electronics. The construction project shall provide the necessary locations, cables, and mounts. The locations shall be coordinated with the security staff at AACPS and the third-party vendor.

Cameras will survey the corridors, specific rooms and portions of the perimeter of the facility. The location of the system cameras, NVRs, power supplies, and associated control software/hardware will be located during the design phase of the project with input from the owner. The system will be capable of reviewing images based upon time and location inquiries.

CCTV system features shall include:

- UTP based devices.
- ANSI/TIA supported infrastructure.
- Motion based recording and searching.
- Alarm activation based on motion.
- Setting of time-lapse, event, or both by camera.
- Alarm activated camera display.

- Selectable image quality by camera.
- Time display and time stamp on each frame.
- Simultaneous record and playback.
- Variable recording settings.
- Remote communication via IP network protocols.

ACCESS CONTROL AND INTRUSION DETECTION DESCRIPTION

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

The system shall consist of motion detectors, door contacts, card readers, door controllers, power supplies, and intelligent software all connected to alarm panels throughout the facility. (Electric locking devices and door hardware shall be provided by others). Cabling for this system will be installed in dedicated pathways with panels located in telecommunications closets and storage rooms. Main entrances shall be equipped with handicapped accessible units, intercom, and video camera entry systems. AACPS currently uses for Honeywell Intrusion and Access equipment and AIPHONE for entry door video intercom systems.

The system shall have the following capabilities:

- Capability to notify audibly and visually on and off site status and alarm conditions.
- Signaling via standard security industry formats.
- Fail Safe operation which allow unhindered egress in all situations.
- Integration with the Fire Alarm system.
- Point by point status and alarm location and description.
- Integration with local door entry systems.

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FIRE PROTECTION DESIGN

FIRE SUPPRESSION SYSTEM

Applicable Codes and Standards

The sprinkler system design shall be in accordance with the following codes and standards, as amended by Anne Arundel County:

- 2018 Edition of the International Building Code (IBC)
- 2018 Edition of NFPA 101, Life Safety Code
- 2016 Edition of NFPA 13, Installation of Sprinkler Systems
- 2017 Edition of NFPA 25, Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems
- AACPS Fire Suppression Design Standards Revised 07/2016
- AACPS Plumbing Design Standards Revised 06/2019
- The manufacturer's requirements

Existing Conditions

The proposed West County Elementary School is new construction. There are no existing sprinkler systems or fire protection systems to be addressed by this project.

Water Supply

Water supply testing was completed on 09/21/2020 by Anne Arundel County Department of Public Works. The results are as follows:

- Static Pressure: 100 PSI
- Residual Pressure: 88 PSI
- Flow: 2,466 GPM
- Test Hydrant Number: 13793
- Flow Hydrant Number: 13794

The water supply will be sufficient to supply the sprinkler system without the use of a fire pump. This assumption is based on the small size and two-story height of the building.

The water supply to the sprinkler system will be tied to the existing water line located on Conway Road. A new 6-inch minimum incoming water supply will be installed for the purpose of connection. There will be a new 6-inch reduced-pressure zone type backflow preventer inside of the school. The backflow preventer will not be more than 42-inch above the floor with a 12-inch clearing on all sides.

Sprinkler Design Criteria

The sprinkler system will have the following characteristics:

- Sprinkler protected throughout per section 901 of the IBC and section 9.7 of NFPA 101.
- All the fire sprinkler system components will be UL Listed or FM Approved.
- Light hazard in offices, classrooms, and public areas 0.10 gpm/S.F. over 1,500 S.F.
- Ordinary hazard group 1 in the gymnasium and media center 0.15 gpm/S.F. over 1,500 S.F.
- Ordinary hazard group 2 in storage, mechanical, electrical, equipment rooms, and service areas 0.20 gpm/S.F. over 1500 S.F.
- Maximum sprinkler coverage
    - Light Hazard: 196 S.F. per sprinkler
    - Ordinary Hazard Group 1: 130 S.F. per sprinkler
    - Ordinary Hazard Group 2: 130 S.F. per sprinkler
- Quick response semi-recessed sprinklers will be used throughout the building.
- Finished brass sprinklers will be provided in normally occupied areas that do not have ceilings.
- Sprinklers will be installed symmetrically with the ceiling layout.

AACPS fire suppression criteria:

- A framed drawing (approximately 24-inch by 18-inch) showing the building sprinkler zones, test valve assembly, fire hose valve, etc. will be attached to the wall in the area of the main sprinkler alarm valve installation.
- A hydraulic data plate will be displayed in the riser room.
- An independent framed valve tag chart for sprinkler system is to be attached to the wall next to the zone and valve location drawings.

Sprinkler Piping Criteria

All sprinkler piping will be steel. Piping 2 1/2-inch and larger will be Schedule 10 and be joined with roll-groove couplings. All piping 2-inch and smaller will be Schedule 40 and be joined by threaded malleable iron or cast-iron fittings. All sprinkler system piping will be located above the suspended ceilings wherever possible. Sprinkler system control valves will be supervised by tamper switches.

Fire Department Connection

The FDC will be provided on the service side of the building pending AHJ approval. The FDC will be located within 100 feet of a new fire hydrant.

FIRE ALARM AND DETECTION SYSTEM

The fire alarm system will have the following characteristics:

- Emergency Voice evacuation fire alarm system throughout per section 907 of the IBC and 9.6 of NFPA 101.
- Speakers throughout to achieve sound level of 15 dB above the ambient noise level per NFPA 72.
- Strobes in all corridors, classrooms, assembly areas, gymnasium, and cafetorium.
- Pull stations at the exits with STI stopper covers (tamper resistant covers).
- Annunciator located at the main entrance with framed building graphic located adjacent to it.
- Pre-recorded and live voice announcement.
- Elevators will have emergency firefighter features (recall and shunt trip).

AACPS fire alarm criteria:

- Fire alarm system shall be a Silent Knight 6820-XL EVS with EVS-RGU remote communicator unit using Hochiki protocol.
- Booster panels shall be Silent Knight 5496 up to a maximum of eight.
- Duct and smoke detectors are to be photoelectric detectors.
- Duct detectors must be powered by the booster panel.
- The fire alarm shall have two dedicated phone lines.
- The fire alarm system shall have its devices labeled so they can be identified by its ID number that matches the panel visible from the floor.
- The alarm system shall have surge protection.

Wiring

Wiring for fire alarm devices are to be 14 AWG THHN stranded in 3/4-inch conduit minimum.

Speaker circuits are to be West Penn 60990BS (or equal) in 3/4-inch conduit minimum.

The following wiring color code will be used in accordance with the AACPS Electronic Safety and Security Design Standards Requirements:

- SLC Loop: Black (-), Red (+)
- Horn/strobe circuit: Blue (+), White (-)
- Duct smoke detector power: Purple (+), Brown (-)

Initiating Devices

The fire alarm initiating devices will consist of smoke detectors, duct detectors, and manual pull stations. Manual pull stations shall be located near each exit and will be provided with STI stopper covers. Duct smoke detectors will be provided in HVAC systems over 2,000 cfm capacity and be powered by a booster panel. Valve supervisory and water flow switches will also be included.

Notification Devices

The notification devices will consist of speaker and strobes throughout the building per NFPA 72. The emergency sound will be a voice evacuation with pre-recorded and live announcement capabilities.

Fire Alarm Control Panel

Alarm, trouble, and supervisory signals are to be displayed on the building fire alarm control panel. The FACP will transmit alarm, supervisory, and trouble conditions to the outside monitoring station via a digital communicator.

The operation of any of the following new devices will automatically activate the notification appliance devices and send an alarm signal to the monitoring station:

- Manual pull stations
- Smoke detectors

The following new devices will transmit a supervisory signal to the monitoring station:

- HVAC duct smoke detectors

The following events shall transmit a trouble signal to the monitoring station:

- Open circuit
- Ground fault
- Short in fire alarm system

KITCHEN & FOOD SERVICE DESIGN

GENERAL DESCRIPTION

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

The kitchen will be designed to operate as an on-site prep/production facility equipped to prepare, cook, and serve lunch meals to the student population of approximately 600 during three meal periods of grades pre-K through 5. Bulk refrigerated items will be stored in a walk-in cooler/freezer with remote refrigeration. On site cooking will take place in convection ovens and steamers requiring a non-grease exhaust canopy. A fire protection system for this style of ventilation is not required. Cooking and serving utensils will be washed and sanitized in a three-compartment sink with integral left & right drainboards. Clean ware will be stored on mobile pot & pan shelving.

Serving of students will take place on two lines of cafeteria counters equipped with: five-well combination hot/cold food counter, mechanically-refrigerated frost top for cold food, and a bulk milk cooler for milk and beverages. Meals will be served on disposable trays, flatware, and cups eliminating the need for a full dishwashing operation.

AREA DESIGNATION

The overall foodservice operation will contain approximately 1,850 square feet and encompass the following functional work areas:

- Receiving Area
- Manager's Office
- Dry Food Storage
- Paper Storage
- Walk-in Cooler/Freezer
- Utility/Soap Storage
- Main Food Prep/Production Area
- Serving – Two Lines
- Staff Toilet/Locker with Laundry
- Dish/Pot & Pan Washing Area

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ENERGY CONSERVATION STATEMENT

Energy conservation is a fundamental aspect of West County Elementary School. Many energy saving techniques are incorporated into the building to maximize energy efficiency, including the following:

- Mechanical and electrical systems will meet or exceed the energy efficiency requirements mandated by the 2018 International Energy Conservation Code and ASHRAE Standard 90.1-2013 and/or ASHRAE Standard 90.1-2016 as applicable.
- Energy recovery will be used to pre-condition ventilation airflow where appropriate and permitted in accordance with the International Mechanical Code.
- Mechanical systems (pumps and fans) will include variable frequency drives to allow systems to operate at lower capacities when building loads are reduced. Premium efficiency motors will be specified for all fans and pumps and all non-variable frequency drive motors over 10 HP will be power-factor corrected to 90 percent minimum.
- Air-handling unit systems will incorporate dry-bulb economizer control allowing the use of “free cooling” when outdoor air temperature and humidity conditions permit.
- Systems delivering ventilation airflow will include MERV 13 filtration to improve indoor air quality.
- Mechanical systems will be designed to maximize indoor air quality by effectively mixing and delivering fresh air to building occupants. Air-handling systems will include airflow monitoring stations on outdoor air connections to assure the delivery of outdoor air.
- 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 to meet ozone.
- The HVAC system will be controlled by the latest generation of computerized energy management equipment.
- The HVAC system will be divided into multiple zones of operation for efficient year-round and after-hours usage.
- Low-flow plumbing fixtures will be specified to reduce overall building water usage. Specific strategies will include low-flow flush valves for water closets, low-flow type urinals, low-flow aerators, and low-flow shower heads.
- Thermally broken aluminum windows with insulating glass will be specified to reduce energy consumption. Windows will be operable to increase ventilation during the spring and fall.
- Insulation and weatherstripping will be carefully detailed and located.
- Building entrances will be provided with an air lock vestibule.
- 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 Classrooms and other instructional spaces, Offices, Workrooms, the Conference Room, Storage Rooms, the Media Center, Cafetorium, and Gymnasium. Lights will not automatically turn on in these spaces, therefore reducing energy usage.
- Occupancy sensors will automatically turn off lighting in the majority of areas when unoccupied.
- Full-cutoff exterior LED luminaires (lighting fixtures) will reduce light pollution to the surrounding areas.
- Electrical service and roof structure will be sized for and capable of being integrated with an on-site solar photovoltaic system (Solar Ready).

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LEED / SUSTAINABLE DESIGN

West County Elementary School will be designed with the goal of attaining Silver certification under the United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) v4 for Schools program.

The project has been registered with the USGBC as a LEED v4 for Schools project pursuing Silver certification (within the range of 50-59 total points). The design will showcase the incorporation of sustainable techniques and materials. The outlined categories below follow the divisions of the LEED v4 for Schools rating system shown on the preliminary scorecard included at the end of this section and briefly describe design strategies that are being considered to achieve various credits.

Integrative Process

This process allows for the support of high-performance, cost-effective project outcomes through early analysis of the interrelationship among systems. The design team will analyze early designs using simple-box energy analysis.

Location & Transportation

Promoting the use of low-emitting and fuel efficient vehicles will minimize the environmental impact of the building on the site. Potential design strategies include providing reserved parking spaces and infrastructure for charging stations for such vehicles.

Sustainable Sites

Sustainable site strategies will minimize the environmental impact of the building on the site. Potential design strategies include:

- Minimize site disruption, soil erosion, and air pollution associated with construction activities.
- Specify appropriate landscaping material for both water conservation and for energy conservation.
- Plant native trees species.
- Eliminate the use of pesticides in order to promote protection of regional watersheds.
- No "light pollution" since exterior lighting is installed at a minimum (for safety requirements) to allow for view of night sky.

Water Efficiency

Water conservation strategies are to be implemented. Potential design strategies include:

- Maximize water conservation.
  - Low flush toilet fixtures.
  - Low flow aerators for sink faucets.
  - Low flow shower heads.
- Manage and conserve storm water and reduce storm water runoff.
- Provide additional water metering.

Energy & Atmosphere

Energy consumption reduction strategies are to be implemented. Potential design strategies include:

- Computer energy modeling used to inform the design of the building. Annual energy savings and yearly operating cost reduction goal should be a minimum of 30% over the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Standard 90.1.
- Building should be zoned and controlled in a way specific to occupancy and use profiles. These systems will recognize the mass and building characteristics of the building as well as control logic designed to maximize the return on investment.
- Building system components selected will be free of chlorofluorocarbons (CFCs) and hydro-chlorofluorocarbons (HCFCs).
- Mechanical ventilation should be decoupled from space conditioning to ensure fresh air and energy recovery independent of space conditioning requirements.
- Incorporate full enhanced building system commissioning to ensure that the design intent will be met.

Materials & Resources

Sustainable material choices will reduce use of virgin materials and high impact materials within the building. Potential design strategies include:

- Storage and collection of recyclable materials within the school.
- Divert a minimum of 75% of the materials during demolition and construction from the landfills through recycling or salvaging.
- Use new construction materials that have an Environmental Product Declaration indicating the environmental impact of the product.
- Use new construction materials that have an Health Product Declaration indicating the impact of the product during manufacturing and ultimately on building occupants.

Indoor Environmental Quality

Reducing levels of contaminants, increasing filtered outside air and ventilation, and monitoring humidity all contribute to a more desirable indoor air quality. Potential design strategies include:

- Smoke-free school zone.
- Classroom spaces will meet a certain STC rating for acoustics - increased insulation, seals, and special acoustic ceiling tiles for better communication between teachers and students.
- Low-emitting materials including adhesives and sealants; paints and coatings; flooring systems; agrifiber products; furniture; and ceiling and wall systems.
- Appropriate ventilation and elimination of chemicals and pollutants such as copy machines and contaminants from the exterior.
- Use outdoor spaces as instructional areas giving students the opportunity for fresh air during the day.
- Carbon dioxide (CO_2) monitors that inform the building controls to insure adequate amounts of ventilation where and when needed.
- Designing electric lights to take advantage of natural light in spaces.
- A mold-free environment.
- New construction implementing the use of daylight in core learning spaces.
- Individual temperature regulation of rooms to provide adequate comfort for all occupants.

Innovation

Incorporating innovative techniques that are unique to West County Elementary School. Potential design strategies include:

- Use LED light fixtures throughout the site and the building.
- Design with features that encourage the occupants to be active by taking the stairs and utilizing the athletic facilities.

Regional Priority

Odenton, MD and surrounding Anne Arundel County areas potentially have materials or regional differences that could result in achieving specific Regional Priority credits.

LEED v4.1 for BD+C: Schools

Project Checklist

Project Name: AACPS West County Elementary School

Date: 3/22/2021

LEED SCORECARD

Y	?Y	N			
1	X	X	Credit	IPc1 - Integrative Process (v4.1)	1

2	1	12	Location and Transportation		15
X	X	0	Credit	LTc1 - LEED for Neighborhood Development Location	15
X	X	1	Credit	LTc2 - Sensitive Land Protection	1
X	X	2	Credit	LTc3 - High Priority Site	2
X	X	5	Credit	LTc4 - Surrounding Density and Diverse Uses	5
X	X	4	Credit	LTc5 - Access to Quality Transit	4
X	1	X	Credit	LTc6 - Bicycle Facilities (v4.1)	1
1	X	X	Credit	LTc7 - Reduced Parking Footprint (v4.1)	1
1	X	X	Credit	LTc8 - Electric Vehicles (v4.1)	1

3	3	6	Sustainable Sites		12
Y			Prereq	SSp1 - Construction Activity Pollution Prevention	Required
Y			Prereq	SSp2 - Environmental Site Assessment	Required
1	X	X	Credit	SSc1 - Site Assessment (v4.1)	1
X	X	2	Credit	SSc2 - Site Development – Protect or Restore Habitat	2
X	1	X	Credit	SSc3 - Open Space (v4.1)	1
1	1	1	Credit	SSc4 - Rainwater Management (v4.1)	3
X	X	2	Credit	SSc5 - Heat Island Reduction	2
X	1	X	Credit	SSc6 - Light Pollution Reduction	1
X	X	1	Credit	SSc7 - Site Master Plan	1
1	X	X	Credit	SSc8 - Joint Use of Facilities	1

5	2	5	Water Efficiency		12
Y			Prereq	WEp1 - Outdoor Water Use Reduction	Required
Y			Prereq	WEp2 - Indoor Water Use Reduction	Required
Y			Prereq	WEp3 - Building-Level Water Metering	Required
2	X	X	Credit	WEc1 - Outdoor Water Use Reduction	2
2	2	3	Credit	WEc2 - Indoor Water Use Reduction	7
X	X	2	Credit	WEc3 - Cooling Tower Water Use (v4.1)	2
1	X	X	Credit	WEc4 - Water Metering	1

13	6	12	Energy and Atmosphere		31
Y			Prereq	EAp1 - Fundamental Commissioning & Verification	Required
Y			Prereq	EAp2 - Minimum Energy Performance	Required
Y			Prereq	EAp3 - Building-Level Energy Metering	Required
Y			Prereq	EAp4 - Fundamental Refrigerant Management	Required
5	X	1	Credit	EAc1 - Enhanced Commissioning	6
6	4	6	Credit	EAc2 - Optimize Energy Performance	16
1	X	X	Credit	EAc3 - Advanced Energy Metering	1
X	2	X	Credit	EAc4 - Demand Response	2
X	X	5	Credit	EAc5 - Renewable Energy Production	5
1	X	X	Credit	EAc6 - Enhanced Refrigerant Management	1

6	0	7	Materials and Resources		13
Y			Prereq	MRp1 - Storage & Collection of Recyclables	Required
Y			Prereq	MRp2 - Construction & Demolition Waste Management Planning	Required
1	X	4	Credit	MRc1 - Building Life-Cycle Impact Reduction (v4.1)	5
1	X	1	Credit	MRc2 - Building Product Disclosure & Optimization – Environmental Product Declarations (v4.1)	2
1	X	1	Credit	MRc3 - Building Product Disclosure & Optimization – Sourcing of Raw Materials	2
1	X	1	Credit	MRc4 - Building Product Disclosure & Optimization – Material Ingredients	2
2	X	X	Credit	MRc5 - Construction & Demolition Waste Management (v4.1)	2

8	5	3	Indoor Environmental Quality		16
Y			Prereq	EQp1 - Minimum Indoor Air Quality Performance	Required
Y			Prereq	EQp2 - Environmental Tobacco Smoke Control (v4.1)	Required
Y			Prereq	EQp3 - Minimum Acoustic Performance (v4.1)	Required
2	X	0	Credit	EQc1 - Enhanced Indoor Air Quality Summary of Requirements	2
2	1	X	Credit	EQc2 - Low-Emitting Materials (v4.1)	3
1	X	X	Credit	EQc3 - Construction Indoor Air Quality Management Plan	1
2	X	X	Credit	EQc4 - Indoor Air Quality Assessment	2
0	1	X	Credit	EQc5 - Thermal Comfort	1
1	1	X	Credit	EQc6 - Interior Lighting	2
X	1	2	Credit	EQc7 - Daylight (v4.1)	3
X	1	X	Credit	EQc8 - Quality Views	1
X	X	1	Credit	EQc9 - Acoustic Performance	1

6	0	0	Innovation		6
1	X	X	Credit	INc1.1 - Occupant Comfort Survey	5
1	X	X	Credit	INc1.2 - Purchasing - Lamps (Low Mercury Lamping)	x
1	X	X	Credit	INc1.3 - PBT Source Reduction	x
1	X	X	Credit	INc1.4 - Design for Active Occupants	x
1	X	X	Credit	INc1.5 - Community Contaminant Prevention	x
1	X	X	Credit	LEED Accredited Professional	1

4	0	0	Regional Priority		4
1	X	X	Credit	Regional Priority - Enhanced Commissioning (5 point threshold)	4
1	X	X	Credit	Regional Priority - Reduced Parking Footprint	x
1	X	X	Credit	Regional Priority - Enhanced Refrigerant Management	x
1	X	X	Credit	Regional Priority - Demand Response (2 point threshold)	x

48	17	45	TOTALS	Possible Points:	110

Certified: 40-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80 points and above

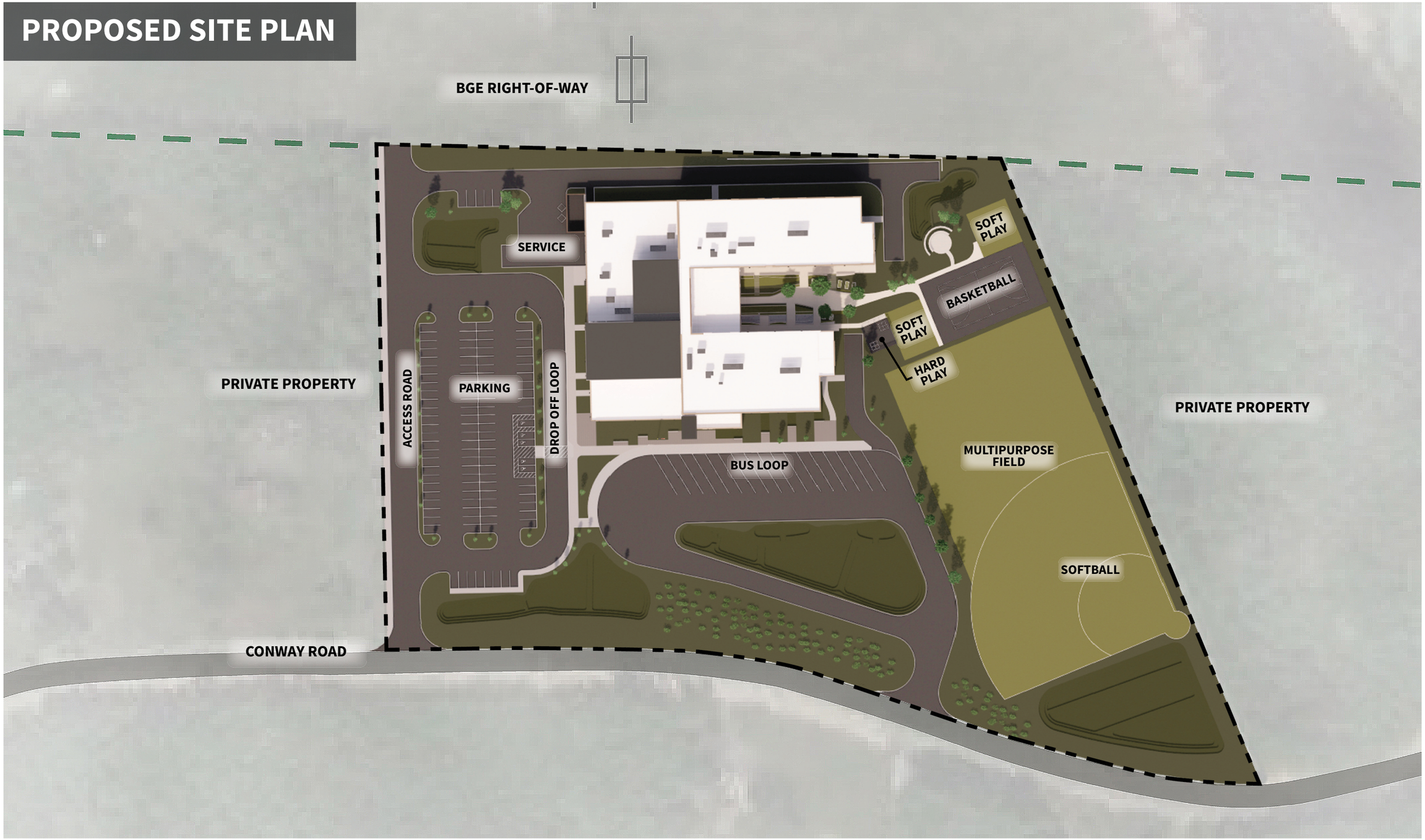
EXISTING SITE PLAN

N

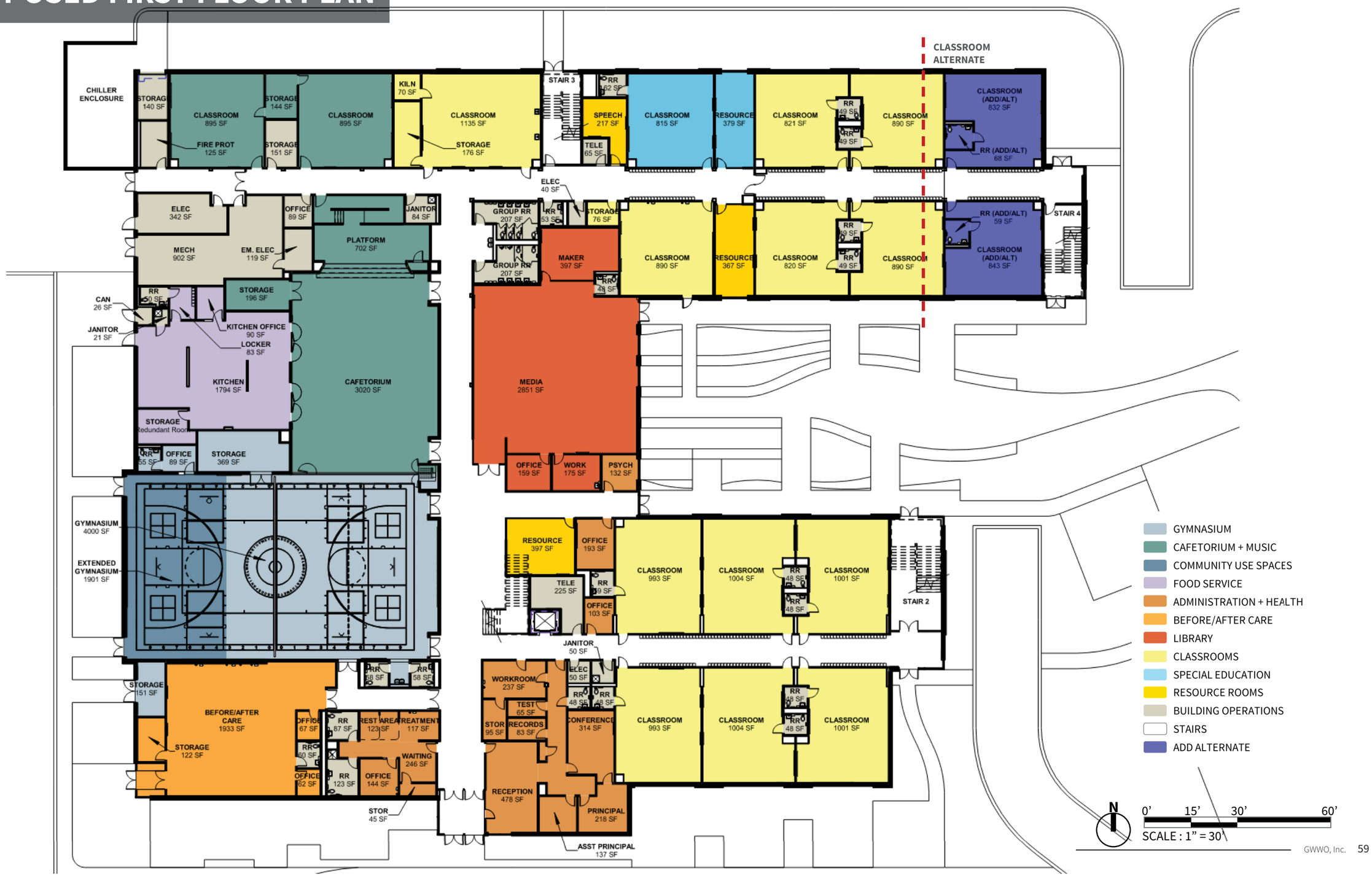
0’ 50’ 100’ 200’

SCALE : 1” = 100’

PROPOSED SITE PLAN



PROPOSED FIRST FLOOR PLAN



PROPOSED SECOND FLOOR PLAN

- GYMNASIUM
- CAFETORIUM + MUSIC
- COMMUNITY USE SPACES
- FOOD SERVICE
- ADMINISTRATION + HEALTH
- BEFORE/AFTER CARE
- LIBRARY
- CLASSROOMS
- SPECIAL EDUCATION
- RESOURCE ROOMS
- BUILDING OPERATIONS
- STAIRS
- ADD ALTERNATE

N

0’ 15’ 30’ 60’

SCALE : 1” = 30’

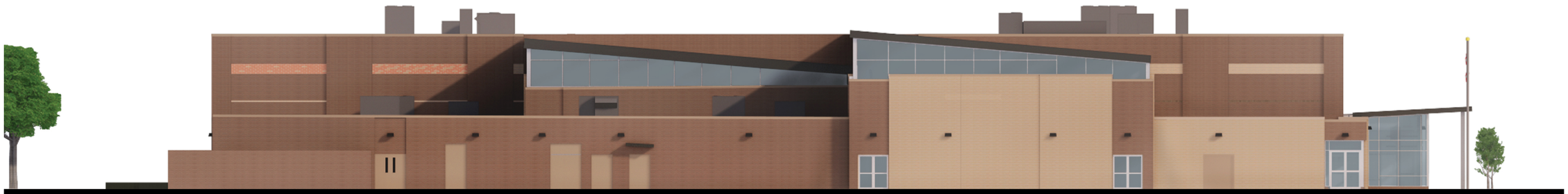
ELEVATIONS

SOUTH

NORTH

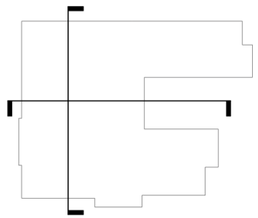
ELEVATIONS

EAST



WEST

SECTIONS



EXTERIOR VIEW

EXTERIOR VIEW

EXTERIOR VIEW

EXTERIOR VIEW