OLO Report 2024-14 October 1, 2024

School Construction Costs

Update to OLO Report 2017-4

Gabriela Monzon-Reynolds Blaise DeFazio

OLO Office of Legislative Oversight

School Construction Costs: *Update to OLO Report 2017-4*

OLO Report 2024-14 **EXECUTIVE SUMMARY** **October 1, 2024**

This Office of Legislative Oversight report re-examines the factors affecting school construction costs identified in OLO Report 2017-4, *New School Construction Costs* and summarizes any changes and new factors that may cause a change in school construction costs. This report:

- Provides background on school construction and summarizes OLO Report 2017-4;
- Describes the funding sources for Montgomery County Public Schools (MCPS) school construction projects, with an emphasis on state aid;
- Studies school construction cost trends and compares costs between MCPS and local jurisdictions;
- Reviews mandated procurement policies/project delivery methods;
- Provides updates on stormwater management costs and regulations for school construction;
- Explores education specifications for school design and community involvement;
- Reviews updates to high performance building mandates for energy efficiency/environment goals; and
- Summarizes updates on market conditions.

School Construction Background. The typical process for a school construction project takes between three and four years to complete, requiring collaboration between the state, the Board of Education, and County government. The types of schools studied for this report are new schools (generally to meet capacity needs when redistricting or additions to existing schools are impractical) and replacement schools (replace the majority or entirely of an existing school). School capital construction cost components consist of 1) costs for maintenance and operations and 2) the costs of designing and construction; the latter is the focus of this report.

School Construction Funding. MCPS's capital projects, including those for school construction, are funded through six primary funding sources: Government Obligation Bonds; State Aid; Recordation Tax; Current Revenue; Recordation Tax Premium; and Schools Impact Tax. State aid is the largest non-local funding source, allowing the County to leverage the maximum funding available for needed schools.

State aid for school construction primarily comes from three state programs (w/FY25 $): Capital Improvement ($42.3M), Built to Learn (BTL) ($87.7M), and Enrollment Growth and Relocatable Classrooms ($13.8). The BTL funds are new since the last OLO report, with MCPS receiving its entire $357M allocation in increments since FY23. The state cost share percentage used to allocate these funds for all programs has remained the same for MCPS since FY16, while it has increased for other counties.

State Cost Share Percentage, FY16 & FY24

County	FY16	FY24
Montgomery	50%	50%
Anne Arundel	50%	50%
Baltimore County	52%	61%
Frederick	64%	65%
Howard	55%	56%
Prince George's	63%	73%

Construction Cost Trends. Although construction inflation rates rose to over 10% in 2021 and 2022, the inflation figures have come down in the past two years and are getting closer to historic figures (3% to 4%) both nationally and in Maryland schools. Local stakeholders identified the following common themes leading to the increase in costs:

- **Smaller labor force**
- **The use of prevailing wages**
- **Programmatic needs**
- **Competition with other types of construction**
- **Stormwater management regulations**
- **Project delays**
- **Smaller projects do not receive multiple bids or qualified firms**
- **Upfront costs for energy efficiencies**
- **Lack of adequate land**

Although the comparison was limited to the number of new schools in MCPS, Maryland, and Virginia, on average the square foot costs for school construction have increased in Maryland (from $286 in 2016 to $445 in 2024) and more so in Virginia (from $255 in 2017 to $461 in 2024).

Cost Factor - Procurement Policies and Practices. While state requirements for school construction procurement have remained relatively the same over the past eight years, MCPS's use of prevailing wages has changed. Prior to the availability of BTL funds, MCPS primarily used non-prevailing wage bids/contracts. Since the BTL funds provided more funding but required prevailing wages, MCPS shifted towards bidding contracts for prevailing and non-prevailing wages, determining which to use based on costs and how to best leverage state aid.

As for project delivery methods, MCPS continues to use the construction manager at-risk method, where the construction manager enters into a guaranteed maximum price contract and the project risk is transferred from the school system to the construction manager. Furthermore, to help save costs MCPS will use add alternates (additional work items that may be added if bids received are below the budgeted amount) and value engineering (where cost savings can be made without compromising quality).

Cost Factor - Stormwater Management Regulations. Stormwater management regulations continue to increase school construction costs, raising project costs by 10-20% due to the need for additional preliminary engineering and site grading to manage runoff. Additionally, the County subjects new and redeveloped sites to the same stormwater average annual groundwater recharge requirements. As a result, replacement school sites are held to the same standards as new schools, requiring MCPS to meet a higher standard for redeveloped sites compared to other school systems in the state.

Cost Factor - High-Performance Building Mandates. School systems in Maryland are required to comply with the High-Performance Green Building Program when designing, building, and maintaining schools. While certification is not required, they must use standards from Leadership in Environmental Design (LEED), the International Green Construction Code (IgCC), or Green Globes. MCPS recently transitioned from using the LEED system to Green Globes, finding it better for its suburban environment and more cost-effective.

In 2022, Maryland enacted regulations requiring schools to comply with Net-Zero Energy (NZE) requirements, mandating that each local school district build at least one NZE school by 2033 (increasing upfront costs). Crown High School will be MCPS's first NZE school (planned to open in August 2027).

Cost Factor - School Design Practices. Design practices related to programmatic needs, community involvement/needs, and prototype use (using the same design for multiple schools) can potentially increase costs. Although there has been more of an emphasis on designed programmatic space for special education and pre-kindergarten, MCPS elementary schools have remained similarly sized since 2016. For community needs, a newer trend among school districts in Maryland is to incorporate security for community use into

school building design, providing additional safety. Also, prototype designs are still being used in Maryland school districts, but only when like-construction conditions, such as similar site management, are met. Otherwise, extensive changes to the design can increase costs.

Cost Factor - Market Conditions. Labor costs and reduced competition continue to significantly impact construction costs. In 2023, 74% of builders reported labor shortages as a major issue with 75% anticipating this trend to continue in 2024. Reduced contractor competition is linked to the decline in non-residential construction companies, and increased demand.

Discussion Items from OLO Report 2017-4 Revisited

There have not been formal deliberations regarding the suggested discussion items on stormwater management, school size, prototype design use, and school construction project timelines. However, there have been County and state initiatives to promote growth in the general labor market – but not targeted to benefit skilled workers for the construction labor force.

OLO Report 2024-14 Recommended Discussion Items

Based on the new findings presented in this study, these discussion items are aimed at alleviating the cost of new school construction and designing schools to address security issues for community use.

1. Continue to examine County and state requirements that can be aligned to lower school construction costs, like stormwater management.
2. Explore different programs or resources to directly help skilled laborers and increase the available pool of workers.
3. Consider incorporating community use-centered design with security prioritized at schools with high public use to address MCPS security concerns.

For a complete copy of OLO-Report 2024-14, go to:
https://www.montgomerycountymd.gov/OLO/Reports/CurrentOLOReports.html

OLO Report 2024-14

School Construction Costs

Update to OLO Report 2017-4

Table of Contents

Appendices

Introduction

Schools are an important asset to the community mainly for educational purposes but also for community use. However, schools across the country are old - nationwide the average age of schools is 49 years old.[1] Schools are also expensive - they are the second largest capital-investment for state and local governments, second only to road construction.[2] Therefore, when replacement or new schools are needed, local government stakeholders must ensure that available funds are efficiently used, carefully examining all factors to help lower costs. For this report, the Council asked the Office of Legislative Oversight (OLO) to re-examine the factors that affect school construction costs identified in *OLO Report 2017-4, New School Construction Costs,* and explore new factors that may cause a change in school construction costs.

The report is organized as follows:

- **Chapter 1 – School Construction Background and OLO Report 2017-4 Summary** provides background on school construction and summarizes OLO Report 2017-4;
- **Chapter 2 – School Construction Funding** provides an overview of school construction funding, with a focus on state aid, and addresses funding public school construction in Virigina;
- **Chapter 3 – Construction Cost Trends** studies school construction cost trends nationally and locally, compares square foot costs for new and replacement schools, and examines site costs;
- **Chapter 4 – Cost Factor - Procurement Policies and Practices** focuses on the State of Maryland mandated procurement policies and project delivery methods;
- **Chapter 5 – Cost Factor - Stormwater Management Regulations** provides updates on stormwater regulations, along with their impacts on school construction;
- **Chapter 6 – Cost Factor - School Design Practices** describes the educational specifications school districts need to meet, community involvement in the project's design, and prototype designs as a potential cost saving measure;
- **Chapter 7 – Cost Factor - High Performance Building Mandates** reviews updates to state and county building performance mandates and how these impact school construction costs;

[1] Nearly One-Third of Public Schools Have One or More Portable Buildings in Use, National Center for Education Statistics, February 15, 2024.
[2] 50-State Comparison: K-12 School Construction Funding, Education Commission of the States, June 6, 2023.

- **Chapter 8 – Cost Factor - Market Conditions** reviews current economic factors and analyzes their impact on school construction projects in Maryland; and
- **Chapter 9 – Findings and Discussion Items** summarizes the report's findings and presents discussion items.

OLO staff members Gabriela Monzon-Reynolds and Blaise DeFazio conducted this study with assistance from Kristen Latham and Karen Pecoraro. OLO received a high level of cooperation from everyone involved in this study and appreciates the information and insights shared by all who participated. In particular OLO thanks:

County
Fariba Kassiri, DCAO
Linda Kobylski, Permitting Services
Mark Etheridge, Permitting Services
Keith Levchenko, Council Central Staff

Montgomery County Public Schools
Brian Hull, Chief Operating Officer (left MCPS)
Henry Johnson, Acting Chief of Staff
Seth Adams, Facilities Management (left MCPS)
Adrienne Karamihas, Cap. Plan. & Real Estate (retired)
Terry Miller, Planning, Design, & Construction
Shiho Shibasaki, Facilities Management
Donald Connelly, Facilities Management
Rachel Vaughn, Planning, Design, & Construction

Other Jurisdictions or Agencies
Jeff Hagan, Anne Arundel County Public Schools
Jeffrey Chambers, Arlington Public Schools
Adnan Mamoon, Frederick County Public Schools
Andrew Jinks, Howard County Public Schools
Azmir Kabilovic, Prince William County Public Schools
Vincent Santmyer, Prince William County Public Schools
Eugene Shanholtz, IAC*
Melissa Wilfong, IAC*
Vijay Ramnarain, Virginia Department of Education
Ann Belanger, Architectural Consultant, VDOE

* Interagency Commission on School Construction

Methodology. To prepare this report, OLO gathered information through document reviews, data analysis, and interviews with staff from the County, Montgomery County Public Schools, Interagency Commission on School Construction, Virginia Department of Education, Howard County Public Schools (MD), Anne Arundel County Public Schools (MD), Frederick County Public Schools (MD), Arlington Public Schools (VA), and Prince William County Public Schools (VA).

To be consistent with OLO Report 2017-4 and to do a comparative analysis from 2016 to 2024, OLO interviewed the same jurisdictions and state entities. OLO also analyzed new and replacement elementary schools (like OLO Report 2017-4), when possible.

Chapter 1. School Construction Background and OLO Report 2017-4 Summary

This chapter provides background on school construction and summarizes OLO Report 2017-4, *New School Construction Costs*, which this report updates.

This chapter is organized as follows:

A. School Construction Background
B. OLO Report 2017-4, *New School Construction Costs*, Executive Summary

A. MCPS School Construction Background

This section provides an overview of school construction, including the school construction timeline, the types of schools studied in the report, and the capital construction cost components for a new school.

1. School Construction Timeline

Progressing a school construction project from conception through design and construction requires coordination and collaboration between the state, the Board of Education, and County government. The typical process takes between three and four years to complete. This subsection describes the standard process for constructing a new school in the State of Maryland.

- **Year One**. All school systems must submit both an Educational Facilities Master Plan and project-specific feasibility study for state review during the summer months. In October, Montgomery County Public Schools (MCPS) requests individual project planning approval from the Interagency Commission on School Construction (IAC).[1]
- **Year Two**. In January, the IAC approves local planning for individual projects. In spring and early summer, MCPS develops project-specific educational specifications and selects a project architect. In September, MCPS submits the schematic design plans[2] to the IAC for review, comment, and approval. MCPS will incorporate and address comments prior to moving

[1] The IAC is the Maryland state agency that approves sites and plans for new school facilities and reviews and approves Capital Improvement Program grant funding or state aid, among other duties. The changes to the IAC since OLO Report 2017-4 are discussed in Chapter 2.
[2] Schematic Design Documents outline scope, specifications, and general school design.

forward in the process. MCPS submits its request for state funding in October and design documents[3] are submitted for review and comment by the IAC in November.

- **Year Three**. In January, the IAC approves state funding for MCPS CIP projects. Construction documents are completed by April. This includes cost estimates, filing of permits, and submission of the construction documents[4] to the IAC for review and comment. If approved, usually around May, the project is posted for bids. MCPS publicly advertises the project for bid; bids are received and awarded to the general contractor or construction manager at-risk.[5] From the commencement of construction, it can take between 24 and 36 months to complete.
- **Year Four.** By May or June furniture, fixtures and equipment are moved into the building and the school is ready for an August opening.[6]

2. Types of Schools Studied for This Report

This report reviews new and replacement schools, which are defined by Maryland's Public School Construction Program:

• New School projects to build new schools, generally to meet capacity needs, where neither redistricting of school populations nor additions to schools in existing neighborhoods and communities are possible or practical.[7]

• Replacement School projects to replace the majority or the entirety of an existing school where the cost of renovation is prohibitive, or site/building layout and other technical factors make renovation of the entire structure infeasible. Replacement may include expansion to increase capacity and must typically be justified based on a feasibility study. [8]

For purposes of this report, OLO used the state's replacement school definition and designation of MCPS projects as either new or replacement schools. As such, MCPS schools undergoing a revitalization/expansion project and were classified by the state as a replacement school were included in OLO's review. This allowed for ease of comparison with all replacement schools across the state.

[3] Design Documents further define the design by laying out mechanical, electrical, plumbing, structural and architectural details.
[4] Construction Documents are detailed drawings including specifications for construction details and materials.
[5] See Chapter 4, page 32 for the definition and further discussion of a construction manager at-risk.
[6] Maryland Public School Construction Program Administrative Procedures Guide, pages 8-11.
[7] Ibid, page 3.
[8] Ibid, page 3.

3. Capital Construction Cost Components

Capital construction costs include: 1) the cost of designing and constructing the school building and 2) costs are for maintenance and operations (these ongoing costs are not reviewed in this study). Capital construction costs are typically divided into three cost components:

- **Site costs** - includes the initial land acquisition and development costs for the project;
- **Soft costs** - includes costs incurred by the school system to move the project forward, such as design and architecture, construction management, and legal fees; and
- **Hard costs** - these costs are most affected by decisions of the school system and the architect, and generally include building core and exterior features, interior enclosures, building services, finishes, and mechanical and electrical services. Hard costs can also include labor and materials and overhead costs. Furniture, fixtures, and equipment (FF&E) and specialized mechanical and electrical services may be considered hard costs but are not typically included in the construction contract.[9]

For this report OLO updated those factors affecting capital construction costs (designing and constructing school buildings) identified in OLO Report 2017-4. These cost factors include procurement policies and practices, stormwater management regulations, school design practices, high performance building mandates and market conditions.

B. OLO Report 2017-4, New School Construction Costs, Executive Summary, November 15, 2016

This Office of Legislative Oversight report responds to Council's request to compare school construction costs in the County with other counties in Maryland and Virginia. In sum, OLO finds that MCPS' construction costs per square foot increased by 19.0% from FY2008 through FY2015, a rate nearly identical to the national average of 18.0%. However, square foot cost comparisons, alone, fail to identify the root causes of construction cost differences, which are significantly impacted by polices and regulations.

STATE SCHOOL CONSTRUCTION PROGRAM AND FUNDING

The Maryland General Assembly established the Public School Construction Program in 1971 to provide a standard process for allocating state aid for school construction projects. Historically, MCPS has received $30 to $40 million annually in state aid for all eligible MCPS capital projects. For FY2017, MCPS received $50.1 million in state construction aid ($38.4 million in regular school construction funding and $11.7 million in funding from the Capital Grant Program for Local School Systems with Significant Enrollment Growth (or ERGC)).

[9] The American Institute of Architects, "Emerging Professionals Companion: Project Cost and Feasibility," the American Institute of Architects, 2013, pp. 67-77.

Regarding new and replacement schools, state construction aid is limited to defined eligible costs based on square foot and capacity allowances, which is then reduced by a cost share formula based on a county's wealth. For FY2017, MCPS received 50.0% of total eligible costs per project. All ineligible costs are paid for by the counties. On average, MCPS receives state aid to fund 15.0% of the total cost of a new school and 20% of the total cost of a replacement school. As a result, local funds (i.e., General Obligation Bonds, current revenue, and Recordation and Impact Tax revenues), pay for 80% to 85% of new and replacement school projects.

SCHOOL CONSTRUCTION COST TRENDS

National school construction costs per square foot have increased 18.0% from $179 per square foot (CY2008) to $212 per square foot (CY2014). While regional cost data reveals cost increases of 25.0% over the same time period, MCPS costs per square foot trends have tracked the national average, increasing by 19.0% from FY2008 to FY2015. Increasing construction costs coupled with projected enrollment growth affect the ability of MCPS to address capital needs.

CONSTRUCTION COST FACTORS

Comparisons of school construction costs data are most meaningful when each school is constructed to the same specifications and in the same environment. However, school construction costs are driven by interrelated state and local policies and practices, school design choices, and market conditions that vary over time and across school districts.

1. Procurement Policies and Practices

State mandated procurement policies, such as Minority Business Enterprise and Prevailing Wage laws, can lead to indirect and direct construction costs increases. These laws apply to all school systems in Maryland.

- *Minority Business Enterprise (MBE) Law*. The state and industry professionals note that the MBE law increases required reporting requirements, which may be especially burdensome for small businesses. As such, bid competition may decrease as these firms may elect not to bid on projects subject to MBE requirements. Reduced competition can indirectly increase school construction costs.
- *Prevailing Wage Law.* Data provided to the State Public School Construction Program by Anne Arundel, Carroll, Frederick, Howard, and Washington Counties from 2012-2015 show the cost differential between prevailing wage bids and market wage bids ranged from 0.0% to 49.0% depending on trade. Of these, the average prevailing wage bid is 11.7% higher than the average market wage bid.

Prevailing Wage Law and State Construction Aid. Since 2014, school construction projects in Maryland trigger the prevailing wage requirement only if the state funds more than 25% of total project costs (prior to 2014 prevailing wage was triggered if the state funded 50% or more of total project costs). This threshold applies to all counties for school construction project valued at $500,000 or more. However, a school system can accept 24.9% of state funding and not require bidding contractors comply with prevailing wage requirements. As such, school systems can receive higher amounts of state aid if the school system uses contractors that pay prevailing wages and lower amounts of state aid if contractors do not.

MCPS does not require bidding contractors to comply with prevailing wage requirements because prevailing wage rates increase overall construction costs. Since 2014, MCPS has not requested more than a 24.9% state share for any individual project. As such, MCPS bids new and replacement school projects without prevailing wage requirements. This may reduce construction costs for MCPS as compared to other Maryland school systems that accept a higher state share of funding and require prevailing wage rates.

School systems can bid projects both with and without prevailing wage rates ("side-by-side" bids) and compare total costs at different state funding levels. This method can result in cost savings. For example, Washington County saved almost $0.8 million by electing not to contract under prevailing wage rates for the replacement of Bester Elementary School. Since MCPS accepts a lower state share of funding and does not require bidding contractors comply with prevailing wage requirements, MCPS does not solicit side-by-side bids.

Comparison to School Systems in Virginia. The Maryland Prevailing Wage and Minority Business Enterprise laws add regulatory requirements to school construction projects that do not exist in Virginia. Increased reporting requirements can dissuade some companies from competing for projects in Maryland and thus decrease competition. Industry experts report these requirements have led to higher labor costs for construction projects in Maryland as compared to Virginia.

2. Site Costs and Stormwater Management Regulations

Site costs vary from project to project and can be affected by geographic differences in the labor market, site topography and geography, and environmental considerations. State public school construction data reveals that grading, utilities, landscaping, and other site costs have increased since 2010, with many elements increasing by 20.0% or more.

Stormwater Management Regulations. In 2010, the Maryland Department of Environment implemented new stormwater management (SWM) regulations affecting all school construction projects after May 2013. These regulations require site specific SWM practices and multi-stage design reviews, resulting in higher civil engineering costs (Anne Arundel County staff estimate about a 20.0% increase in engineering costs). Further, the regulations reduce available land for site and building spaces and give preference to non-structural design alternatives to meet standards, such as vegetated roofs, which can increase overall project costs.

While state SWM regulations apply to all school systems in Maryland, the County has more stringent SWM requirements than the state. For example, the County requires redeveloped sites (i.e., replacements schools on existing school sites) to meet the same stormwater standards as new construction. MCPS estimates that employing the less stringent state standard for redeveloped sites could reduce square foot site costs by 10.0% to 20.0%. For example, reduced site costs for a 95,000 square foot replacement school could equal roughly $5.0 to $10.0 per square foot, or a $.48 million to $.95 million reduction in total site costs.

Comparison to School Systems in Virginia. Like Maryland, site costs vary from project to project in Virginia. Additionally, Maryland and Virginia manage stormwater differently making cost comparisons difficult.

3. High Performance Building Mandates

All school systems in Maryland must comply with the State's High Performance Building Act, which requires at a minimum Leadership in Energy and Environmental Design (LEED) Silver Certification. This requirement adds 2.0% to 5.0% to total construction costs compared to a non-LEED building.

For each project school systems can use a combination of LEED credits to achieve required LEED certification points. As a result, a LEED Silver or Gold certified school in the County may have a different LEED score (higher or lower) and different design credits than a school constructed in another jurisdiction. OLO reviewed costs associated with two green building components, vegetated roofs and geoexchange systems, both used

extensively by MCPS. OLO found that while upfront construction costs are more expensive than traditional counterparts, lifecycle costs are generally lower.

Comparison to School Systems in Virginia. School systems in Virginia can use LEED or other green building standards (i.e., the Virginia Collaborative for High Performance Schools) in school designs. However, Virginia does not require LEED certification.

4. School Design Practices

School design priorities and choices can affect construction costs. This report reviewed the following design practices:

- *School Building Size.* Schools today are larger than in previous years to accommodate modifications in educational programs and building specifications (i.e., full day kindergarten, project based learning, and larger health suites). These changes affect construction costs as it is simply more expensive to build larger buildings.
- *Community Involvement in the Design Process*. School systems establish their own policies guiding community involvement in the design process. All school systems reviewed invite community members, neighbors, and school staff to participate in the design process. This can impact final design choices, scheduling, and project timetables, all of which can affect project costs. OLO found that school systems using prototype school designs have more limited opportunities for community involvement, but this may reduce overall project schedules and design costs.
- *Use of School Buildings for Non-Educational Programs.* In many jurisdictions, including Montgomery County, schools serve as community assets, housing non-educational program space (i.e., enlarged gymnasiums and child care); however, this practice can result in additional construction costs. OLO found that when comparing school construction costs, variations in non-educational program use of a school building should be noted.
- *Use of Prototype School Designs*. School systems that frequently use prototype school designs see a reduction in average architectural fees of 10.0% to 25.0% or around 0.5% to 1.5% of total building construction costs. School systems may also see a reduction in change orders and contingency costs. However, cost savings associated with prototype designs depend on the number of times a prototype plan is used, whether the design is modified, and site conditions.

Comparison to Other School Systems in Virginia. Like Maryland jurisdictions, school design polices are determined locally in Virginia. Variances in policies relating to community involvement, non-educational program use of school facilities, and use of prototype school designs should be noted when comparing costs across jurisdictions.

5. Market Conditions

Reduction in the labor force and the number of construction-related companies following the 2009-2010 recession increased costs. Additionally, as the workforce ages and fewer people enter the trade professions, future labor costs are likely to increase. School construction projects compete in a regional labor market with architecture firms and general contractors often working in both Maryland and Virginia. As such, increases and decreases in labor and materials markets are external cost factors that affect all school systems in the region.

OLO Recommended Discussion Questions

OLO recommends the following discussion questions for Council consideration:

1. **State Regulations**
   - What amendments to state regulations could the Council and MCPS pursue that might result in reduced construction costs?
   - Should the County propose amendments to the state aid construction formula to account for variations in school system policies, such as class size reduction? What impact would this have on funding?
2. **County Regulations**
   - Should the Council request additional information and data regarding the financial impact of County stormwater management regulations on school construction costs?
   - In addition to stormwater management regulations, are there other opportunities to align County and state regulatory requirements that could result in school construction cost reductions?
3. **Community Use**
   - As it's the County's policy to use school buildings as year-round community facilities, how should the County measure its school construction costs relative to other jurisdictions that use school facilities differently?
4. **School Building Design and Construction**
   - Are there opportunities to adjust school building size and site requirements to reduce total construction costs?
   - Would the increased use of prototype school building designs for new and replacement schools as implemented by other school systems allow MCPS to build schools at a faster rate for lower cost, and provide equity of school buildings County-wide?
   - Could project schedules and timelines be reduced through a review of policies and practices such as community involvement in the design process?
5. **Labor and Market Conditions**
   - Are there opportunities for the Council to promote programs or policies that could enhance competition and promote growth in the construction labor market in the County?

Chapter 2. School Construction Funding

State aid for school construction comprises 29% percent or $117 million of MCPS's FY25 approved capital funding, with the remaining 71% or $290 million coming from local sources such as Government Obligation Bonds, Current Revenue, and Recordation Tax.[1] The more state aid funded, less is needed or provided by local funds. This chapter provides an overview of MCPS school construction funding, with a focus on state aid and Maryland's Public School Construction Program, since state funding provides a critical component towards the County's capacity to build schools.

The initial OLO report on new school construction focused on state aid since it is critical to fund school construction and allows the County to leverage maximum funding available. Therefore, this chapter will update state aid funding types and processes that have occurred since the initial report's release. OLO did not identify any additional significant factors in school construction funding.

This chapter is organized as follows:

A. School Construction Funding
B. Maryland State Aid
C. Funding Public School Construction in Virigina

A. School Construction Funding

MCPS's capital or long-term projects (including school construction) are funded through its Capital Improvements Program. For the FY25 approved MCPS capital budget, MCPS had six funding sources, as shown below, with state aid being the largest source after Government Obligation Bonds. The other funding sources are from the County.

Table 1. MCPS FY25 Approved Capital Funding

($ in millions)

Fund	FY25 Funding	Percent of Total
Government Obligation Bonds	$169,332	42%
State Aid	$117,218	29%
Recordation Tax	$51,109	13%
Current Revenue	$31,383	8%
Recordation Tax Premium	$20,983	5%
Schools Impact Tax	$16,630	4%
Total	**$406,655**	

[1] Schedule CIP 260P2 – Detail by Revenue Funding Source, Department/Agency, and Project, Montgomery County's Office of Management and Budget

Source: Schedule CIP 260P2 – Detail by Revenue Funding Source, Department/Agency, and Project, Montgomery County's Office of Management and Budget
Note: includes planned/programmed funding for FY25 and it may include unspent funding from prior years.

Descriptions of the funding sources used for MCPS capital projects are below:

- Government Obligation (GO) Bonds: secured by the full faith, credit, and taxing powers of the County and finances long-term public purposes such as the acquisition and construction of County/school facilities.

- State Aid: grant funding provided by the State of Maryland and can be applied to capital projects like GO Bonds. *A further discussion of the state aid types is in the next section*.

- Recordation Tax: tax levied when changes occur in deeds, mortgages, leases, and other contracts pertaining to the title of either real or personal property. The revenues are used to pay for school CIP projects, housing rental assistance for low-to-moderate income households, and other government activities.[2] This funding can also be applied to capital projects like GO Bonds. Recordation Tax Premium is the same tax, but with different rates for higher amounts of real or personal property.[3]

- Current Revenue: funding source provided annually within the operating budget from general, special, or enterprise funds. MCPS only applies current revenue to three projects: Facility Planning, Relocatable Classrooms, and Technology Modernization.

- School Impact Tax: only assessed on residential construction projects and used towards projects that increase capacity through new schools, additions to schools, or the portion of a school project to increase capacity.

OLO has summarized the key state aid components below including the funding types, processes, and a background of the Public School Construction Program (provides state aid). A more detailed analysis on state aid was completed in OLO Report 2021-12, "State School Construction Aid Eligibility and Funding of MCPS Capital Projects," in conjunction with the Interagency Working Group on School Construction and Eligibility.

[2] Glossary, Montgomery County Office of Management and Budget
[3] Bill 17-23 Recordation Tax Changes effective October 1, 2023, Department of Finance

B. Maryland State Aid

1. State Aid Funding Types

The state has several ongoing programs that provide capital funding to Maryland school systems for school construction. The table below lists the programs MCPS has recently received funding from for FY25 and their descriptions.[4] For the FY25 capital budget, MCPS requested $182.4 million from the state and received $143.7 million or 79% of its request.[5]

Table 2. School Construction State Funding Programs & MCPS Funding

($ in millions)

Program	Description	FY16 Funding	FY25 Funding
Capital Improvement Program	The state's largest school construction grant program, averaging $280M per year. Funding is based on a cost-share formula and it can be used for major new, renewal, or replacement school projects; can also be used for addition projects and systemic renovations for maintenance. Projects must be at least $100K.	$39.8	$42.3
Built to Learn Program	The program distributes additional, set allocations to Local Education Agencies. MCPS has a one-time allocation of $357M and it has received received all funds in yearly increments, which started in FY23.	N/A	$87.7
Enrollment Growth and Relocatable Classroom Program	Addresses significant enrollment growth (exceeds 150% of the statewide average over the past five years) and/or a significant number of relocatable classrooms (an average of more than 300 relocatable classrooms in a local school system over the past five years).	$5.9	$13.8
	Total	**$45.7**	**$143.7**

Sources: Programs and Initiatives, Interagency Commission on School Construction

FY2025 MCPS Educational facilities Master Plan & FY25-30 CIP, page 1-12

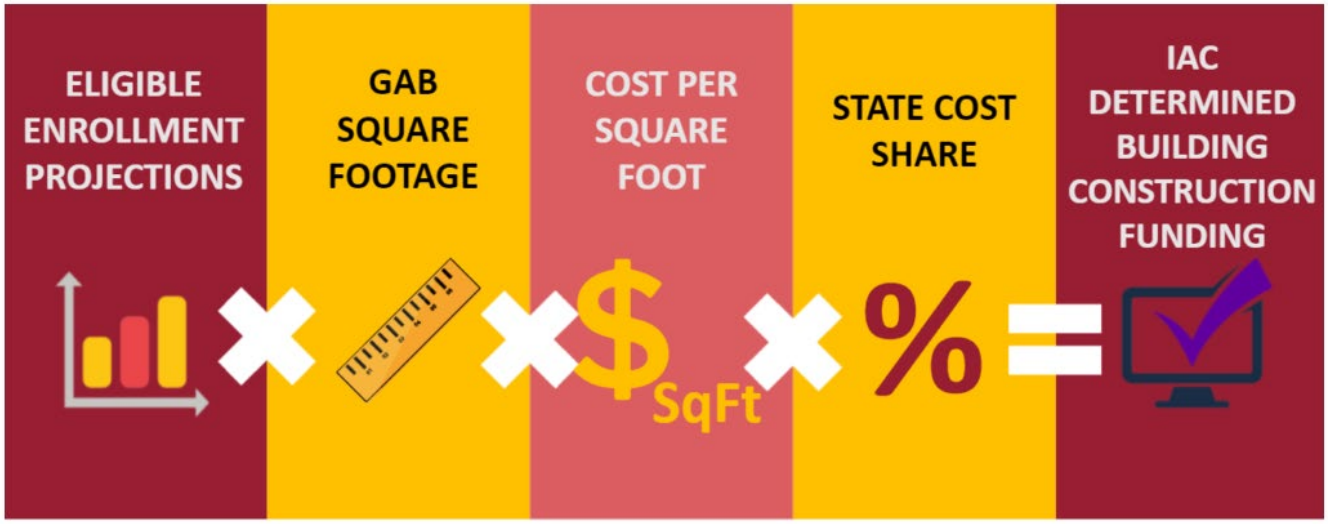
[4] Other state programs include the Aging Schools Program, School Safety Grant Program, the Healthy School Facility Fund, the Innovation Incentive Pilot Program, and Pass Through Grant.

[5] FY2025 MCPS Educational facilities Master Plan & FY25-30 CIP, page 1-12. Note: Certain projects had not received planning funds through the state allocation at the time of the FY2025 MCPS Master Plan & CIP Publication. After it was published, Crown High School and JoAnn Leleck Elementary School received $42.0M and $8.0M in Built to Learn funds, respectively. In addition, MCPS adjusted its overall state aid request – no funds were requested for Damascus High School.

2. Maryland State Funding Process for the Capital Improvement, Built to Learn, and Enrollment Growth and Relocatable Classroom Programs

For the Capital Improvement, Built to Learn, and Relocatable Classroom programs, the Interagency Commission on School Construction (explained further in the next section) uses four funding factors to determine building construction funding for new schools, replacement schools, and renovation projects as shown in the chart below:

Chart 3. Funding Factors Formula



Source: Funding Factors, IAC

- Eligible Enrollment Projections: based on projected enrollment at the project school and available capacity at adjacent schools.

- Gross Area Baseline (GAB): The baselines are intended to support all spaces required to deliver the educational programs required by the State of Maryland and to encourage multiple uses of spaces and other utilization-maximizing strategies that can reduce facility size and therefore long-term costs of ownerships.

- Cost Per Square Foot: established by the IAC by July of the calendar year in which applications are submitted. It is multiplied by the IAC's statewide cost-per-square-foot school building cost. For FY25, it was $495 for construction, with site development ($416 without site development).

- State Cost Share Percentage: created for each individual Local Education Agency (school district) and it's revisited every two years. It's calculated so that counties with higher numbers of students participating in the Free and Reduced Price Meal Program, higher unemployment rates, larger student enrollment growth rates, or provide a larger share of local finances for school construction relative to the local wealth of the district that receive more state funding

Table 4 displays the cost share percentages for Montgomery County compared with other jurisdictions in FY16 and FY24. Montgomery County and Anne Arundel County's share remained stagnant at 50% (lowest level), but other jurisdictions' rose, with Prince George's County having the largest increase of 10%.

Table 4. State Cost Share Percentage, FY16 & FY24

County	FY2016	FY2024
Montgomery	50%	50%
Anne Arundel	50%	50%
Baltimore County	52%	61%
Frederick County	64%	65%
Howard County	55%	56%
Prince George's	63%	73%

Source: IAC State & Local Cost Shares

To obtain funding from the state, MCPS must separate eligible costs for capital projects and those ineligible – which are paid by MCPS/the County. Eligible costs include those for new construction, renovation work, and systematic renovations. The ineligible costs include such items as land acquisition and feasibility studies. A full list of eligible and ineligible costs is below.

Table 5. Eligible and Ineligible Costs for State Funding

Eligible Costs for State Funding, include:	Ineligible Costs for State Funding, include:
• New Construction (including new schools, additions, building replacements, and modular construction); • Renovation work necessary to restore and modernize existing facilities that are 16 years or older; • Systemic renovations, such as roofs, windows, etc. to extend the facility life for at least 15 years; • State-owned relocatable classrooms;	• Site acquisition; • Office development costs not listed as eligible by law; • Master plans, feasibility studies, programs, educational specifications or equipment specifications; • Ancillary construction (permits, test borings, soil analysis, bid advertising, water and sewer connection charges, topographical surveys, models, renderings, estimates); • Leasing or purchasing school facilities; • Construction inspection services; • Relocation costs for site occupants;

• Temporary facilities (including utilities and portable classrooms) that are necessary on-site during construction of state-funded projects; • Built-in equipment and furnishings; • Off-site development costs required by local, state or federal agencies; • Emergency repairs established by law; • *Certain planning and design work (see details below); and* • *Certain furniture, fixtures, and equipment (FFE*; see details below).*	• Salaries of local employees; • Construction of administrative or support facilities; • Maintenance and temporary storage; • *FFE not allowed under the eligible costs; and* • *Architecture, engineering, or other consultant fees <u>not allowed</u> under the eligible planning and design costs.*

*Furniture, fixtures, and equipment

Since 2021[6] there have been significant changes to the eligible costs for planning and design, and furniture, fixtures, and equipment (highlighted in italics in above chart). Certain planning and design costs are now eligible for state funding:[7]

- <u>Planning:</u> Consulting costs related to the project-specific educational specifications submission and, if necessary, the feasibility study submission; as well as the development of required equipment specifications.

- <u>Design:</u> Architecture and engineering (A/E) services directly contracted by the LEA; consulting (commissioning agent, industrial hygienist, etc.) services; geotechnical surveys; third-party materials testing and inspections; and pre-construction services engaged prior to the start of the schematic phase of the design.

In addition, there is now particular furniture, fixture, and equipment (FFE) eligible for funding if they are associated with the project and are used in the delivery of educational programs or services in a facility. They must be dedicated to permanent use in the facility and have a median use of life of at least 15 years from the date of purchase.[8] They cannot be specific FFE that already exist in facilities, portable electronic equipment for student use, or portable security-related equipment.[9]

Finally, in addition to the eligible cost changes, there were also changes since 2016 that increase the eligible square footage. The programs now eligible are those for cooperative space, career and technical education, and pre-kindergarten (due to the work from Blueprint for Maryland's Future).

[6] COMAR 14.39.02.11
[7] FAQs About State-Eligible Costs of Planning, Design, and FF&E, IAC
[8] Ibid.
[9] Ibid.

3. State of Maryland's Public School Construction Program

Maryland's Public School Construction Program's was established in 1971, and its purpose is to equalize educational facilities across the state and provide state aid for school construction projects.[10] The program oversees statewide school planning, design, construction, and financing.

The Public School Construction Program and the roles of state stakeholders have notably changed since 2016, following the completion of the 21st Century School Facilities Commission (also known as the Knott Commission). The Commission recommended changes to the program to provide flexibility, streamline the process, center the role of the state to provide technical assistance, and provide incentives. [11] A summary of significant changes to the program is summarized below.

Table 6. Timeline of Changes to the Public School Construction Program

Year	Change	Description
2016	21st Century School Facilities Commission (Knott Commission) Recommendations	There were 36 recommendations made, with the key one being that a statewide school assessment was performed by an outside vendor, with state and Local Education Agencies (LEAs) continually updating the information.
2018	21st Century School Facilities Act	Codified most of the recommendations from the Knott Commission and transformed the Interagency *Committee* on School Construction to the Interagency **Commission** on School Construction.
2021	Built to Learn Act	Allowed the Maryland Stadium Authority to issue up to $2.2 billion in revenue bonds to fund school construction projects; created the Public School Facilities Priority Fund; made design and other project expenses eligible for state funding; mandated an increase to Enrollment Growth and Relocatable Classroom (ERGC) funding; and extended the Healthy School Facility Fund.
2023	Establishment of IAC as an Independent Agency	Previously the IAC operated as an independent unit of the Maryland State Department of Education.

As shown in the table above, in 2018, most of the recommendations by the Commission were codified in the 21st Century School Facilities Act. Two key changes included:

- The creation of the "Workgroup on the Assessment and Funding of School Facilities." Its purpose is to make recommendations on 1) the prioritization and funding of school facilities based on the results of the statewide school facilities assessment and 2) identification of "factors used in the State and local-cost share formula, gross area baselines, and maximum state construction allocations, as well as the purpose and implementation of the Local Share of

[10] OLO Report 2017-4, Page 3
[11] History of the Public School Construction Program, IAC

School Construction Costs Revolving Loan Fund and possible incentives for Local Education Agencies (LEAs) that reduce the cost per student and the total cost of ownership."[12]

- The shifting of authority over state school construction funding. The Interagency *Committee* on School Construction transformed to the Interagency **Commission** on School Construction (IAC)[13]. When operating as a committee, its five-member independent unit[14] of the Maryland State Department of Education administered the Public School Construction Program and provided recommendations that were then approved by the Board of Public Works.

  When it became a commission, it expanded its membership to nine members, adding four more appointees (two by the Governor and one each by the Maryland Senate and House). A chair was also created and the IAC took on the school construction responsibilities previously held by the Board of Public Works – in addition to previous IAC responsibilities. These additional responsibilities include having direct authority over school construction funding, standards and procedures governing how schools are planned, approved and constructed, and approving all payments for projects. The updated roles and responsibilities of all departments involved in the Public School Construction Program are in the organizational chart on the next page.

[12] The Assessment and Funding Workgroup, IAC
[13] COMAR 23.03.01
[14] Included the State Superintendent of Schools, the Secretary of General Services, the Secretary of the Maryland Department of Planning, and two public members appointed by the Speaker of the House and the President of the Senate.

Chart 7. Current Organizational Structure of the Interagency Commission on School Construction

Source: The Interagency Commission on School Construction

In 2021, the Built to Learn Act of 2020 was implemented, creating up to $2.2 billion[15] in revenue bonds to fund school construction projects.[16] Additionally, the Act:

[15] Issued by the Maryland Stadium Authority (MSA). The MSA manages school construction projects approved by the IAC.
[16] History of the Public School Construction Program, IAC

- Created the Public School Facilities Priority Fund, which prioritizes funding to high need schools, based on the results of the statewide school assessment.
- Extended the Workgroup on the Assessment and Funding of School Facilities.
- Made certain design and other project expenses eligible for state funding.
- Increased Enrollment Growth and Relocatable Classroom funding (starting in 2026).
- Extended the Healthy School Facility Fund.

Finally, in 2023 the last significant change was the IAC becoming an independent agency; the IAC was previously an independent unit under the Maryland State Department of Education.[17]

C. Funding Public School Construction in Virginia

Since OLO's 2016 report on school construction, the Commonwealth of Viriginia has operated similarly in terms of their public school construction program. It is still not as highly centralized as the State of Maryland, but it does still require building codes, minimum educational program standards, and publishes school facility guidance. Each school system is still responsible for developing standards, designing, and constructing schools.

The Commonwealth of Virigina also funds its local systems (through its traditional School Construction Grant Program[18]) less than the State of Maryland; that trend has continued since OLO Report 2017-4. In 2016, the Commonwealth of Virginia provided 5% of the cost of capital construction, compared with the national average of 18% and Maryland at 26%.[19] In 2021, the amount increased, with Virginia providing 10% of the cost of capital construction, compared with the national average of 22% and Maryland at 31%.[20] As for some background into Virginia's lower funding, the Commonwealth has traditionally provided more funding for road maintenance, with the understanding that local jurisdictions would provide more funding for school construction.[21]

However, the amount of aid increased through the Commonwealth's 2022 Appropriation Act[22], in which the School Construction Assistance Program was created. This program provided a one-time amount of $450,000,000 to "award grants on a competitive basis to local school boards that demonstrate poor building conditions, commitment, and need in order for such local school boards to be able to fund the construction, expansion, or modernization of public school buildings."[23] To date, $365,344,910 has been awarded to qualifying school projects.[24]

[17] History of the Public School Construction Program, IAC
[18] Code of Virigina, § 22.1-175.2.
[19] State of Our Schools (2016), 21st Century Fund
[20] State of Our Schools (2021), 21st Century Fund
[21] Virginia Has History of Underfunding School Construction, by Megan Pauly & Sean McGoey, VPM, May 17, 2024.
[22] Chapter 2, Item 137, Paragraph C.43 of the 2022 Virginia Appropriation Act
[23] School Construction Assistance Program, Virginia Department of Education
[24] Ibid.

Chapter 3. Construction Cost Trends

This chapter reviews school construction cost trends in Maryland and Virginia, as well as nationally. It compares square foot costs for new and replacement schools for MCPS against other local jurisdictions and costs from 2016. The chapter closes by examining site costs and state-local cost burden.

The initial OLO report on new school construction reviewed cost trends, compared new and replacement school construction costs per square foot, and the state/local cost burden for site costs. Therefore, this chapter will update these trends and costs since the initial report's release.

This chapter is organized as follows:

A. National School Construction Cost Trends
B. Maryland and Virigina School Construction Cost Trends
C. School Cost Per Square Foot Comparison
D. Site Costs and State-Local Cost Burden

A. National School Construction Cost Trends

Before the COVID-19 pandemic began, construction costs (including those for schools) typically had an average of 3% to 4% inflation each year. [1] However, that dramatically changed during 2021 and 2022, where the construction inflation rate rose to over 10% in most cities across the country.[2] The cause of the high costs in 2021 and 2022 could be attributed to supply chain disruptions, pandemic-related restrictions, labor shortages, and elevated construction demand.

The inflation figures have come down in the past two years and are getting closer to historic figures (3% to 4%) both nationally[3] and in Maryland for schools (according to the IAC). Conditions to help costs stabilize include lower fuel costs (reduces cost of freight for construction materials) and most construction materials have been more readily available.[4] However, labor costs continue to rise (construction firms competing for a limited pool of skilled workers) and the overall construction workforce continues to shrink.[5] In fact, the construction industry had the highest level of unfilled jobs

[1] Planning for Construction Cost Inflation, Paul Erickson, American School and University, February 2, 2023.
[2] Ibid.
[3] Ibid.
[4] United States Construction Market Trends, 2023 Year-End, CBRE, February 7, 2024.
[5] Ibid

recorded[6] in 2023 (650,000) and this trend has continued, albeit at a smaller amount (450,000) in 2024.[7]

While it is impossible to predict converging events' effect on the construction industry, school districts can enable to the following strategies to help manage such potentially devastating conditions:

- Using higher inflation percentages in forecasting;
- Modifying designs and systems to accommodate market conditions;
- Introducing alternate materials and methods into projects to address cost fluctuations;
- Obtaining separate bids on selected "big-ticket" components; and
- Requesting options for extending completion dates.[8]

One example of the use of these strategies is Arlington County. The County completes a full, revised estimate at schematic design[9] and at 65% of construction documents. They then compare the two estimates to look for any potential changes and cost saving possibilities. Another example is MCPS, who modified their designs for Woodward and Crown High Schools. Due to a limited budget, only the shell of the auditoriums was included; the funding will be requested for the completion of the auditoriums.

B. Maryland and Virigina School Construction Cost Trends

As presumed, school construction costs have increased dramatically in Maryland and Virginia since OLO Report 2017-4. The Interagency Commission on School Construction (IAC) annually establishes the cost per square foot it reimburses to LEAs in Maryland for all school types, based on "industry sources and anticipated cost escalation factors used by Maryland's state agencies."[10] When report 2017-4 was published, it used the IAC's reimbursable construction rate of $261 per square foot (2015 figure, includes site development costs).[11] That figure has now escalated to $481[12] in 2024, an increase of $220 or 84.3% over the 2015 figure of $261. Other examples of increases in cost include:

[6] "The Iconic American Hard Hat Job That Has the Highest Level of Open Positions Ever Recorded," by Lori Ann LaRocco and Natalie Rose Goldberg, CNBC, July 29, 2023
[7] "Construction Job Openings Hit Highest Levels Since December 2022," by Ryan Whisner, Equipment World, January 2, 2024.
[8] Planning for Construction Cost Inflation, Paul Erickson
[9] According to the American Institute of Architects, the schematic design phase of a project is the first of five increments of architectural services. The five phases in chronological order are: 1) programming; 2) schematic design; 3) design development; 4) construction documents; and 5) bidding. In the schematic phase the architect typically works with the client and other project team members to explore alternative concepts to address the client's needs.
[10] FY2023 Annual Report, IAC, page 26.
[11] Cost Per Square Foot, IAC
[12] Ibid.

- A sample of replacement schools (2014-2016[13]) studied by the Maryland State Public School Construction Program averaged $286 per square foot for replacement elementary schools.[14] When reviewing recent replacement elementary schools (2020-2023[15]) provided by the IAC, that average number rose to $445 per square foot, which is an increase of $159 or 55.6% when comparing those two time periods.

- When examining Virginia costs per square foot, its available data only goes back to 2017-2018, but the statewide average for new elementary schools cost is $255 per square foot in 2017-18[16] compared with $461 per square foot in 2023-24, an increase of $206 per square foot or 80.9%.

To get an understanding of regional construction cost trends/increases, OLO interviewed a cross-section of counties and state authorities from within the District/Maryland/Virginia (DMV) area. Those stakeholders included:

- Montgomery County Public Schools
- Howard County Public Schools
- Anne Arundel County Public Schools
- Frederick County Public Schools
- Interagency Commission on School Construction
- Prince William County Public Schools
- Arlington County Public Schools
- Virigina Department of Education

The stakeholders identified the following common themes leading to the increase in construction costs:

- Smaller labor force for construction firms – especially after the COVID-19 pandemic.
- With a smaller workforce, construction firms across all industries can work on fewer projects. Therefore, school construction is competing with other types of construction.
- The smaller workforce has affected smaller CIP projects and it's harder to get multiple bids and/or qualified firms for these projects. Larger projects, such as new schools or replacement schools have retained numerous bidders.
- Use of prevailing wages for state funding increased costs (discussed further in Chapter 4).
- Stormwater management regulations (discussed further in Chapter 5). County regulations are more stringent than state regulations, adding more costs.
- Upfront costs for making schools more energy efficient (discussed further in Chapter 7).
- Programmatic needs for larger school size, such as more space needed for pre-kindergarten classrooms.
- Project delays.

[13] Bid opening dates approved by the IAC.
[14] Construction Costs for New and Renovated Schools, MACO, 2016
[15] Bid opening dates approved by the IAC.
[16] School Construction Cost Data, Virginia Department of Education

- For urban areas of counties with less land to work with, local education agencies were forced to make a school fit, regardless if the parcel was well-suited for a school.

C. School Cost Per Square Foot Comparison

To make a parallel comparison as close to possible to the schools studied in OLO Report 2017-4[17], OLO studied new elementary schools with opening dates from 2021 to 2025 and replacement elementary schools from 2023-2024. OLO selected new and replacement elementary schools in Montgomery, Frederick, Charles, and Baltimore counties in Maryland. In Virigina, OLO selected schools from Loudoun and Prince William counties; the cost comparison in Virigina focuses only on new schools. Schools were selected based on the following criteria:

- Opened or plan to open between 2021 and 2025; and
- Opened or planned to open within +/- 2 years of an MCPS new or replacement school.

The MCPS cost data was provided by the MCPS Division of Construction, which also matched the data on other Maryland schools provided by the IAC (*See Appendix A*). The Virigina cost data was based on bid awards submitted to the Virigina Department of Education (*See Appendix B*). As a caveat, the data from both Maryland and Virigina may not consider change orders or cost overruns.

It should also be noted that the size of schools studied overall is a small sample size and the cost data provided does not include costs related to land acquisition and permitting fees, design and engineering fees, and furniture and equipment. Nor do the costs consider state and/or county regulations or school policies that may contribute to cost variations (design differences that may have caused variations are noted when possible). Overall, given the differences, the cost comparisons are limited.

Finally, it should be noted these same caveats apply to the schools studied in OLO Report 2017-4.

1. New Schools: 2021 to 2025

MCPS opened one new elementary school in 2023 - Cabin Branch, with a cost per square foot of $428. Cabin Branch used a prototype design[18] and it has a lower cost per square foot (when compared to other school districts), but MCPS and other jurisdictions interviewed said that cost savings are not always realized with prototype designs. That is mainly because the prototype designs do not account

[17] Reviewed new elementary schools from 2007-2009 and from 2013-2015; replacement elementary schools from 2008-2010 and 2014-2015.

[18] Prototype designs use a base design from other elementary schools and incorporated site, permitting, or other needed adjustments.

for different land/site features and permitting that must be accounted for (discussed further in Chapter 6).

Overall, three out of the four new elementary schools studied from Maryland and Virginia have a higher cost per square foot when compared to MCPS (albeit the new schools opened in both states recently have been limited). The one exception is the Woodbridge Area (Prince William County) with a cost of $351 per square foot. However, it should be noted these costs are based on bid award data, as such final costs per square foot may be higher than the data shown (especially for a school scheduled to open in 2025). Prince William Public Schools stated that the low initial bid data may be due to a contractor that understands the construction sequencing and has built a prototype of the school previously.

Table 8. School Construction Costs – New Schools 2021-2025

State	District	Elementary School	Year Opened	Square Feet	Site Size (acres)	Total Construction Cost (Building + Site)	Total Cost/ Sq. Ft.
MD	Montgomery	Cabin Branch	2023	95,327	9.61	$40,800,000	$428
MD	Frederick	Blue Heron	2021	97,870	15	$43,726,924	$447
MD	Charles	Margaret Jamieson Thornton	2025	91,595	19.3	$45,450,100	$496
VA	Loudoun	Henrietta Lacks	2024	114,328	117*	$53,152,608	$465
VA	Prince William	Woodbridge Area	2025	129,903	9.68	$45,553,000	$351

Note: Virginia schools' costs include construction, site development, water system, sewage disposal, built-in equipment and demolition. Architect and engineering fees, value engineering, construction management fees, cost of site, loose equipment, and furniture are excluded. Furthermore, the total costs are based on bid award data and may not account for cost overruns or change orders, such as final costs per square foot may be higher than the data shown. *Shared campus with Lightridge High School and Hovatter Elementary School.

When comparing the 2023 MCPS schools with the only new school opened in 2014 in OLO Report 2017-4 (on the next page), Cabin Branch's average square foot cost of $428 is significantly higher than the cost of Wilson Wims' cost of $255 (increase of $173 or 68%). The same pattern occurs when comparing other Maryland Schools and Virigina schools. This follows the rapid construction cost inflation discussed in Section A of this chapter.

Table 9. School Construction Costs – New Schools 2013-2014

State	District	Elementary School	Year Opened	Square Feet	Site Size (Acres)	Total Construction Cost (Building + Site)	Total Cost/ Sq. Ft.
MD	Montgomery	Wilson Wims	2014	91,931	9.3	$23,454,982	$255
MD	Howard	Ducketts Lane	2013	102,028	10.1	$28,427,208	$279
MD	Prince George's	Edward M. Felegy	2014	92,391	7	$27,160,000	$294
VA	Arlington	Discovery	2015	97,588	16	$32,305,808	$331
VA	Loudon	Cardinal Ridge	2014	105,951	36.7	$25,270,000	$239
VA	Prince William	Chris Yung	2015	107,273	20	$20,286,000	$189
VA	Prince William	Haymarket	2014	99,135	24.3	$17,888,000	$180
VA	Loudon	Moorfield Station	2013	105,951	19	$18,842,791	$178

2. Replacement Schools/Major Capital Projects: 2023 to 2024[19]

MCPS opened four replacement schools in 2023, with an average cost per square foot of $454. When comparing the average cost per square foot to other school districts, Red Run (Baltimore County) is slightly less at $442 per square foot. Brunswick's (Frederick County) cost per square foot is higher than MCPS ($507), which may be due to higher site costs (according to IAC data, site costs for this school added an additional $78 per square foot). However, it is again important to note that the sample size of comparable schools is limited, and these costs do not allow for a comparison of building features or school system policies that may drive construction costs (i.e., building performance mandates, stormwater management regulations, etc.)

Table 10. School Construction Costs – Replacement Schools/Major Capital Projects 2023-2024

State	District	Middle School/ Elementary School	Year Opened	Square Feet	Site Size (Acres)	Total Construction Cost (Building + Site)	Total Cost/ Sq. Ft.
MD	Montgomery	Burnt Mills	2023	94,398	15.1	$43,000,000	$456
MD	Montgomery	Stonegate	2023	84,094	10.27	$37,429,451	$445
MD	Montgomery	South Lake	2023	80,757	10.2	$37,500,000	$464
MD	Montgomery	Woodlin	2023	98,861	10.97	$44,841,806	$454
MD	Baltimore County	Red House Run ES	2024	107,774	15.41	$47,624,109	$442
MD	Frederick	Brunswick ES	2023	85,595	24.63	$43,355,711	$507

[19] From 1985 to 2020, replacement schools fell under the Revitalization/Expansion Program, which was completed in 2020. The program transitioned to the Major Capital Project Program, in which four elementary schools (Burnt Mills, Stonegate, South Lake, and Woodlin) and two middle schools were completed (Odessa Shannon and Neelsville); these schools were considered replacement schools.

Consistent with new school comparison to schools opened from 2013-2015, the cost per square foot increase is significant. For example, when looking at elementary schools from MCPS, the average cost per square foot for the schools opened in 2023 is $454, which is an increase of $187 or 70% over the average cost per square foot ($267) of the schools opened in 2014 and 2015. Again, the same pattern occurs for the other Maryland school districts.

Table 11. School Construction Costs – Replacement Schools 2014-15

State	District	Elementary School	Year Opened	Square Feet	Site Size (Acres)	Total Construction Cost (Building + Site)	Total Cost/ Sq. Ft.
MD	Montgomery	Candlewood	2015	82,222	11.8	$22,915,854	$279
MD	Montgomery	Rock Creek Forest	2015	98,140	8	$26,751,203	$273
MD	Montgomery	Bel Pre	2014	95,330	8.9	$23,884,182	$251
MD	Anne Arundel	Lothian	2015	84,588	17.1	$24,405,000	$289
MD	Frederick	North Frederick	2015	95,613	15.1	$26,726,230	$280

D. Site Costs and State-Local Cost Burden

Site costs can be defined as expenses associated with preparing land for the construction of a new school or for the redevelopment of an existing one. While these costs can vary from project to project, during interviews with various school districts, OLO found school construction site costs were typically influenced by the following factors:

Geographic location and site conditions. Labor rates and material costs vary across the state and within individual counties. In addition, land availability and space constraints may increase both engineering and construction costs. For example, in Frederick County, sites are particularly challenging because of topography – the rocky sites and inclined sites can increase grading costs.

Environmental regulations. Regulations such as stormwater management requirements can increase construction costs by 10-20%. For Howard County Public Schools, adding a parking lot to one of their new schools would have increased stormwater management costs by about one million dollars.

Redeveloped Sites. If a replacement school is being constructed on an existing school site (and holding facilities are not available), site work may be constrained by the existing building, construction phasing, and safety conditions. These conditions typically result in higher site costs.[20]

[20] Bryant, Stephanie. *OLO Report 2017-4: New Construction Costs,* 2017. Montgomery County Office of Legislative Oversight, pp 30.

1. State Funding for Site Costs

Under Maryland law, certain site costs are eligible for state funding as part of the state construction funding formula. Before 2018, eligible site development costs included off-site development costs required by local, state, and federal regulations. However, with the passage of the 21st Century School Facilities Act, early planning and design costs also became eligible. This expanded coverage includes feasibility studies, educational and equipment specifications, and other planning work that occurs before the design phase begins.

Design expenses and additional ancillary costs—such as architectural and engineering fees, construction management services, geotechnical surveys, and other services required to finalize the architectural specifications for a school project—are also covered.

Ineligible expenses, which are covered by the counties, include site acquisition, off-site costs, master planning, and other ancillary construction costs like permits, test borings, soil analysis, water and sewer connection charges, topographical surveys, models, renderings, and cost estimates. However, according to Montgomery County's Department of Permitting Services, MCPS is exempt from paying permitting fees, with these costs being absorbed by Montgomery County Government instead.

The state calculates site costs as a percentage of building construction costs. This allows for state funding to increase based on the type of school constructed (elementary, middle, or high school) and is reflective of increasing building costs over time. Prior to FY2017, the state determined eligible site costs to be 12% of building costs. Starting in FY2018, the state increased this percentage to 19%, a rate that has been maintained through the current fiscal year.

Table 12. Cost Share Formula and Site Development Costs for Selected Elementary Schools

School	Bid Date	State CIP Building Costs	State CIP Site Costs @19%	% Cost Share	Amt. Funded by State
New					
Burnt Mills ES (Montgomery)	9/24/2021	$33,860,000	$6,433,000	50%	$3,217,000
Blue Heron ES (Frederick)	2/20/2020	$26,831,000	$5,098,000	64%	$3,263,000
Replacement					
Neelsville MS (Montgomery)	3/31/2022	$50,454,000	$9,586,000	50%	$4,793,000
Nottingham MS (Baltimore)	11/18/2021	$63,366,000	$12,040,000	57%	$6,863,000

Table 12 shows that even though early planning and site costs are now covered by state funding, and eligible site costs account for 19% of building costs, MCPS still receives only 50% of state aid for site costs compared to other jurisdictions due to the state's wealth-adjusted cost share formula.

Chapter 4. Cost Factor - Procurement Policies and Practices

This chapter focuses on the State of Maryland mandated procurement policies (including those for minority businesses and prevailing wages) and project delivery models. For the jurisdictions in Virigina, they do not have requirements for minority businesses or prevailing wages, but they are encouraged to use minority businesses. Thus, their regulatory environment is less onerous and their labor costs can be lower for school construction projects at times.

The initial OLO report on new school construction focused on procurement policies and practices identified in this chapter, since they have the largest impact on cost. Therefore, this chapter will update those practices since the initial report's release. OLO did not identify any additional significant procurement factors in school construction funding.

This chapter is organized as follows:

A. Minority Business Enterprise Requirements
B. Prevailing Wage Requirements
C. Project Delivery Methods
D. Add-Alternates and Value Engineering

A. Minority Business Enterprise (MBE) Requirements

The MBE Program was established in 1978 and is administered by the Governor's Office of Small, Minority, and Women Business Affairs. The program is designed to encourage small, minority-, and women-owned vendors to participate in state procurements. The goal of the program is to have at least 29% of the total dollar value of state procurement contracts awarded to MBEs – including those receiving funds through the IAC.[1] MBEs in the State of Maryland are identified as:

- Legal entities organized to engage in local transactions;
- Managed by, and the daily business operations controlled by, one or more of the socially and economically disadvantaged individuals who own it; and
- At least 51% owned and controlled by one or more individuals who are socially and economically disadvantaged, including African Americans, American Indians/Native Americans, Asians, Hispanics, physically or mentally disabled individuals, women, or a non-profit entity organized to promote the interests of physically or mentally disabled individuals.[2]

[1] MBE Program, IAC
[2] Frequently Asked Questions, Maryland Department of Transportation

Local Educational Agencies in Maryland such as MCPS are required to follow the MBE program. MCPS is required to set appropriate goals for MBE participation in every contract that includes state funding.[3] MCPS's MBE procedures further state that they "…shall attempt to achieve the result that a minimum of 29 percent of the total dollar value of all construction contracts is made directly or indirectly with certified minority business enterprises when State PSCP (Public School Construction Program) funds are utilized, with a minimum of 8 percent from certified African American-owned businesses, a minimum of 11 percent from certified women-owned businesses, and the balance from any certified minority business enterprises."[4]

For contracts estimated to cost $50,000 or less, MCPS is required to encourage MBE participation but is not expected to set a percentage goal for participation.[5] For those above $50,000, MCPS must establish a Procurement Review Group to develop MBE goals and provide analysis/justification to the Governor's Office of Minority Affairs. For these more expensive projects, such as school construction, the following language is required in solicitation documents: "The contractor…shall attempt to achieve the specific overall MBE goal of_____ percent established for this project."[6]

The requirements for the State's Minority Business Enterprise (MBE) Program have not changed since OLO Report 2017-4. This information includes awards, outreach, payment, and compliance data.[7] Bidders can request a waiver (partial or full) if they determine they cannot meet MBE goals.[8]

B. Prevailing Wage Requirements

A prevailing wage is "the basic hourly rate of wages and benefits paid to a number of similarly employed workers in a given geography"[9] for contracted construction and service workers of publicly funded projects. The wages for each public works trade and occupation are set by government regulatory agencies, as well as the State Department of Labor.[10] The benefits of applying prevailing wages include:

- Promoting quality work and producing good value for taxpayers;
- Helping to close racial pay gaps;
- Promoting sectoral standards;
- Protecting union workers' gains;

[3] Minority Business Enterprise Procedures for State Funded Public Schools Construction Projects, Approve by the Montgomery County Board of Education, 2008, page 1
[4] Ibid.
[5] Ibid, page 4
[6] Ibid, page5
[7] MBE Reporting Manual, pages 6 & 7
[8] New MBE Liaison Welcome Packet, page 10
[9] Prevailing Wages: Frequently Asked Questions, American Progress, December 22, 2020
[10] Overview – Prevailing Wage for State Funded Construction Contracts, Maryland Department of Labor

- Providing an equal opportunity for high-road employers[11]; and
- Supporting compensation rates above legislated minimums.[12]

The Maryland Prevailing Wage Law[13] applies to a construction project valued at $250,000 or more if either of the following criteria are met:

1) The contracting public body is a unit of State Government or an instrumentality of the state, and there is any state funding for the project, or
2) The contracting public body is a political subdivision, agency, person, or entity (such as a county) and the state funds 25% or more of the project including school construction.[14]

Since MCPS is an agency that falls under the direction of the Maryland State Department of Education, it follows the state's prevailing wage law.[15] A snapshot of how the prevailing wages changed from 2016 to 2024 among a sample of sectors in Montgomery County, is below. For the selected trades, basic hourly wage increased from $2.57 or 10.3% (Painter) to $15.28 or 53.6% (Roofer/Waterproofer).

Table 13. Comparison of Prevailing Wages for Montgomery Construction Trades (2016 & 2024)

Trade Classification	Basic Hourly Wage 2016	Basic Hourly Wage 2024	Change	Percent Change
Bricklayer	$28.17	$36.50	$8.33	29.6%
Carpenter	$27.56	$33.21	$5.65	20.5%
Cement Mason	$24.89	$29.65	$4.76	19.1%
Drywall - Spackling, Taping, Finishing	$24.89	$33.21	$8.32	33.4%
Electrician	$42.80	$53.00	$10.20	23.8%
Ironworker - Structural	$30.65	$34.85	$4.20	13.7%
Painter	*$24.89*	*$27.46*	*$2.57*	*10.3%*
Plumber	$38.92	$48.00	$9.08	23.3%
Roofer/Waterproofer	*$28.50*	*$43.78*	*$15.28*	*53.6%*
Stone Mason	$35.19	$43.16	$7.97	22.6%

Source: August 5, 2024 Informational Prevailing Wage Rates, Maryland Division of Labor and Industry, Maryland Department of Labor

[11] Employers who pay family supporting wages, engage workers and their representatives in building skills and competitiveness, and compete based on the quality of their services and products.
[12] Prevailing Wages: Frequently Asked Questions, American Progress
[13] MD. Code. Ann., State Finance and Procurement Code, §17-201
[14] Overview – Prevailing Wage for State Funded Construction Contracts, Maryland Department of Labor
[15] Since this report also examines school districts in Virginia, it is important to note that Virginia does not require prevailing wages on public construction projects.

Regarding prevailing wage, the only significant change in regulation from 2016 was decreasing the value of the applicable construction projects from $500,000 to $250,000, with the goal of increasing the number of applicable contracts. [16]

MCPS Prevailing Wage Policy. If MCPS decides to pursue a prevailing wage construction project, it can receive up to 50% in state aid. If it chooses not to pursue a prevailing wage construction project, it can receive up to 25% in state aid. Prior to the Built to Learn Act of 2020 (see page 6), MCPS primarily used non-prevailing wage contracts for individual school projects and did not request more than a 24.9% state share. Therefore, MCPS only requested bids for new and replacement school projects without prevailing wage requirements. This was due to:

- Increased construction costs associated with the prevailing wage obligation;[17]
- MCPS's total construction costs often exceeding eligible state costs and the state paying less than 50% of total construction costs, making prevailing wage rates not applicable[18];
- Having fixed total state funding allocations for each LEA (regardless of the number of projects submitted)[19], and
- Funding availability from the County (allowed projects critically needed for enrollment to be forward funded).

However, since the Built to Learn Act in 2021, MCPS has changed its approach on bids for prevailing wage contracts. Due to the availability of more state funding[20], MCPS now requests up to 50% state share of prevailing wage contracts. Although the prevailing wage bid contracts are higher by at least 10%, MCPS receives more funding from the state – with less of a burden on local County funding. Furthermore, the state has expanded eligible costs for school construction including those for design, planning, and furniture, fixtures, and equipment.

MCPS now requests bids for both prevailing wage and non-prevailing wage contracts for individual schools, determining whether to accept a prevailing wage contract or a non-prevailing wage contract, mainly based on the type of school construction. For example, MCPS will not get funds from the state for class size reductions, so it makes fiscal sense to use non-prevailing wage contracts. Examples of accepted prevailing and non-prevailing wage contracts are in the table below.

[16] Comparison figures from OLO Report 2017-4, page 18.

[17] Department of Legislative Services, "Fiscal and Policy Note HB 23 - Prevailing Wage – Waiver from Provisions." 2016 Session.

[18] Did not make fiscal sense to request more from the state for a prevailing wage contract, not get the state funding needed and end up with a more expensive project the County had to find funding for.

[19] Especially during high enrollment growth, MCPS had plenty of eligible projects. Since the total amount given to MCPS by the state was an absolute number, MCPS would not get more money for submitting more projects. Therefore, it would lower the state share request to 24.9% and the funding the County needed to fully fund the projects would be less, since the contracts were non-prevailing wage.

[20] As noted in Chapter 2, MCPS has already received its entire $357M Built to Learn, one-time funding.

Table 14. MCPS Prevailing and Non-Prevailing Wage Contract Amount Comparison

School	Type	Bid Date	Trade Contractor and Supplier Non-Prevailing Wage Bids	Trade Contractor and Supplier Prevailing Wage Bids	% Variance in Trade Contracts	State Funding	State % Funding of Construction Contract*	Reason for Acceptance
Prevailing Wage Contracts Accepted								
Cabin Branch ES	New	October-21	$32,117,183	$36,501,161	13.6%	$18,869,000	46.2%	Eligible for Built to Learn (BTL) Funds
South Lake ES	Replacement	October-21	$29,597,981	$32,615,487	10.2%	$18,243,500	48.6%	Eligible for BTL Funds
Poolesville HS	Renovation	December-21	$54,182,355	$62,083,291	14.6%	$49,928,000	49.6%	Eligible for BTL Funds
Northwood HS	Replacement	October-23	$147,538,920	$164,975,093	11.8%	$83,585,000	44.1%	Eligible for traditional State capital improvement funds. For that year, used up request for BTL funds, thus maximized available traditional funds for this project.
Non-Prevailing Wage Contracts Accepted								
Harriet Tubman ES	New	December-20	$29,163,362	$31,949,577	9.6%	$8,493,290	25.0%	At the time of contract award there was a shortfall of funding and a transfer had was requested to completely fund the project. MCPS stated it was not feasible at the time to pursue 25% or more State funding, which would result in even more local costs.
Odessa Shannon MS	Renovation	October-21	$52,646,248	$59,830,070	13.6%	$18,243,500	23.0%	When the school was initially bid, the total exceeded the project's appropriation (prevailing and non-prevailing). The project went into a value-engineering and re-design phase, and was re-bid with non-prevailing wages only, since MCPS was aware of the large prevailing wage variance.

Source: Montgomery County Public Schools Division of Design and Construction

When interviewing other local Maryland jurisdictions such as Frederick, Howard, and Anne Arundel counties, they all predominantly used prevailing wage contracts over $250,000 when using state funds, even before additional Built to Learn funds were available. That was mainly because they had fewer projects and could not forward fund projects with local funding the way Montgomery County can before being reimbursed for state aid.

C. Project Delivery Methods

State regulations permit school systems to use a range of different school construction contracting delivery methods[21] depending on the size and scope of the project, the project's complexity, availability of general and trade contractors, schedule requirements, prior record of success with a specific model, and aversion to risk. [22] After interviewing and researching the same jurisdictions as the 2016 OLO report, all Maryland counties used the same two types of methods for large school projects – construction management agency (Anne Arundel, Frederick, and Howard) and construction manager at-risk (Montgomery):

- Construction Management Agency – this is for school systems that have smaller staff. A construction manager is hired under a separate contract early in the process and serves as an extension of the school system's staff, protecting the school system's interests. This manager oversees all work and reports directly to the school system, providing cost estimates, value engineering, constructability reviews[23], and other services that could affect scope, schedule, and time. The school system retains the risk for managing and coordinating sub-contracts. [24]

- Construction Manager At-Risk – this is for school systems with larger staff and it blends both general contracting and construction manager agency. A contracted manager is involved early in the process (like construction manager agency) and enters a guaranteed maximum price contract (in which project risk is transferred from the school system to the construction manager). The construction manager also is responsible for any budget overruns; if there are cost savings, they are shared by the manager and the school system.[25]

Each method has their advantages and disadvantages, and they can both produce cost savings, according to the jurisdictions interviewed and industry professionals.[26]

[21] Includes general contracting, construction management agency, construction management at-risk, design-build, and job order contracting.
[22] The Cost of School Construction, IAC, p. 29-31.
[23] Constructability review is a structure evaluation of project design documents by an independent third party.
[24] The Cost of School Construction, IAC, p. 29-31.
[25] Ibid.
[26] Construction Delivery Methods Explained!, Vancon

Type	Advantages	Disadvantages
Construction Management Agency	The Local Education Agency's (LEA) is represented during each state of the project.	Risk is on the LEA.
	Takes burden off staff so it is advantageous for LEAs with fewer staff.	The construction manager is not accountable for schedule and budget.
	Construction manager usually knows the market better for cost estimates and bidding.	The LEA enters trade contracts, not the construction manager.
	Although there are fees for the construction manager, they offset traditional overhead and profit charges from a typical general contractor affiliation.	
Construction Management At-Risk	Provides a guaranteed maximum price and risk is solely on the construction manager.	Requires a high level of communication between the LEA and construction manager.
	A more controlled environment so the project can proceed on schedule and under budget with few, if any, change orders.	Requires cooperation of the architect to work out details of design before or during construction.
	Construction can begin without the design fully completed.	Construction costs may run over if design mistakes are not detected early.
	Post-bid negotiation is possible before establishing the price.	

D. Add-Alternates and Value Engineering

A procurement practice to manage school construction costs is the use of add-alternates. An add-alternate is an additional work item that may be added to a project if bids are received below the budgeted amount (i.e., different materials or addition/deletion of particular work). This allows school systems to maximize the amount of work awarded within the budget. By pricing the add-alternate separately, a school system can later determine the final scope of the project.[27]

MCPS and other local jurisdictions interviewed often bid add-alternates with school construction projects. These items are often aesthetic improvements (such as higher level building finishes) and convenience items (such as bus canopies). Add-alternates are not improvements that would alter the

[27] Add Alternate Bidding, Engineering Policy Guide, MoDot

core building or educational program provided. In some cases, construction bids come in at funding levels that permit these alternates. Examples include LED lighting, stone materials for outside entranceways, upgrades to sound for larger rooms, or an outside message board for a school.

There are times in a project post-bid where the projected costs will exceed the budget, usually for unseen reasons such as extensive site changes or higher labor and material costs – especially during construction. For these cases, MCPS and other local jurisdictions can either request a supplemental appropriation (for large increased costs) or for smaller increases, apply value engineering.

Value engineering "analyzes designed building features, systems, equipment, and material selections to achieve essential functions and enhance results while reducing the life-cycle cost."[28] An example MCPS started using during the Covid-19 pandemic and continues to use is the use of drywall inside buildings, as opposed to using more expensive brick or concrete.

Another option MCPS has used when costs/initial needs are beyond the budget is to design the building so that features or improvements can be added later. For example, due to funding constraints and higher costs, MCPS delayed the completion of the auditoriums for Charles W. Woodward and Crown High Schools (designed with only the auditorium shells; will request more funding to complete the auditoriums).

[28] Value Engineering, U.S. General Services Administration

Chapter 5. Stormwater Management Regulations

This chapter provides an update on state and county stormwater management regulations from the initial OLO report on public school construction costs. The report explores current requirements, their impact on school construction projects and upcoming regulatory changes. It also provides a comparison with other school systems and Virginia.

This chapter is organized as follows:

A. Stormwater Management Regulations
B. Comparison to Other School Systems in Maryland and Virginia

A. Stormwater Management Regulations

1. Stormwater Requirements in Maryland

Stormwater requirements are still regulated through the Maryland Stormwater Management Act of 2007. The act mandates the implementation of Environmental Site Design (ESD) through small-scale management practices, such as rainwater harvesting, landscape infiltration, rain gardens, bio-swales, and micro-bio retention facilities around parking areas, to replicate natural hydrologic runoff characteristics. Structural practices should only be used when ESD techniques are not possible[1].

For each project, school systems are required to use these ESD techniques to the Maximum Extent Practicable (MEP). The MEP varies from project to project, and interpretation of this standard is different in each county. In Montgomery County, the MEP assessment is subject to the discretion of permitting reviewers and can vary significantly from one site to another due to the unique nature of each construction project. To address this issue, the construction engineer will normally analyze various stormwater scenarios and provide justification for why certain mitigation measures cannot be applied, which typically increases the project's design cost.

In 2000, the Maryland Department of the Environment (MDE) developed the 2000 Maryland Stormwater Design Manual as the official guide for stormwater management practices in Maryland. Updated in 2009 as a result of the 2007 Stormwater Management Act, the manual sets performance standards for any construction activity that disturbs 5,000 or more square feet of earth. The design guidelines resulted in the following changes for new school construction:

- Increased preliminary engineering design upfront to identify and incorporate ESD techniques, involving civil and geotechnical engineers before submitting the first planning document.

[1] Bryant, Stephanie. *OLO Report 2017-4: New Construction Costs,* 2017. Montgomery County Office of Legislative Oversight, pp 30.

- More space is required for stormwater control, as highlighted in OLO's previous New School Construction Costs study, which found that this can reduce the available land for site improvements and building spaces by up to 20% of the developed area.
- Additional site grading so that water runoff will flow from impervious areas directly to pervious areas or other natural conveyance systems[2].

2. Stormwater Requirements in Montgomery County

In Maryland, local governments are usually responsible for most stormwater management review authority. This is the case in Montgomery County, where the Department of Permitting Services (DPS) oversees design requirements, plan review and overall construction permits.

Chapter 19 of the Montgomery County Code specifies stormwater permitting requirements for both new and redevelopment sites. Per the code applicants must design and construct structural and non-structural stormwater management measures to mitigate runoff. These measures include those specified in the Maryland Design Manual.

Montgomery County still subjects new and redeveloped sites to the same stormwater requirements. For example, both new and redevelopment projects must use environmental site design to maintain 100% of the average annual groundwater recharge for the developed site. In comparison, the state does not apply recharge requirements to redevelopment sites. As a result, replacement school sites are treated the same as new schools, leading MCPS to meet a higher standard for redeveloped sites compared to school systems elsewhere in the state.

3. Upcoming Regulatory Changes

In 2023 MDE circulated its first public draft of revised stormwater regulations that incorporate updated rainfall data and require significant expansion of management practices to address runoff from higher-intensity, short-duration storms.

According to industry stormwater practitioners the proposed rules would increase the cost of compliance and further reduce buildable area. Among the proposed changes are:

- Increased volume of water quality treatment and flood control using ESD techniques.
- Reclassifying open space to assume less infiltration and higher peak runoff rates.
- Applying new development standards to redevelopment in selected environmental justice locations.

The proposed regulations will allow a transition period for projects in concept approval by June 30, 2028, and those scheduled to complete construction by June 30, 2035[3].

[2] Maryland Department of the Environment. *2000 Maryland Stormwater Design Manual,* 2009. Chapter 5.
[3] Commercial Real Estate Development Association, Maryland Chapter. *MDE Considering Changes to Stormwater Requirements*, 2023.

4. Impact of Stormwater Management Regulations on Costs

OLO interviewed various Maryland school districts, which confirmed that stormwater regulations continue to increase project costs (MCPS estimated these requirements increase project costs by 10-20%). The need for increased preliminary engineering design results in higher engineering fees, while site grading to manage runoff significantly raises site development costs. Space constraints also contribute to rising costs. Sites unable to incorporate ESD must resort to more expensive structural practices, such as management ponds and sand filters.

B. Comparison to Other School Systems in Maryland and Virginia

The Maryland Stormwater Management Act of 2007 requires stormwater be managed through Environmental Site Designs (ESDs). ESDs represent a significant change in stormwater management from the prior approach, which focused on treating stormwater through Best Management Practices (BMPs) such as stormwater ponds or infiltration systems, before returning the water to the watersheds.

Stormwater requirements in Virginia are like those in Maryland, as both states aim to minimize runoff by using design practices that mimic natural hydrologic runoff characteristics. Once these natural design practices have been maximized, approved BMPs can be implemented. Virginia's stormwater design principles are based on avoidance, minimization, and mitigation. According to the Virginia Department of Environmental Quality's Stormwater Management Handbook, construction projects must seek first to avoid impacts by preserving areas with key environmental features during construction. In areas that cannot be fully avoided, impacts can be minimized by maintaining natural flow paths, limiting building footprints and layouts to reduce clearing and grading, and reducing unnecessary impervious cover. When avoidance and minimization are not sufficient, mitigation is used to reduce the impact of developed areas by maximizing the disconnection of impervious cover.

Even though both states have different sets of requirements, these requirements increase construction costs. As mentioned before, the need for more extensive preliminary engineering design, such as site inventory and natural resources mapping, leads to higher engineering fees. For example, under Virginia's stormwater regulations, engineers must evaluate if the project will disturb over one acre of soil during the design process. If the project remains under this one-acre threshold (and is not part of a larger common plan of development), the design and construction fees are significantly lower. This is due to fewer design requirements and pollution prevention practices needed during construction. However, if the site disturbs over one acre of soil, it requires a Virginia Pollutant Discharge Elimination System (VPDES) permit. In this case, design engineers must create a comprehensive stormwater management plan that includes both the construction process and post-construction measures to manage permanent stormwater[4]. Maryland has a similar requirement for any construction activity that disturbs 5,000 or more square feet of earth.

[4] Spilman, Thomas and Battle. *Construction Stormwater Permitting Changes in Virginia*, 2023.

Chapter 6. School Design Practices

School design priorities and practices change often, having to deal with increasing challenges such as promoting sustainability, changing programmatic needs, prioritizing equity, ensuring physical safety, integrating technology, community needs, and securing funding.[1] This chapter describes the educational specifications school districts need to meet, community involvement in the project's design, and prototype designs used for multiple schools as a potential cost saving measure.

The initial OLO report on new school construction focused on school design practices that have a larger impact on costs - educational specifications, community involvement, and prototype design use. Therefore, this chapter will update these design practices costs since the initial report's release. Through interviews and research, OLO did not identify any additional significant design practices for school construction.

This chapter is organized as follows:

A. Educational Specifications
B. Community Involvement
C. Prototype Designs

A. Educational Specifications

Educational specifications affect the size of school buildings and in turn the cost of construction. School systems in Maryland develop standardized educational specifications that translate into spatial requirements for construction and use of the building. These specifications often are modified to accommodate site conditions, size and demographics of the expected student body, new education or building mandates, and new technologies.[2] For each project, state regulations require school systems to submit specifications to the state for review and approval during the design phase. [3]

When the educational specifications were studied by OLO in 2016, new or replacement schools showed dramatic increases in square footage. For example, Candlewood Elementary School originally opened in 1968 with square footage of 30,747 and when it reopened in 2015, it increased to 82,222. OLO stated that the following conditions or factors increased the size of Candlewood and other schools at that time:

[1] Key Design Trends in K-12 Facilities for 2024, Salas O'Brien
[2] "The Cost of School Construction: A Comparison of the Monarch Global Academy and Conventional School Facilities.", IAC
[3] COMAR 23.03.02.14

- Pre-kindergarten and full-day kindergarten program requirements;
- More special needs students requiring Individualized Education Programs (IEP) and the space to implement them;
- Early childhood intervention space;
- More roaming support staff, teachers and counselors;
- Separate gymnasium and enlarged spaces to meet community recreation needs;
- Enlarged health suites; and
- More stringent fire codes.[4]

MCPS staff report these trends have continued. In particular:

- There is an increase in the need for special education space because more children are identified for special needs.
- There are more pre-kindergarten programs available at more schools.
- Many high schools are creating space to accommodate the Career and Technology Education programs, per the Blueprint for Maryland's Future plan.

However, while these trends continue, the school sizes in terms of square footage have remained similar over the past eight years, with slightly more square footage per student. The table below compares Wilson Wims Elementary School, which opened in 2015 (studied by OLO in 2016) and two elementary schools in 2023 – Burnt Mills and Cabin Branch, who have similar student capacities.

Table 15. Square Footage Per Student for New/Replaced Schools, 2014 & 2023

School	Opening	Grades Served	Total Rooms	Square Footage	State-Rated Capacity*	Sq.Ft./ Student
Wilson Wims ES	2014	K-5	37	91,931	726	126.6
Burnt Mills ES	2023	PreK-5	40	94,398	757	124.7
Cabin Branch ES	2023	PreK-5	37	95,327	722	132.0

Source: The County Council Adopted FY2025 Capital Budget and the FY 2025-2030 Capital Improvements Program, Montgomery County Public Schools

* State-Rated Capacity is used to determine state funding and it provides a parallel comparison to other school districts. Program capacity is based on MCPS policy, regulations, and budget guidelines.

[4] COMAR 13A.06.03; COMAR 13A.01.02.05; Len Lazarick, "Is Maryland Building 'Cadillacs or Buicks' for its new public schools?" Maryland Reporter, July 7, 2016

Burnt Mills has the lowest square feet/student at 124.7, but that is due to it having three more rooms than the other two schools (two more support rooms and one more classroom). When comparing Wilson Wims with Cabin Branch - both schools with 37 rooms - the difference in the way the rooms are utilized is notable, as show in the chart below (using approved CIP student capacity figures).

Table 16. Program Capacity by Room for

Wilson Wims & Cabin Branch Elementary Schools

School	Support Rooms	Regular Class Rooms (23)	Pre-K (20)	Kindergarten Rooms (22)	Autism Services (6)	PEP (6)	PEP (12)	PEP (18)
Wilson Wims ES	3	26	-*	4	-	3	-	1
Cabin Branch ES	3	24	1	5	3		1	

Source: The County Council Adopted FY2025 Capital Budget and the FY 2025-2030 Capital Improvements Program, Montgomery County Public Schools

Note: Figures in parentheses represent the maximum number of students per classroom.

"Autism Services" refers to the Autism Spectrum Disorders Services and "PEP" represents the Preschool Education Program, in which services range from itinerant services for children in community-based childcare setting and preschools to home-based services for medically fragile children. The class sizes for PEP can vary depending on the services provided (either 6, 12, or 18).

* Has pre-k services, but not a dedicated room identified in MCPS's FY2025 Capital Budget.

Wilson Wims has four kindergarten rooms, 26 regular classrooms for Grades 1–5, and four Preschool Education Program (PEP) rooms (three with six student capacity and one with 18 student capacity). Cabin Branch has two fewer classrooms that serve Grades 1–5, a dedicated pre-kindergarten room, fewer PEP rooms, but three Autism Spectrum Disorders Services Rooms. The newer school follows the pattern that MCPS reported – more emphasis on pre-kindergarten and varied/more special education services.

When comparing square footage per student with similar, recently opened schools for the next two largest school districts in Maryland, Cherokee Lane ES (Prince George's County) and Honeygo ES Thornton (Baltimore County), both have similar levels of space per student compared to MCPS.

Table 17. Square Footage Per Student for Recent New/Replaced Schools in Maryland

School	Opening	Grades Served	Square Footage	State-Rated Capacity	Sq.Ft./ Student
Cherokee Lane ES (Prince George's)	2022	Pre-K-5	110,000	822	133.8
Honeygo ES (Baltimore County)	2019	Pre-K-5	95,085	725	132.1

Sources: Board of Education Approved Request for FY25 CIP, Prince George's County Public Schools, Appendix U, page 4

Education Facilities Master Plan 2024, Baltimore County Public Schools, Northeast Planning Region, page 6

B. Community Involvement

Including the community in the school construction process is essential to a project's development.[5] The Board of Education has a commitment to ongoing collaborative communication processes with the community and believe it is critical to the school system's success.[6] MCPS continues to put an emphasis on keeping community members informed of school construction decisions. Those involved on a typical school construction project, include:

- *Instructional staff* includes teachers, principals, and other staff working at the school;
- *MCPS Central Office Staff* includes staff from the MCPS Office of Facilities Management;
- *Community* includes parents, neighbors, PTA representatives, cluster representatives, childcare providers; and
- *Other* includes elected officials, County agency representatives, and state agency representatives.

MCPS has instituted a significant change to the community involvement process since 2016. Previously, MCPS would do its feasibility study[7] at the beginning of the school construction process through public meetings, study circles, focus groups, and/or task forces. The community would be involved while MCPS evaluates technical, legal, operational, engineering, economic, and time feasibility factors. Since the timeline to finish projects expanded in recent years due to materials and labor shortages, MCPS modified the timing of the community involvement to ensure that projects are completed on time and not make expectations too high for projects.

[5] "Engaging Your Community in the Budgeting Process, " by Madeline Henry, Western City, November 1, 2017.
[6] MCPS Board of Education Policy ABA, Community Involvement, Last Revised February 7, 2023.
[7] An assessment of the practicality of a proposed project. Typically, the feasibility study is the first step for a capital project. For a standard project it is completed first, then schematic design, securing project funding, completion of building design, and completion of building construction.

Currently, MCPS includes the community after the feasibility process. They still evaluate the feasibility factors, but they do them in-house first to ensure they have a well-thought out study before the community is involved, saving valuable time to complete the project. MCPS reported it is crucial to resolve the engineering factors first for cost-saving measures. Once the feasibility study is completed, the community involvement begins through various methods described above, getting feedback on the project's design and incorporating changes as needed.

1. Community-Centered School Design

MCPS schools continue to be community assets for programs such as before and after school care, gathering spaces, school-based wellness centers, athletic events, after school activities/trainings, religious services, and County-based programs such as Excel Beyond the Bell and Linkages to Learning. Most of these programmatic events are booked by community members through the County's Community Use of Public Facilities (CUPF).[8]

MCPS has been a willing partner with the County for community use, making space available during non-instructional hours through CUPF. With more limitations on available land, MCPS and the County have also adjoined the Kingsview Middle School with the Germantown Community Recreation Center (each with a separate and distinct main entry)[9].

MCPS staff report the main priority for each school being built is for educational programming, with design and construction reflecting that goal. The community can use the facilities based on the education program layout, but available rooms are not specifically geared towards community use. Furthermore, MCPS stated in OLO Report 2022-5, *Community Use of Public Facilities*, that security during public use is a concern not only for the school workers in the building, but also for other non-permitted spaces in the building that public users can potentially get access to and damage.

A newer trend identified by the IAC and interviewed counties indicate that newer schools are being designed for community use with school security prioritized, when applicable. They determined they can design areas of the school where community members can access rooms with little school staff involvement while also securing the rest of the school, alleviating security concerns about community members having full access to most of the school during before and after hours.

The IAC reported that various jurisdictions have created and/or plan on creating a practical school feature to ensure closed off community use, with school staff kept to a minimum, while securing the rest of the non-community use space. The Virigina Department of Education also noted a similar trend among their school districts. Examples from a few school districts include:

- Baltimore County: community restrooms only assessed from the outside, mainly for gym and/or athletic field use.

[8] ActiveMONTGOMERY, Community Use of Public Facilities.
[9] County Council Adopted FY2025 Capital budget and the FY2025-2030 Capital Improvements Plan, page 3-7

- Baltimore City: a joint vestibule where there is separate access to the school and another into community spaces.
- Anne Arundel County: in addition to having dedicated community recreation centers[10], a joint vestibule for before and after school care and school space.

C. Prototype Designs

As thoroughly discussed in OLO Report 2017-4, prototype design use is a method utilized by school systems to reduce project schedules and achieve costs savings. Prototype school designs are construction plans that can be used in the construction of multiple schools with minor modifications. School systems use prototype designs in three ways:

- School systems can hire an architect to design a prototype school that is tailored to the local educational program and future needs.
- School systems can utilize an "off the shelf" design from a selection of tested school plans.
- School systems can use predesigned modules that can be arranged in different configurations to fit different sites.[11]

The use of prototype school building designs varies depending on school system policies, school location, and school type.

The use of prototype designs for multiple schools can potentially provide savings in architectural fees and/or construction/contingency costs, allowing for familiarity to construct the building more precisely, and shorten the timeframe to complete a project.[12] However, as stated in 2016, the cost savings remain dependent on many factors, and in many cases the savings are non-existent or in some instances, the costs are even more. These two main factors include:

- Available and Wide-Ranging Space: without available space or land, it is difficult to use the exact same designs. This makes prototype use more prevalent in rural areas but less so in areas where land is limited and expensive to purchase/use.

- Similar Conditions: beyond available land needed, the stormwater management, permitting, and other site-specific factors must be the same. Furthermore, educational and programmatic plans must be the same and since they are so varied at middle schools and high schools, prototype designs are more difficult to use.

MCPS reported it's still able to use prototype designs at some elementary schools, but has avoided using them at middle schools and high schools since each have unique programmatic needs. MCPS

[10] "The Cost of School Construction: A Comparison of the Monarch Global Academy and Conventional School Facilities.", IAC
[11] "Prototype School Designs: Can Prototypes be Used Successfully?," by Laura A. Wernick, et. al., p. 19.
[12] Ibid.

has used prototype designs at a host of elementary schools, including Cabin Branch, Great Seneca Creek, Little Bennett, William B. Gibbs, Snowden Farm, and Wilson Wims. MCPS still uses prototype designs on elementary schools when applicable, but with fewer ideal available land areas, they are becoming less feasible and costly.

One example MCPS provided is Cabin Branch Elementary School's prototype use, in which the designs did not have expanded rooms for more special education programs. Thus, they had to modify the design and construction, adding time and costs. Conversely, it was impossible to use a prototype design for Bayard Rustin Elementary School in Rockville due to the smaller land area and the different permitting requirement from the City of Rockville as compared to other non-incorporated County areas.

Other examples of local jurisdictions using prototype design include:

- Howard County: recent design and construction has been prototypes, but the school system is re-evaluating this practice because there have not been significant cost savings or additional costs. Howard County Public Schools staff reported they end up doing multiple, costly changes to prototype schools. An example is a high school design that, while in the same geographical area as another high school, required the addition of another stair tower for redundancy/safety purposes in case of a fire or another emergency because of new permitting requirements.

- Anne Arundel County: use prototype designs, for elementary, middle, and high schools. They do have adjustments, but they are minor and do not call for wholesale design changes.

- Prince William County: use prototype designs, especially for elementary schools and school additions.

- Frederick County: use prototype designs, especially for elementary schools, but have not built or used a prototype design on a new middle school recently.

- Arlington County: do not use prototype designs. Arlington Public Schools stated there is limited land/space and each site is unique.

Chapter 7. Cost Factor - High Performance Building Mandates

School systems in Maryland are required to use green building technologies when designing, building, and maintaining schools. This chapter reviews updates to state and County building performance mandates and their impact on construction costs. It also compares high-performance building mandates with those in other Maryland school systems and in Virginia.

The initial OLO report on new school construction focused on Leadership in Energy and Environmental Design (LEED) requirements. Since that report, MCPS now has other programs or codes it may follow; this chapter revisits LEED and reviews those other options.

This chapter includes the following sections:

A. High Performance Building Requirements in Maryland and Montgomery County
B. Current High-Performance Building Costs
C. Comparison to Other School Systems in Maryland and Virginia

A. High Performance Building Requirements in Maryland and Montgomery County

1. Maryland High Performance Building Requirements and Regulations

State of Maryland laws require use of green building technologies when constructing or renovating State of Maryland-owned buildings that meet specific criteria[1]. In response to the laws, the Maryland Green Building Council established the High-Performance Green Building Program (HPGBP) to guide Maryland state agencies and local educational agencies (LEAs) in programing, design, and construction of facilities[2].

Requirements of the HPGBP apply to facility design, and construction of projects funded solely with State of Maryland funds, state-funded new and replacement school-construction and community-college projects that are funded in part with state funds. The HPGBP requires the use of one of three approved green building rating programs or codes in the design, construction, and operation of facilities:

a. Leadership in Energy and Environmental Design (LEED), a program of the U.S. Green Building Council;

[1] Md. Code Ann., State Fin. & Proc. (SFP) §3-602.1 (2015).
[2] Maryland Green Building Council. High Performance Green Building Program, 2024

b. International Green Construction Code (IgCC), one of the many codes of the International Code Council; or
c. The Green Globes protocol of the Green Building Initiative.

Maryland LEAs are required to adhere to the program but are not subject to certification requirements. LEAs may obtain independent third-party verification of their compliance with a rating system or code without needing to obtain certification from the organization that grants it[3]. Representatives from various school districts estimate savings of $7,000 to $8,000 per school by opting out of certification requirements.

This section describes the different rating programs required by HPGBP, their applicable credits and requirements to attain certification and comply with high-performance building mandates. This section also details the requirements set forth by the Climate Solutions Now Act of 2022—and other high-performance building standards in Montgomery County.

a. Leadership in Energy and Environmental Design (LEED)

LEED is an assessment tool designed by the United States Green Building Counsel (USGBC) that evaluates environmental building performance and measures their sustainability. Under LEED's rating system, buildings earn points for meeting certain criteria in categories such as energy efficiency, water conservation, and indoor environmental quality.

While projects can pick and choose the credits to pursue, the USGBC established minimum requirements that all buildings must meet before they can apply for LEED certification. Fulfilling the prerequisite requirements for a construction project does not earn points towards final certification[4].

School systems can select any credit applicable to LEED criteria for schools and earn points towards a building's final certification. The number of points determines the level of LEED certification.

[3] Ibid
[4] Bryant, Stephanie. *OLO Report 2017-4: New Construction Costs*, 2017. Montgomery County Office of Legislative Oversight, pp 34-35.

Figure 18. LEED Levels of Certification

Source: Green Building Alliance

Under the HPGBP, projects using the LEED rating program must achieve at least a Silver rating in the relevant system (e.g., LEED BD+C, LEED for Schools), with a goal of achieving a Gold rating or higher[5].

b. International Green Construction Code (IgCC)

IgCC was developed by the International Code Council (ICC) and co-sponsored by the USGBC[6].

Per HPGBP, the locality where the building is located must abide by the same or more recent edition of the IgCC than was adopted by the Maryland Green Building Council.

In 2011, Maryland became the first state to authorize the use of the IgCC as an alternative compliance path to the mandated LEED Silver certification for public projects over 7,500 gross square feet and for new public schools. Since then, five editions of the IgCC have been released, with Maryland adopting the 2018 version in 2022. Montgomery County followed suit in 2017, adopting the IgCC and replacing previous LEED requirements with stricter sustainability standards set by the IgCC.

c. The Green Globes Protocol of the Green Building Initiative

Adapted for use in the United States in 2007 through the Green Building Initiative (GBI), Green Globes is a comprehensive certification system that evaluates the environmental sustainability, health & wellness, and resilience of all types of commercial real estate. Comparable to LEED, Green Globes focuses on similar criteria and objectives, including enhanced energy and water efficiency, site sustainability, indoor air quality, and occupant health.

[5] Maryland Green Building Council. *Maryland High Performance Green Building Program*, 2024.
[6] Ndou, Livhu. *Executive Regulation 12-20, Adoption of the 2018 International Green Construction Code,* 2021.

While LEED evaluates buildings based on nine criteria, Green Globes uses seven. Green Globes also offers four levels of certification. To earn certification, buildings must achieve at least 35% of 1,000 points. Each certification level corresponds to a different score range. Under the HPGBP, projects using the Green Globes rating program must achieve a minimum rating of two Green Globes. with a goal of achieving three Green Globes or better.

Figure 19. Green Globes Levels of Certification

Source: Green Building Initiative

According to industry experts, LEED imposes strict standards for each category, potentially limiting the design team's flexibility. In contrast, Green Globes is considered a more flexible and performance-based rating system, allowing for customized building evaluations. MCPS has transitioned from using LEED to Green Globes, as it better suits its suburban environment. According to MCPS, LEED proved too costly and impractical for their specific needs. For instance, one of LEED's requirements is for projects to be near mass transit options, which is unfeasible for County schools due to its predominantly suburban setting.

Spotlight: Climate Solutions Now Act of 2022

Enacted in 2022, the Climate Solutions Now Act requires the state to reduce greenhouse gas emissions by 60% from 2006 levels by 2031 and to achieve net-zero emissions by 2045. Among its various requirements, the act introduces a building energy performance standard, mandating that most buildings over 35,000 square feet report their direct greenhouse gas emissions starting in 2025. These buildings must then reduce their emissions by 20% below 2025 levels by 2030 and achieve net-zero carbon emissions by 2040. Although schools are exempt from this mandate, other buildings may face penalties for not meeting these targets.

While the act does not specifically mandate that schools be "solar ready," it promotes energy efficiency and the use of renewable energy sources, including solar power, as part of its broader greenhouse gas reduction goals. It encourages measures that support renewable energy, which can include making buildings, such as schools, more suitable for solar installations.

Additionally, the law requires each local school district to build at least one net-zero school by 2033 and establishes a Net-Zero School Grant Fund, providing up to $3 million to cover the additional costs associated with constructing a net-zero building. Counties that build net-zero schools will also receive an extra 5% increase in the state's contribution to the project.

Crown High School in Gaithersburg will be MCPS's first net-zero project, utilizing renewable energy sources, including solar panels and geothermal energy, to meet the net-zero requirements mandated by this law.

2. Montgomery County Regulations

a. International Green Construction Code (IgCC)

As noted earlier, the County Council adopted Executive Regulation (ER) 21-15AMII in September 2017, mandating the use of the 2012 version of the IgCC. This regulation replaced previous LEED requirements in Montgomery County with stricter sustainability standards set by this code. Additionally, it reduced the minimum square footage required to trigger the green building code from 10,000 square feet to 5,000 square feet, thus encompassing more buildings in the County.

In 2021, the Council adopted ER 12-20, which superseded ER 21-15AMII and implemented the 2018 version of the IgCC. This updated version introduced new energy performance modeling based on the Zero Energy Performance Index (zEPI) and specific building types. The adopted version of this code also establishes procedures to measure energy consumption by installing utility measuring devices (meters).

b. Bill 13-22 -Comprehensive Building Decarbonization

This bill seeks to deter the use of fossil fuels in new building construction to further the County's climate change goals. As of December 31, 2026, the law requires that nearly all new residential and commercial buildings must exclusively use electric-powered equipment rather than gas-powered.

The law mandates the County Executive issue new electric building guidelines by 2026, requiring new commercial and residential buildings to utilize electric hot water systems and heat pumps for space heating and cooling. Exemptions apply to hospitals, wastewater treatment plants, crematories, facilities needing emergency backup systems, and high-energy industrial commercial cooking facilities.

This law does not apply to building permit applications submitted before the end of 2027 for private and public schools. Consequently, MCPS will not need to comply with these requirements for schools currently under construction but will need to plan for compliance in future projects after 2027.

3. High Performance Building Requirements for MCPS

MCPS has a long history of incorporating sustainability practices into their school design. Beginning in 2003, MCPS updated its Facility Design Guidelines to align with LEED requirements in the County and in 2006 opened Great Seneca Creek Elementary School, the first public school in Maryland to achieve "gold" certification under LEED. From FY2007 through FY2019, all new schools were designed to achieve LEED certification. Beginning in FY2020, schools are being designed using the Green Globes rating system for green building design[7].

MCPS recently adopted a sustainability policy that commits the district to reducing greenhouse gas (GHG) emissions by 80% by 2027 and achieving net-zero emissions by 2035, compared to 2005 levels, aligning with the County's Climate Action Plan[8]. Immediate actions related to new construction and renovation projects under this policy include maximizing solar production potential and minimizing energy use. It also promotes energy-saving infrastructure improvements in existing buildings through public-private partnerships, grants and tax credits. The policy supports the colocation of schools to encourage compact growth, efficient public infrastructure use, and proximity to public services and amenities. Additionally, it aims to increase the tree canopy, mitigate stormwater runoff, and establish minimum sustainability procurement guidelines that prioritize locally sourced, reusable, and recycled-content products.

B. Current High Performance Building Costs

This section examines the cost implications of complying with the IgCC and implementation of the Climate Solutions Now Act of 2022, as these are the two regulations currently impacting Montgomery County's high-performance building requirements.

1. Cost Impact of IgCC Compliance

According to the American Institute of Architects, the cost impact of complying with IgCC requirements varies greatly by building type, design approach, and local code and practice. Some of the requirements in the code exceed common practices and existing codes, leading to higher upfront costs. However, these costs are often offset by long-term savings in energy and maintenance. Design fees and construction costs may increase, but operational costs may decrease due to reduced utility and maintenance expenses.[9]

OLO reached out to MCPS to evaluate the cost implications of complying with the IgCC. However, comparing costs was challenging since earlier construction projects were bid under IgCC 2012, while more recent ones were based on IgCC 2018, which has stricter requirements. Additionally, the COVID-19 pandemic caused inflation to rise, making it difficult to determine whether the cost increases were

[7] Montgomery County Public Schools. *FY25 Capital Improvements Program, Facility Planning Objectives.*
[8] Montgomery County Public Schools. *MCPS Policy ECA, Sustainability,* 2008.
[9] The American Institute of Architects. *The IAIA Guide to the IgCC*, 2012.

attributable to IgCC mandates or pandemic-driven inflation. Finally, MCPS noted that specific provisions in the 2018 IgCC, such as solar-ready requirements and the need to monitor utility consumption via sub-meters, have contributed to higher construction costs.

a. Cost Impact of the Climate Solutions Now Act of 2022

As of now, Maryland has only three Net-Zero Energy (NZE) schools, which were financed through a merger settlement grant. Grant funds covered an average of 8% of the construction costs for each of these three schools, which opened between 2017 and 2020. The table below summarizes the costs of these three schools. It should be noted that the two Baltimore City Schools were completed as a package.

Table 20. Cost for Existing Net-Zero Schools in Maryland

	Wilde Lake Middle School (Howard County)	**Graceland Park/O'Donnell Heights Elementary/Middle School and Holabird Academy Elementary/Middle School (Baltimore City)**
CIP Funding from IAC	$15,359,000	$47,625,000
Maryland Energy Administration (MEA) Grant	$2,755,671	$5,190,802
Total Funding from IAC and MEA	$18,114,671	$52,815,802
Overall Design and Construction Cost	$34,000,000	$68,082,500
Gross Square Feet (GSF) of Facility	106,221 GSF	Both were 94,070 GSF
Cost Per GSF	$320	$362 per GSF

The per-GSF cost for the Howard County school was 27.5% higher than the IAC's approved standard construction cost of $251/GSF for FY2015, the year in which the contract was bid[10] while the per-GSF cost for the Baltimore City Schools were 3.7% higher than the IAC's approved standard construction cost of $349 per GSF for FY2018, the year the contract was bid[11].

C. Comparison to Other School Systems in Maryland and Virginia

All school systems in Maryland must now comply with the HPGBP, which mandates the use of LEED, IgCC, or Green Globes standards in the design, construction, and operation of facilities. While school districts must follow these programs, they are not required to obtain certification by the certification-granting organization. Maryland has also implemented net-zero requirements for schools, including a

[10] Interagency Commission on School Construction and the Maryland Energy Administration. *Report required by HB 630/Ch. 608(2) (MSAR # 13331) - Maryland Net Zero Energy School Initiative Grant Program Report, 2022.*

[11] Interagency Commission on School Construction and the Maryland Energy Administration. Report required by HB 630/Ch. 608(2) (MSAR # 13331) - Maryland Net Zero Energy School Initiative Grant Program Report, 2022.

requirement under the Climate Solutions Now Act that each local school district build at least one net-zero school by 2033.

School systems in Virginia are also encouraged to meet high-performance energy certification programs, such as LEED or other recognized energy efficiency standards. While using a sustainable rating program or green code is not mandatory for their public schools, it is recommended. Like Maryland, Virginia schools adapt green standards without necessarily pursuing certification[12].

Virginia is also emphasizing the adoption of net-zero schools. Virginia's General Assembly recommends that public school buildings and facilities be designed and constructed to generate more energy than they consume. Design strategies to achieve net-zero schools include:

a. Meeting the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) guidelines entitled "Achieving Zero Energy—Advanced Energy Design Guide for K-12 School Buildings";
b. Orientation and massing of buildings;
c. Proper design of the building envelope, including thermal performance, airtightness, window/wall ratio, and exterior shading;
d. Daylighting as an integral part of lighting design;
e. Energy-efficient HVAC systems and HVAC controls to support energy-positive buildings;
f. Electrical lighting and controls to promote energy efficiency;
g. Metering and sub-metering of systems to track key performance metrics;
h. Occupant behavior and plug load management strategies;
i. Commissioning of mechanical, electrical, plumbing, and envelope systems; and
j. Use of renewable energy sources (solar, wind, and other natural renewable sources) to generate more electricity than consumed in the operation of the building[13].

Virginia school systems establish their own sustainability policies for building construction. For example, Virginia Beach City Public Schools (VBCPS) mandates that any new or renovated building must be designed to achieve at least a LEED Silver rating. To date, eight of their schools have earned LEED certifications, with one achieving Platinum level. VBCPS has also integrated sustainable practices throughout the school division by adopting an environmentally sustainable practice policy. This policy includes purchasing ENERGY STAR rated appliances and electronics when possible and reducing GHG emissions through performance contracting and solar power purchasing[14].

[12] Virginia Department of Education, Office of Support Services. *Guidelines for School Facilities in Virginia's Public Schools*, 2021.
[13] Virginia Department of Education, Office of Support Services. Guidelines for School Facilities in Virginia's Public Schools, 2021.
[14] School Board of the City of Virginia Beach. *Environmentally Sustainable Practices 3-67*, 2022.

Chapter 8. Cost Factor - Market Conditions

Market conditions refer to various factors that affect the state of a specific market at a given time. In the case of school construction, these factors include material and labor costs, as well as the overall economic climate. This chapter reviews current economic factors and revisits those identified in the previous OLO report, analyzing their impact on school construction projects in Maryland. The chapter includes the following sections:

A. Market Increase Factors
B. Comparisons to Other School Systems in Maryland and Virginia

A. Market Increase Factors

Several factors contribute to the rising costs of school construction, including material/labor costs and overall economic climate. Over the past two years, school construction prices have stabilized, with material prices increasing at a more predictable rate. Factors contributing to this stabilization include lower fuel costs and the general availability of most construction materials. However, labor costs continue to rise due to construction firms competing for a limited pool of skilled workers, with the overall construction workforce continuing to decrease.

This section analyzes the impact of material prices on school construction, as well as the role of labor costs and reduced contractor competition.

1. Material Prices

The inflation rate for nonresidential construction materials increased in recent years, reaching 12% in 2022, the highest since 1980–81[1]. Since then, prices have somewhat stabilized with construction input prices increasing by 2.1% in 2023. These increases can cause delays if funding is not immediately available, as schools may need to seek additional resources or wait for prices to drop, potentially extending the project timeline. In 2023 MCPS increased its six-year construction budget request by more than 9% to $1.94 billion. Other school systems throughout the United States have similarly been impacted by escalating construction costs.

2. Labor Costs and Declining Skilled Workforce

Labor costs have been a significant challenge for the construction industry for several years and are expected to continue to increase. In 2023, 74% of builders reported labor shortages as a major issue

[1] Construction Analytics. *Inflation Indexing*, 2024.

with 75% anticipating this trend to continue in 2024[2]. In Maryland, the average number of employees in this sector has decreased by approximately 4,236 from 2019 to 2023, reflecting a broader decline of 68,550 employees since its peak in 2007[3]. This decline is attributed to several factors, including:

- Competition for skilled workers: Companies are competing for a limited pool of qualified workers, which drives up wages.
- Aging workforce: Many experienced workers are retiring without enough new entrants to replace them.
- Lack of interest in trade careers: Younger generations are less interested in trade careers.

To address these challenges, the State of Maryland has launched an initiative to promote workforce development in state public works projects. In November 2023, Governor Wes Moore signed an executive order requiring officials overseeing state construction projects costing over $5 million to consider using contractors that participate in registered apprenticeship programs.[4] The order emphasizes that encouraging the growth of apprenticeship training programs in the Maryland construction industry, particularly in areas with high unemployment, will help promote essential workforce development, and expand job opportunities for individuals in a rapidly changing economy.

3. Reduced Contractor Competition

Reduced contractor competition can be partly attributed to the decline in non-residential construction companies, increased demand, and the challenges small and minority-owned contractors face in competing in the bidding process. The number of construction companies decreased in the United States during the Great Recession of 2008 and further declined during the COVID-19 pandemic in 2020.

Maryland has shown similar patterns - OLO's analysis of private non-residential companies per quarter from 2019 to 2023 revealed that Maryland has been losing an average of 3.7 construction companies per year. In 2019, there were 245 non-residential construction companies; by the end of 2023 this number had dropped to 237[5].

Despite the decline in companies, construction spending has shown healthy growth. Non-residential construction spending rose by 18.1% in 2023. Publicly funded construction, including highways and streets, water supply, and sewage/waste disposal, increased from 15.3% to 26.6% from the previous year. Additionally, private sectors such as education, healthcare, and utility construction also experienced significant growth[6]. However, fewer construction companies combined with increased construction demand results in fewer contractors bidding for school construction projects and higher construction costs.

---

[2] National Association of Home Builders. Top Challenges for Builders in 2024, January 2024.
[3] Bureau of Labor Statistics. *Quarterly Census of Employment and Wages. Annual Averages for Private Construction in Maryland*, 2019-2023.
[4] Governor Wes Moore Signs Workforce Development Executive Order for State Public Works Projects, by Patrick Herron, MoCo Show, November 19, 2023.
[5] Ibid.
[6] Building Congress and Exchange. *Forecasters Expect Shifting Construction Demands in 2024,* January 2024.

For example, between the 2018-2019 and 2021-2022 fiscal years, five construction contractors conducted more than $150 million of business with Maryland school districts. These companies—Keller Brothers, HESS Construction & Engineering Services, Oak Contracting, Dustin Construction, and Whiting-Turner Contracting—are among the largest construction firms in Maryland. In Montgomery County, Keller Brothers and Dustin Construction ranked as MCPS' top contractors[7].

B. Comparison to Other School Systems in Maryland and Virginia

All school systems in Maryland and Virginia are integrated into a regional economy. Construction companies and contractors frequently operate across multiple jurisdictions within this region. Therefore, the same factors, such as construction and labor costs, as well as market conditions affect all school systems in Maryland and Virginia uniformly. During interviews with different school systems in Maryland and Virginia, all cited issues with decreased competition and increased market prices for materials and labor.

[7] The Local News Network. *Health Care, Construction, Tech Among Biggest School Expenses*, August 2023.

Chapter 9. Findings and Discussion Items

New and replacement schools are needed throughout the state to meet capacity needs and replace aging infrastructure, which requires significant funding and time investment. For this report, OLO was tasked with re-examining the factors that affect school construction costs identified in OLO Report 2017-4, *New School Construction Costs* and explore new factors that may cause a change in school construction costs. This chapter summarizes the major findings from this report and presents discussion items developed by the Office of Legislative Oversight (OLO) for Council consideration. This chapter includes three sections:

A. Major Report Findings
B. Previous Discussion Items from OLO Report 2017-4
C. OLO Discussion Items for Council Consideration

A. Major Report Findings

Chapter 1: School Construction Background and OLO 2017-4 Report Summary

Finding #1. The typical process for advancing a school construction project in the State of Maryland takes between three and four years to complete.

A school construction project from conception through design and construction requires coordination and collaboration between the state, the Board of Education, and County government. The following outlines the required process:

- **Year One**. MCPS submits both an Educational Facilities Master Plan and project-specific feasibility study for state review during the summer months. In October, MCPS requests individual project planning approval from the Interagency Commission on School Construction (IAC).
- **Year Two**. In January, the IAC approves local planning for individual projects. In spring and early summer, MCPS develops project-specific educational specifications and selects a project architect. In September, MCPS submits the schematic design plans to the IAC for review, comment and approval. MCPS will incorporate and address comments prior to moving forward in the process. MCPS submits its request for state funding in October and design documents are submitted for review and comment by the IAC in November.
- **Year Three**. In January, the IAC approves state funding for MCPS CIP projects. Construction documents are completed by April. This includes cost estimates, filing of permits, and submission of the construction documents to the IAC for review and comment. If approved, usually around May, the project is posted for bids. MCPS publicly advertises the project for bid;

bids are received and a to the general contractor or construction manager at risk. From the commencement of construction, it can take between 24 and 36 months to complete.

- **Year Four.** By May or June furniture, fixtures, and equipment are moved into the building and the school is ready for an August opening.

Chapter 2: School Construction Funding

Finding #2. MCPS's capital or long-term projects (including school construction) are funded through its Capital Improvements Program. For the FY25 approved MCPS capital budget, MCPS had six funding sources.

The table below outlines the six funding sources for capital projects in MCPS. This project focuses on state aid, which accounts for 29% of capital funding.

MCPS FY25 Approved Capital Funding

(in millions)

Fund	FY25 Funding	Percent of Total
Government Obligation Bonds	$169,332	42%
State Aid	$117,218	29%
Recordation Tax	$51,109	13%
Current Revenue	$31,383	8%
Recordation Tax Premium	$20,983	5%
Schools Impact Tax	$16,630	4%
Total	**$406,655**	

Finding #3. New school construction state aid primarily comes from three state programs: Capital Improvement, Built to Learn, and Enrollment Growth and Relocatable Classrooms. The Built to Learn Program is the only new program since OLO's last report in 2016, implemented in 2021.

In FY25, the three programs accounted for $143.7 million, which is more than triple the amount of FY16 funding ($45.7 million). However, MCPS has received its entire one-time allocation for Built to Learn funds ($357M) from FY23 to FY25. Unless there is another new state aid funding source in FY26, funding levels will return to lower levels experienced pre-FY23.

School Construction State Funding Programs & MCPS Funding

($ in millions)

Program	Description	FY16 Funding	FY25 Funding
Capital Improvement Program	The state's largest school construction grant program, averaging $280M per year. Funding is based on a cost share formula and can be used for major new, renewal, or replacement school projects; can also be used for addition projects and systemic renovations for maintenance. Projects must be at least $100K.	$39.8	$42.3
Built to Learn Program	The program distributes additional, set allocations to Local Education Agencies. MCPS has a one-time allocation of $357M and it has received all funds in yearly increments, which started in FY23.	N/A	$87.7
Enrollment Growth and Relocatable Classroom Program	Addresses significant enrollment growth (exceeds 150% of the statewide average over the past five years) and/or a significant number of relocatable classrooms (an average of more than 300 relocatable classrooms in a local school system over the past five years).	$5.9	$13.8
	Total	**$45.7**	**$143.7**

Finding #4. To allocate school construction funding across all 24 school systems in Maryland for the Capital Improvement, Built to Learn, and Enrollment Growth and Relocatable Classroom programs, the state established a cost share formula which favors school districts with high student Free and Reduced Price Meal Program rates, higher unemployment rates, larger student enrollment growth rates, or that provide a larger share of local finances for school construction relative to the local wealth of the district.

The cost allocation is updated every three years and MCPS' percentage remains unchanged since 2016, along with other local jurisdictions like Anne Arundel County. However, others local counties' percentages have increased.

State Cost Share Percentage, FY16 & FY24

County	FY2016	FY2024
Montgomery	50%	50%
Anne Arundel	50%	50%
Baltimore County	52%	61%
Frederick County	64%	65%
Howard County	55%	56%
Prince George's	63%	73%

Finding #5. In general, Virginia's funding of school capital projects is less than Maryland's - Virginia provides 10% of the cost of capital construction for counties compared with the Maryland average of 31%. Virginia's school construction polices/restrictions have remained mostly the same since 2016.

Virginia's school construction program is not as highly centralized as the State of Maryland, but it does require building codes, minimum educational program standards, and publishes school facility guidance. Each school system is mainly responsible for developing standards, designing, and constructing schools. Virginia funds its local school systems through its traditional School Construction Grant Program (like Maryland's Capital Improvement Program). It also provided one-time funding statewide in the amount of $450,000,000 for its State Construction Assistance Program, like Maryland's Built to Learn Program funding. Overall, the Commonwealth has traditionally provided more funding for road maintenance, with the understanding that local jurisdictions would provide more funding for school construction.

Chapter 3: Construction Cost Trends

Finding #6. Although construction inflation rates rose to over 10% in 2021 and 2022, the inflation rates have come down in the past two years and are getting closer to historic figures (3% to 4%) both nationally and in Maryland schools.

Labor costs continue to rise nationwide due to construction firms competing for a limited pool of skilled workers within a shrinking workforce. In fact, the construction industry has recently faced the highest level of unfilled jobs recorded in 2023 (650,000); this trend has continued, albeit at a smaller amount (450,000), into 2024.

Local stakeholders identified these and additional factors leading to the increase in costs:

- Smaller labor force for construction firms;
- Competition with other types of construction;
- Smaller bids do not receive multiple bids or qualified firms;
- The use of prevailing wages for state funding;
- Stormwater management regulations;
- Upfront costs for making schools more energy efficient;
- Programmatic needs for larger schools;
- Project delays; and
- Lack of adequate land for urban areas.

There are strategies that school districts can use to help manage high construction costs and construction workforce shortages:

- Using higher inflation percentages in forecasting;
- Modifying designs and systems to accommodate market conditions;
- Introducing alternate materials and methods into projects to address cost fluctuations;
- Obtaining separate bids on selected "big-ticket" components; and
- Requesting options for extending completion dates.

Finding #7. Since the initial OLO report, on average, the square foot costs for school construction have increased in Maryland (from $286 in 2016 to $445 in 2024) and even more so in Virginia (from $255 in 2017 to $461 in 2024).

New Schools. When comparing MCPS's only recent new school to other Maryland new elementary schools built from 2021-25, the cost per square foot is less than schools from Frederick and Charles counties. When comparing MCPS to Virginia new elementary schools built from 2021-25, OLO found one school (Henrietta Lacks) costs more while the Woodbridge Area had significantly lower costs per square foot. However, it should be noted these costs are based on bid award data, as such final costs per square foot may be higher than the data shown (especially for a school scheduled to open in 2025).

School Construction Costs – New Elementary Schools 2021-2025

State	District	Elementary School	Year Opened	Square Feet	Site Size (acres)	Total Construction Cost (Building + Site)	Total Cost/ Sq. Ft.
MD	Montgomery	Cabin Branch	2023	95,327	9.61	$40,800,000	$428
MD	Frederick	Blue Heron	2021	97,870	15	$43,726,924	$447
MD	Charles	Margaret Jamieson Thornton	2025	91,595	19.3	$45,450,100	$496
VA	Loudoun	Henrietta Lacks	2024	114,328	117	$53,152,608	$465
VA	Prince William	Woodbridge Area	2025	129,903	9.68	$45,553,000	$351

Replacement Schools. When comparing the replacement of four MCPS schools to other like schools in Maryland built from 2023 to 2024 (the only replacement school built in the time period), MCPS's average cost per square foot ($454) was slightly higher than Red House Run, but lower than Brunswick, whose higher costs may be due to higher site costs.

School Construction Costs – Replacement Schools 2023-2024

State	District	Middle School/ Elementary School	Year Opened	Square Feet	Site Size (Acres)	Total Construction Cost (Building + Site)	Total Cost/ Sq. Ft.
MD	Montgomery	Burnt Mills	2023	94,398	15.1	$43,000,000	$456
MD	Montgomery	Stonegate	2023	84,094	10.27	$37,429,451	$445
MD	Montgomery	South Lake	2023	80,757	10.2	$37,500,000	$464
MD	Montgomery	Woodlin	2023	98,861	10.97	$44,841,806	$454
MD	Baltimore County	Red House Run ES	2024	107,774	15.41	$47,624,109	$442
MD	Frederick	Brunswick ES	2023	85,595	24.63	$43,355,711	$507

Chapter 4: Cost Factor - Procurement Policies and Practices

Finding #8. The procurement landscape for school construction has undergone minor changes in recent years. While the State Minority Business Enterprise (MBE) requirements have remained the same since OLO Report 2017-4, the State's Prevailing Wage Law decreased the applicable value of contracts from $500,000 to $250,000.

Two state procurement policies addressed in the first OLO report, Minority Business Enterprise and Prevailing Wage, have not changed significantly since the report's release:

- There were no changes in the MBE requirement – LEAs are required to provide MBE documentation for the Interagency Coordinating Commission's (IAC) quarterly reporting/contract review process for projects over $50,000.

- The Prevailing Wage Law now only applies to construction projects valued at $250,000 or more if either of the following criteria are met:
    - The contracting public body is a unit of State Government or an instrumentality of the state, and there is any state funding for the project, or
    - The contracting public body is a political subdivision, agency, person, or entity (such as a county) and the state funds 25% or more of the project including school construction.

Finding #9. Since the Built to Learn Act, MCPS has changed its approach on bids for prevailing wage contracts.

Prior to the Built to Learn Act of 2020, MCPS primarily used non-prevailing wage contracts for individual school projects and did not request more than a 24.9% state share. This practice was due to:

- Increased construction costs associated with the prevailing wage obligation;

- MCPS's total construction costs often exceeded eligible state costs and the state paid less than 50% of total construction costs, making prevailing wage rates not applicable;
- Fixed total state funding allocations for each local education agency; and
- Funding availability from the County.

Due to more available state funding, MCPS now requests up to 50% state share of prevailing wage contracts. It also puts out requests for proposals asking for prevailing wage bids and non-prevailing bids, weighing the costs and feasibility of each option.

Finding #10. Two project delivery methods, Construction Management Agency and Construction Manager-At Risk are still the most prevalent types utilized among Maryland counties interviewed. Each method has the potential to produce cost savings.

A construction management agency is when a construction manager is hired under a separate contract early in the process and serves as an extension of the school system's staff. Anne Arundel, Frederick, and Howard counties use construction management agency.

MCPS uses construction manager at-risk, which blends both general contracting and construction manager agency. In this method, the construction manager enters into a guaranteed maximum price contract and the project risk is transferred from the school system to the construction manager.

Chapter 5: Cost Factor - Stormwater Management Regulations

Finding #11. Stormwater management regulations continue to increase site costs. Montgomery County still requires the same standards for new and redeveloped sites.

According to MCPS, stormwater requirements increase project costs by 10-20% for the following reasons:

- Need for increased preliminary engineering design results in higher engineering fees;
- Site grading to manage runoff significantly raises site development costs;
- Space constraints; and
- Sites unable to incorporate Environmental Site Design (ESD) must resort to more expensive structural practices.

In addition, the County has the same stormwater requirements for both new and redeveloped sites. For example, both new and redevelopment projects must use ESD to maintain 100% of the average annual groundwater recharge for the developed site. In comparison, the state does not apply recharge requirements to redevelopment sites. As a result, replacement school sites are treated the same as new schools, leading MCPS to meet a higher standard for redeveloped sites compared to school systems elsewhere in the state.

Chapter 6: Cost Factor - School Design Practices

Finding #12. MCPS elementary school sizes have remained similarly sized since 2016, with more emphasis on designed space for special education and pre-kindergarten. Furthermore, their square footage per student is comparable to other like schools in Maryland.

Although the analysis was limited, elementary schools that opened in 2023 (Burnt Mills at 127.7 square feet per student and Cabin Branch at 132.0 square feet per student) showed similar size in square feet per student to Wilson Wims (studied in the original report and has 126.6 square feet per student). When comparing to other recently opened elementary schools in local jurisdictions, MCPS's schools have fewer square feet per student - both Prince George's (Cherokee Lane) and Baltimore County (Honeygo) have more square feet per student at 133.8 and 132.1, respectively.

Finding #13. A newer trend among school districts in Maryland is to incorporate the need for security during community use into school building design when applicable.

Community use design includes designing areas of a school where community members can access rooms with little school staff involvement while also securing the rest of the school, alleviating security concerns about community members having full access to most of the school during before and after hours. Several local jurisdictions (Baltimore County, Baltimore City, and Anne Arundel County) incorporate community use in their schools' design, including such attributes as a joint vestibule with separate access to the school and the community use area.

MCPS staff report that the community can use facilities based on the education program layout, but the available rooms are not specifically geared towards community use. Further, MCPS reports that security during public use is a concern not only for school workers in the building, but also for other non-permitted spaces in the building that public users can potentially get access to and damage. Therefore, while MCPS considers community use in design, educational programming is prioritized.

Finding #14. Prototype designs are still being used for schools attempting to achieve cost savings, but some school districts are finding that these designs may be more costly in some cases if the conditions are not the same for each school built.

Prototype designs are existing school facility design plans that are used for another site, making only slight adjustments to account for grade changes, foundations, etc. with the goal of cost savings. However, cost savings remain to be dependent on factors, and in many cases the savings are non-existent or in some instances, costs are even more. These two main factors include:

- Available and Wide-Ranging Space: without available space or land, it is difficult to use the exact same designs. This makes prototype use more prevalent in rural areas but less so in areas where the land is limited and expensive to purchase/use.

- Similar Conditions: beyond the available land needed, stormwater management, permitting, and other site-specific factors must be the same. Furthermore, educational and programmatic plans must be the same and since they are so varied at middle schools and high schools, prototype designs are more difficult to use.

Chapter 7: Cost Factor - High Performance Building Mandates

Finding #15. All school systems in Maryland must now comply with the High-Performance Green Building Program (HPGBP).

The HPGBP mandates the use of Leadership in Environmental Design (LEED), International Green Construction Code (IgCC), or Green Globes standards in the design, construction, and operation of facilities. While school districts must follow these programs, they are exempt from certification requirements. Instead, they can obtain independent third-party verification to confirm compliance with a rating system or code, without the need for certification from the granting organization. Representatives from various school districts estimate savings of $7,000 to $8,000 per school by opting out of certification requirements.

MCPS has recently transitioned from using the LEED rating system to Green Globes, finding it better suited to their suburban environment and more cost-effective. Additionally, in 2017, the County adopted the IgCC, replacing previous LEED compliance requirements.

Finding #16. The Climate Solutions Now Act requires each local school district to build at least one Net-Zero Energy (NZE) school by 2033.

In addition to requiring the building of one NZE school for each school district in the state, the law establishes a Net-Zero School Grant Fund, which would give school districts up to $3 million to cover the difference in costs for a net-zero building. In addition, counties that build net-zero schools would receive an additional 5% increase in state contribution to the project.

The first NZE school built in Maryland was Wilde Lake Middle School (Howard County Public Schools) and had a total cost, of approximately $320 per gross square foot (GSF). This cost is 27.5% higher than the IAC's approved standard construction cost of $251 per GSF for FY2015, the year in which the contract was bid. In contrast, Graceland Park/O'Donnell Heights Elementary/Middle School and Holabird Academy Elementary/Middle School, the second and third NZE schools (both in Baltimore City

Public Schools System), had a total cost of approximately $362 per GSF. This per-GSF cost is 3.7% higher than the IAC's approved standard construction cost of $349 per GSF for FY2018.

Crown High School in Gaithersburg will be MCPS's first net-zero project, utilizing renewable energy sources, including solar panels and geothermal energy, to meet the net-zero requirements mandated by this law.

Chapter 8: Cost Factor - Market Conditions

Finding #17. Two significant factors that impact construction costs are labor costs and reduced competition.

Labor costs have been a significant challenge for the construction industry for several years and are expected to continue to increase. In 2023, 74% of builders reported labor shortages as a major issue with 75% anticipating this trend to continue in 2024. Companies are competing for a limited pool of skilled workers due to many experienced workers retiring and younger generations expressing less interest in trade careers.

Reduced contractor competition is also linked to the decline in non-residential construction companies and increased demand. Maryland has lost an average of 3.7 construction companies annually from 2019 to 2023, yet construction spending continues to grow, particularly in publicly funded projects.

B. Previous Discussion Items for Council Consideration from OLO Report 2017-4

This report sought to assess the actions taken to control school construction costs based on the recommendations from the previous report. In the 2017-4 study, OLO recommended the Council discuss the following questions with MCPS representatives:

1. What amendments to state regulations could the Council and MCPS pursue that might result in reduced construction costs?
2. Should the County propose amendments to the state aid construction formula to account for variations in school system policies, such as class size reduction? What impact would this have on funding?
3. Should the Council request additional information and data regarding the financial impact of County stormwater management regulations on school construction costs?
4. In addition to stormwater management regulations, are there other opportunities to align County and state regulatory requirements that could result in school construction cost reductions?

5. As it is the County's policy to use school buildings as year-round community facilities, how should the County measure its school construction costs relative to other jurisdictions that use school facilities differently?
6. Are there opportunities to adjust school building size and site requirements to reduce total construction costs? Would the increased use of prototype school building designs for new and replacement schools, as implemented by other school systems, allow MCPS to build schools at a faster rate, for lower cost, and provide equity of school buildings County-wide? Could project schedules and timelines be reduced through a review of policies and practices such as community involvement in the design process?
7. Are there opportunities for the Council to promote programs or policies that could enhance competition and promote growth in the construction labor market in the County?

Based on OLO's research, these discussions have not taken place formally – except for the County and state's initiatives to promote growth in the general labor market. Interviews with MCPS indicate no studies or conversations have been initiated regarding potential amendments to state regulations to reduce construction costs. The areas addressed in the discussion items are further discussed below.

State Aid. The County has not formally proposed any changes to the state aid construction formula to account for differences in school system policies, such as class size reduction. However, the recommendations and analysis from OLO Report 2021-12, *State School Construction Aid Eligibility and Funding of MCPS Capital Projects*, were provided to the Office of Intergovernmental Relations to use in negotiations with the state on modifications to the state formula.

Stormwater Management. There have been no formal discussions concerning stormwater management regulations. The Council has not requested additional information or data on the financial impact of County stormwater management regulations on school construction costs, nor have there been any discussions about aligning County and state regulatory requirements to reduce these costs.

School Size. As discussed in the report, school size has remained relatively the same over the past eight years, with small increases in size related to pre-kindergarten and special education needs.

Prototype Design Use. The use of prototype schools varies; the conditions need to be ideal to use the same design or there may be additional costs. Prototype designs have most recently been applied to MCPS elementary schools, when applicable.

Project Timelines. MCPS has reviewed project timelines to expedite the overall project process by changing the community involvement from the beginning to end of the feasibility process.

Construction Labor Market. Regarding policies that could increase competition and foster growth in the County's construction labor market, several state and County initiatives have been adopted

since the last study to achieve this goal. Through the state's Blueprint's College and Career Readiness (CCR) Pathways, the state has been encouraging school districts to expand or highlight their Career and Technical Education (CTE), with such initiatives as making sure students have free access to CTE courses that lead to a certificate or license. As noted earlier, the state now requires officials to consider using contractors that participate in registered apprenticeship programs for state constructions projects over $5 million. Also, the state recently made Employment Advancement Right Now (EARN) grants available, which are aimed at helping various job fields, including skilled laborers. Finally, the County Council passed the J.O.B.S. Initiative, in which the Job Creation Fund will support the growth of industries, including trade associations.

C. Current Discussion Items for Council Consideration

Based on new findings presented in this study, these discussion items are aimed at alleviating the cost of new school construction and designing schools to address security issues for community use.

Discussion Item # 1. Continue to examine County and state requirements that can be aligned to lower school construction costs, like stormwater management.

MCPS is required to perform the same environmental site design for replacement schools as for new schools – which is more stringent than state requirements – increasing costs for replacement schools. With stormwater management costs comprising a significant portion of school construction cost increases, it would be worth examining the financial impacts of the County's stormwater management regulations on school construction costs, as well as exploring opportunities to streamline County and state requirements to reduce similar costs.

Discussion Item # 2. Explore different programs or resources to directly help skilled laborers and increase the available pool of workers.

While the County and state have programs generally aimed at helping the overall workforce, it may be advantageous to explore creating programs or aid directly to skilled laborers. For example, since there is a shortage on workers, construction companies must look beyond historic labor pools and look at other non-traditional talent areas, such as women. In order to free up workers' availability (particularly women), child care is an impediment to helping them join the workforce. Programs can be created to provide child care assistance directly to these potential workers, increasing their availability to work. Other program examples are to provide free community

college technical programs, assisting veterans to join the skilled labor field, and expanding apprenticeship programs.[1]

Discussion Item # 3. Consider incorporating community use-centered design with security prioritized at schools with high public use to address MCPS security concerns.

As noted, MCPS has concerns about community users having access to many areas around the school beyond the permitted areas, creating security concerns. For new or replacement schools, MCPS can consider designing a layout that restricts community users from accessing other non-community use areas of the school. While the upfront costs may be more, there may be less of a need for building/security workers to be there during community use and/or prevent any possible vandalism or theft.

[1] The Associated General Contractors of America, Workforce Development Plan

Appendix A

Bids for Average Statewide Cost Per Square Foot Analysis Provided to the Interagency Commission on School Construction

School Name	*PSC*	*LEA*	*Project Type*	*Bid Opening Date*	*Proposed SRC*	*Sq. Ft.*	*Bldg. Cost w/o site*	*Bldg. Cost per SF w/o site*	*Bldg. Cost w/ site*	*Bldg. Cost per SF w/ site*	*% Increase w/ site*	*Square Foot per student*	*Cost per student*
Furley Elementary #206	30.256	City Schools	Replacement	January 2023	628	87,683			$47,933,500	$547	0.00%	139.62	$ 76,327
Red House Run ES	3.109	Baltimore County	Replacement	January 2022	775	107,774	$37,607,219	$349	$47,624,109	$442	26.64%	139.06	$ 61,450
Bedford ES	3.089	Baltimore County	Replacement	April 2022	735	102,449	$35,772,382	$349	$44,179,582	$431	23.50%	139.39	$ 60,108
New Northeast Area MS	TBD	Baltimore County	New	2022	1408	205,479	$83,587,311	$407	$100,032,861	$487	19.67%	145.94	$ 71,046
Lansdowne HS	3.149	Baltimore County	Replacement	November 2022	1759	318,461	$127,972,700	$402	$150,627,900	$473	17.70%	181.05	$ 85,633
Westminster East MS	6.004	Carroll	Replacement	June 2021	671	102,018		$0	$59,795,891	$586	0.00%	152.04	$ 89,115
North East M/HS	7.044	Cecil	Replacement	June 2022	2050	294,166			$125,000,000	$425	0.00%	143.50	$ 60,976
ES #23	TBD	Charles	New	January 2023	778	91,595			$45,450,100	$496	0.00%	117.73	$ 58,419
N. Dorchester HS	9.013	Dorchester	Replacement	August 2016	650	116,720		$0	$43,106,483	$369	0.00%	179.57	$ 66,318
Brunswick ES	10.025	Frederick	Replacement	December 2021	725	85,595	$36,714,277	$429	$43,355,711	$507	18.09%	118.06	$ 59,801
Waverly ES	10.058	Frederick	Replacement	April 2020	1019	126,519	$43,161,171	$341	$52,363,500	$414	21.32%	124.16	$ 51,387
Rock Creek School	10.08	Frederick	Replacement	August 2019	150	78,000	$39,623,161	$508	$51,101,161	$655	28.97%	520.00	$ 340,674
Blue Heron ES	10.081	Frederick	New	February 2020	700*	97,870	$39,016,414	$399	$43,726,924	$447	12.07%	139.81	$ 62,467
Homestead Wakefield	12.022	Harford County	Replacement	March 2023	1100	142,872	$46,940,653	$329	$59,448,286	$416	26.65%	129.88	$ 54,044
New HS #13	13.09	Howard	New	February 2020	1650	266,760	$78,390,818	$294	$98,078,616	$368	25.11%	161.67	$ 59,442
Neelsville MS	15.136	Montgomery	Replacement	March 2022	1063	162,864			$78,129,457	$480	0.00%	153.21	$ 73,499
Beaver Run ES	22.005	Wicomico	Replacement	January 2020	650	98,304		$0	$42,420,364	$432	0.00%	151.24	$ 65,262

*Capacity adjusted to 705, per Frederick County Public Schools Capital Improvement Plan.

Appendix B

Virginia Department Of Education

Annual Cost Data Report

2022 - 23 New Elementary School(s)

Project Number	Project Name	Grades	Division Name	Contract Award Date	Maximum Operating Cap (b)	Building Cost	Site Cost	Total Cost (a)	Total Sq. Feet	Sq. Feet/ Pupil	Total Cost/ Sq. Feet	Building Only Cost/Sq Feet	Total Cost/Pupil
021-92-00-100	New 360 West Area Elementary	PK-5	Chesterfield County (021)	Aug-20	928	$ 28,250,636	$ 4,055,413	$ 32,306,049	104,621	113	$ 308.79	$ 270.03	$ 34,813
037-24-03-100	New Goochland Elementary School Replacement	PK-5	Goochland County (037)	Jan-23	882	$ 35,386,622	$ 9,519,592	$ 44,906,214	104,826	119	$ 428.39	$ 337.57	$ 50,914
042-16-03-100	Consolidated John M. Gandy, Henry Clay Elementary School	preK-5	Hanover County (042)	Nov-02	890	$ 42,699,776	$ 5,054,968	$ 47,754,744	150,722	169	$ 316.84	$ 283.30	$ 53,657
053-118-00-100	ES-32	K-2	Loudoun County (053)	Feb-23	984	$ 48,993,636	$ 4,158,972	$ 53,152,608	114,328	116	$ 464.91	$ 428.54	$ 54,017
075-119-00-100	Woodbridge Area Elementary School	k-5	Prince William County (075)	Mar-19	847	$ 39,291,000	$ 6,262,000	$ 45,553,000	129,903	153	$ 350.67	$ 302.46	$ 53,782
Total					**4,531**	**$ 194,621,670**	**$ 29,050,945**	**$ 223,672,615**	**604,400**				
Statewide Average										**133**	**$ 370.07**	**$ 322.01**	**$ 49,365**

(a) Usually includes construction, site development, water system, sewage disposal, built-in equipment and demolition. A ; E fees, value engineering, construction management fees, cost of site, loose equipment, and furniture are excluded.

(b) Pre-kindergarten classrooms counted at 16 students, grades K-3 classrooms counted at 24:1,Grades 4-5 counted at 25:1.

(c) See Appendix A for project specific comments