Preliminary Report on the Impact of School Size

Prepared for
Maryland State Department of Education

By
Cheryl Humann, Humann Consulting
&
Shawn Stelow Griffin, Collaborative Communications

Submitted by
APA Consulting

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The Maryland General Assembly enacted Chapter 288, Acts of 2002 – the Bridge to Excellence in Public Schools Act, which established new primary state education aid formulas based on adequacy cost studies using the professional judgment and successful schools methods and other education finance analyses that were conducted in 2000 and 2001 under the purview of the Commission on Education Finance, Equity and Excellence. Over the next six years, state funding was phased in to implement the Bridge to Excellence Act, which reached full implementation in the 2008 fiscal year. Chapter 288 called for a follow-up study of the adequacy of education funding in the state, to be undertaken approximately 10 years after the 2002 enactment. This study is required to include, at a minimum, adequacy cost studies identifying the following: a base funding level for students without special needs; per-pupil weights for students with special needs which could then be applied to the base funding level; and an analysis of the effects of concentrations of poverty on adequacy targets. The adequacy cost study is to be based on the Maryland College and Career-Ready Standards (MCCRS) adopted by the State Board of Education. The study should include two years of results from new, MCCRS-aligned Maryland state assessments. These assessments are scheduled to be administered beginning in the 2014-2015 school year.

There are several additional components mandated to be included in the study. These components include evaluations of the following: the impact of school size; the Supplemental Grants program; the use of Free and Reduced Price Meal eligibility as the proxy for identifying economic disadvantage; the federal Community Eligibility Program in Maryland; prekindergarten services and funding; the current wealth calculation; and the impact of increasing and decreasing enrollments on local school systems. The study must also include an update of the Maryland Geographic Cost of Education Index.

Augenblick, Palaich and Associates, in partnership with Picus Odden and Associates and with the Maryland Equity Project at the University of Maryland, will submit a final report to the state no later than October 31, 2016.

This report on the preliminary impact of school size, required under Section 3.2.2 of the Request for Proposals (R00R4402342), is the second of three required school size reports. This *Preliminary Report on the Impact of School Size* will:

1. Extend the findings from the literature review on the impacts of smaller schools on student achievement, efficiency, and school climate contained in the first report.
2. Identify models for establishing smaller schools as presented in the literature.
3. Describe currently available state programs for supporting school facility construction in Maryland.
4. Outline the remaining analyses to be presented in the final school size report.

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Introduction

Since the passage of the No Child Left Behind Act in 2001, legislators, policy-makers, and school district officials have worked to reform education programs and services so that *all* students have equitable access to an adequate education that can be sustainably funded through available revenue streams. After a decade of implementation and evaluation, a number of reforms have shown promise in improving education outcomes. One such reform is the creation of smaller learning communities (NASSP, 2004). The Maryland State Department of Education (MSDE) asked the study team to examine the effects of school size on student achievement and operational efficiency. In the first report on this topic, the *Summary of School Size Report,* the team outlined current local education agency (LEA) policies regarding school size in Maryland. The team also studied other states' policies and best practices regarding school size and conducted research regarding school size and its impact on student achievement and expenditures.

In this, the second report in a series examining the effects of school size on student achievement and operational efficiency, the study team expands its analysis of literature covering the effects of smaller schools; identifies models for establishing smaller schools; begins assessing the impact of different factors (e.g. local zoning requirements) on construction costs; and provides a description of programs for financing school construction in the state.

The research on the effects of school size suggests smaller schools have a positive influence on key education climate factors such as student engagement, teacher and parent satisfaction, and social behavior. Research also suggests that these positive influences are amplified for students living in poverty. This report will provide an expanded review of this literature, describe models for establishing smaller schools, and discussing policy considerations for establishing such schools.

Additionally, this report will update data and information provided in the *Summary of School Size Report,* presented to MSDE on September 2, 2014.

Methodology

The research team has implemented a carefully designed approach to answer the questions set forth in the project RFP. The approach contains four main components:

1. Data collected from the LEAs, using online document reviews, local district phone interviews, and case studies;
2. Data collected from recognized facility planner professionals during phone interviews;
3. A thorough review of the literature and state reports on school size, using online databases and other online resources; and
4. An analysis of data the study team collected from MSDE, LEAs, and other sources.

These four components will allow the study team to determine optimal school size models and to provide overarching recommendations for school size. Appendix A denotes how each of the study components contributes to the completion of these study elements.

In the *Summary of School Size Report,* submitted on September 2, 2014, the study team presented findings regarding Maryland's existing school size policies, other states' school size policies, facility management and school administration association best practices, educational issues tied to school size, and literature and research on school size. In this report, the *Preliminary Impact of School Size Report,* the study team expands on this previous literature review and presents models for establishing smaller schools.

In the final report on school size, to be submitted on June 30, 2015, the study team will provide recommendations for optimal school sizes across the state. The study team will also identify the relative benefits and compromises of adopting a school size policy.

Data Collection

To gather data for the first report, the study team conducted a comprehensive review of documents and data available on the MSDE website and on each of the LEA websites. The team also conferred with facility directors regarding local policies on school size. Finally, the study team contacted LEA facilities planning directors to review LEA school size policies and to clarify any information not publicly available on the LEA websites. As of this writing, 19 of the 24 facilities planning directors have responded to the study team to clarify information related to their policies and practices.

For this report and for the final report, the study team is gathering a significant amount of quantitative and qualitative data from MSDE, covering:

- Enrollment and attendance data by school;
- Academic achievement data by school, utilizing the 2012 state assessment data for elementary and middle schools and the 2013 assessment data for high schools;
- Free and Reduced-Priced Meals (FARM), English Language Learner (ELL), or Special Education (SPED) enrollment data by school for the 2014 fiscal year;
- School staffing and salary expenditure data by school;

- 2014 square footage, state-rated capacity, and state capital allocation data by school from the Public School Construction Program; and
- LEA expenditure reports.

Literature Review

There is a sizeable body of knowledge related to the impacts of school size on educational achievement and the options for creating smaller learning environments at each educational level. Such options include:

- Schools within schools, houses, or academies within high schools;
- Pods or clusters within middle schools;
- Learning families or neighborhoods within elementary schools; and
- Redistribution of grade bands across a number of school buildings.

The study team expanded the literature review from the *Summary of School Size Report* regarding the academic performance and operating efficiencies of smaller schools. The team paid particular attention to the favorable learning environments often associated with smaller schools and smaller learning communities.

Case Studies

Utilizing the existing, available state and district data and the forthcoming boundary information, the study team will identify two to three LEAs from which to request additional information on a school by school basis. The requested information will cover program focus and school level expenditures. The study team will choose LEAs that have the following criteria:

1. Multiple schools within each school type (elementary, middle, and high school);
2. A broad range of enrollments within each school type; and
3. Whether one or more of the small school models described later in this report have been implemented.

The study team will design an interview protocol to effectively collect this data while minimizing the amount of time required of district administrators. These case studies will provide more complete data on the relationship between school size, instructional programs, and school-level expenditures.

In the report that follows, the study team updates and describes the nuanced research findings on the impact small schools have on academic achievement and education costs. Additionally, the study team identifies models for establishing smaller schools; begins to assess the impact of factors (e.g. local zoning requirements) on construction costs; and provides a description of programs for financing school construction in the state.

Research on the Effects of School Size

This section builds on research presented in the earlier study regarding the effects of school size on student- and system-level outcomes. Research on the impacts of smaller schools generally focuses on the following issues:

- Operating efficiencies;
- Academic achievement;
- Academic achievement for schools with students who need additional learning support, i.e. schools with high percentages of FARM, ELL, or SPED students; and
- School climate, including extracurricular participation, teacher and student satisfaction, and student discipline.

In general, results of the research are mixed. When small schools are carefully planned, implemented, and supported, they can have positive impacts on student achievement, particularly for students living in poverty. However, size is not the sole driver of either operating efficiency or positive student outcomes.

Operating Efficiency

Conventional wisdom assumes that larger schools must be more cost efficient to operate due to greater economies of scale. The research on the relationship between school size and efficiency is not entirely conclusive, but evidence suggests that school operating efficiency is actually “U” shaped. Very small schools do experience greater inefficiencies, but as schools grow larger, their efficiency advantage is diminished by the increasing costs of administration and coordination of a larger, more complex school organization (Stiefel, Berne, Iatarola, & Fruchter, 2000; Walberg & Walberg, 1994).

Meanwhile, some research also suggests that smaller schools may be *more* efficient when it comes to producing higher levels of student performance. Stiefel, Berne, Iatarola, and Fruchter (2000) found that larger schools are less efficient at producing higher student outcomes, which results in a lower return on investment than that of smaller schools.

Academic Achievement

Researchers have examined the correlation of school size to student achievement for several decades. However, a confluence of events—investment by the Bill and Melinda Gates Foundation, a special project of the National Governor’s Association (NGA), and investment from the U.S. Department of Education—brought renewed attention to the issue in the early 2000s, particularly as related to high schools. These investments in smaller school models were accompanied by strategy and outcome evaluations, contributing to our current understanding of the impacts of small schools.

A meta-analysis of studies of small schools (Rochford, 2005) found that size functions primarily as an enabler of improved student outcomes. Small schools that moved the needle forward on student outcomes decreased enrollment as part of a suite of related reform efforts. Early implementers and proponents of small schools conjectured that, with fewer students, school staff would be able to form deeper and more supportive relationships with learners. Indeed, this hypothesis was proven to be true—but only in the schools that also changed their approaches to community engagement, instruction, and school structure.

First and foremost, small schools benefited from leadership that both 1) set a tone that encouraged personalization and 2) distributed responsibility for the reform effort among multiple staff and the community at large. Successful small schools focused on improving the quality of instruction, often implementing new curricula or approaches to teaching. Teachers and leaders participated in professional development to learn new content delivery and relationship-building skills, and participated in follow-up meetings to discuss implementation of these new skills. Smaller schools succeeded when district leaders, Boards of Education, and community members bought into the work. In short, a school's staff, leaders, and surrounding community must work collaboratively to make the small school learning environment successful (Howley, 2002).

Finally, it is important to note that research shows smaller schools and smaller learning environments have a more pronounced effect on children from low-income families (Friedkin & Necochea, 1988; Greenwald, Hedges & Laine, 1996). Indeed, in addition to improved grades and standardized test scores, low-income elementary-aged students attending small schools have better attendance, fewer behavior problems, and increased participation in extracurricular programs.

However, research around the advantages of smaller schools is not unanimous. Several recent studies have found a larger school performance advantage (Steiner, 2011; Tanner & West, 2011). In the case of high schools, proponents of larger schools have argued that larger enrollments are needed to support more diverse course offerings (Conant, 1959; Hoagland, 1995). Other research, however, suggests that this advantage of larger schools may be overstated. Unks (1989) found that smaller schools provide a broader array of learning experiences than the published course offerings may suggest, while Monk (1987) found that the relationship between school size and curricular diversity begins to decrease with school enrollments above roughly 400 students. This suggests that relatively small high schools may provide nearly as diverse a curriculum as much larger schools.

Academic Achievement of Students in Need of Additional Learning Support

With the conflicting conclusions about the effects of school size on academic achievement, there is a growing area of research focused on the benefits of smaller schools. Specifically, this research covers the degree to which smaller schools benefit students in need of additional learning supports. The challenge with this area of research is isolating the effects of *only* school size on academic achievement, since school reforms often take place as a package, or in combination with other changes in policies, practices, or resources over time (Schwartz, Stiefel & Wiswall, 2011).

There is, however, a strong body of research identifying interventions and services that bolster the achievement of SPED students, ELL students, and students living in poverty. Relationship-enhancing interventions are especially important for students at risk of academic failure and students prone to teacher-student relationship problems. These students include boys, students living in poverty, students with disabilities, students from minority backgrounds, and students with problematic behavior (Rathvon, 2008). As noted above, other interventions proven to be beneficial for students from low-income families are often part of the fabric of successful small school environments. Such interventions include strong parental engagement, personalized instruction, and collaborative, flexible approaches to meeting student needs. Thus, the academic achievement of students who need additional learning supports increases when interventions such as personalized learning, specialized curriculum, a distributed model of school leadership, and parent and community engagement are available in small school settings.

Achievement outcomes appear more pronounced for students who are traditionally lower-achieving (Darling-Hammond, Ross & Milliken, 2006). This is evidenced in Unterman's 2014 report on New York City's Small Schools of Choice (SSC). The SSC student population, accepted on a lottery basis, is 94 percent minority. Eighty-four percent of SSC students are eligible for free or reduced-price lunch, and 75 percent enter high school performing below grade level in reading or mathematics. Nevertheless, these SSCs are sending more students to college than other city schools, with 49 percent attending college compared to an average of 40 percent at other city high schools.

School Climate

Researchers have identified several characteristics of smaller schools that may explain their positive effects on student performance. Key among these characteristics is the presence of a supportive school climate. Some smaller schools are found to be more successful at developing personal and informal relationships among school staff, students, and parents than larger schools serving similar student populations. Such relationships lead to improved student engagement and student social behavior, broader participation in extracurricular activities, heightened teacher satisfaction and collaboration, and increased parent involvement (Lee & Loeb, 2000). These positive effects are even more pronounced for low-income and minority students, who tend to have higher attendance rates and lower dropout rates in smaller schools (Carruthers, 1993). A study in North Carolina specifically identified the positive impact of smaller schools on school climate, leading to recommendations for much smaller school sizes to prioritize school climate, and larger school sizes to prioritize operating efficiency (North Carolina Department of Public Instruction, 1998). A 2001 meta-analysis of research on school size notes increased attendance and fewer behavior problems among students attending elementary schools with enrollments under 500 (Rochford, 2005).

Smaller schools tend to have fewer incidences of negative social behavior than large schools, resulting in greater student engagement and satisfaction, higher attendance rates, and lower dropout rates. Again, the research suggests that ethnic minority and low-income students in particular benefit from this characteristic of smaller schools (Cotton, 1996).

Extracurricular Activities Participation

The research related to extracurricular participation (EP) in high school focuses on the correlation between EP and socioeconomic status, academic achievement, self-esteem, and school size. The school size research compares participation at smaller high schools (defined as having enrollments under 800) to participation at larger high schools (defined as having enrollments greater than 1,600). Enrollment size is often associated with other community characteristics that contribute to EP. For example, smaller schools are often located in rural areas, where the high school is the hub of community attention.

Research suggests that students in rural areas feel a greater sense of opportunity, even responsibility, to participate in activities like sports or plays. This results in students participating in multiple activities over the course of the school year. Students at large, urban high schools have EP readily available outside of school through other venues, such as park and recreation programs, or competitive youth sports that allow student athletes to specialize in specific sports or other activities, resulting in participation in a narrower range of activities within the high school setting.

Overall, research on the impact of school size on EP has competing findings. Larger schools tend to offer more varied opportunities that include expanded student government and volunteerism choices, enhancing the likelihood that students will be able to find an activity of personal interest (Lay, 2007). Yet Coladarci and Cobb (1996) found that EP was higher among students attending smaller high schools than those attending larger high schools. There is agreement in the research that larger high schools offer a greater variety of activities, which provides greater opportunities for more students to participate, while smaller schools have a narrower range of opportunities, but have students who feel encouraged or compelled to participate in multiple activities throughout the school year.

Teacher and Student Satisfaction

Surveys of school staff show that smaller schools tend to cultivate better attitudes towards work among school administrators and teachers, leading to greater staff collaboration and more successful school improvement efforts (Cotton, 1996; Klonsky, 2006). The likely causes of this effect include the more favorable school climates and deeper personal relationships found in smaller schools (Cotton, 1996). Still, it is difficult to attribute improved teacher satisfaction solely to enrollment size. Often, smaller schools employ other strategies that may also improve educator satisfaction. For example, small schools may use a distributed leadership model and may enjoy greater support from the district office. Both of these factors have been found to have positive impacts on teacher satisfaction and motivation (Rochford, 2005).

School Size Policy

Since the publication of the *Summary of School Size Report,* the study team has conducted additional research on national, state of Maryland, and local school size policies. As a result of a deeper scan of school size policies across the United States, the team has learned that state departments of education have focused their direction and resources on variables such as class size (student-to-teacher ratios), site size, and square footage per student, as opposed to focusing on decreasing overall school enrollment. The data search found only two states—Arizona and North Carolina—that currently have a published statute or guideline regarding school size. In both cases the guidelines are presented as recommendations rather than requirements.

In Arizona, the recommended maximum school sizes are 500 students for elementary and middle schools, and 1,000 students for high schools. While these maximum size recommendations are outlined in the state's School Facilities Board's *21st Century Schools Report* (2007)*,* they have not been codified by the state. North Carolina has published two ranges of recommended maximum school sizes. The first, which prioritizes school climate, recommends maximum school sizes of 300 to 400 students for elementary schools, 300 to 600 students for middle schools, and 400 to 800 students for high schools. The second set of recommendations, prioritizing economic efficiency, recommends larger size maximums of 450 to 700 students for elementary schools, 600 to 800 students for middle schools, and 800 to 1,000 students for high schools. As is the case in Arizona, North Carolina's school size maximums are only presented as guidelines, and are not mandated by the state (North Carolina Department of Public Instruction, 1998).

A third state, Florida, had adopted a school size statute in 2000 to require schools to create smaller learning environments for students within existing larger structures. However, this statute was short-lived given that the state amended it in 2001. In 2002, the statute was eliminated entirely with the re-write of the state's entire education code. The elimination of school size requirements came in response to limited available funding for the implementation of smaller school sizes.

Other Size-Related Statutes

The study team examined information from all 50 states, relying primarily on state education agency and legislative websites, as well as publications of national organizations that compile relevant state policy and practice information (such as the Education Commission of the States and Building Education Success Together). From these sources, we gathered information about other states' school size and facility planning policies, including:

- School size requirements, as well as the related components of classroom size guidelines;
- Square footage per student guidelines;
- Minimum school site size;
- Requirements for completing an Educational Facilities Master Plan (EFMP); and
- Benchmarking operational data.

Regarding other size related requirements, over half of the states have some sort of guidelines or recommendations regarding classroom size, square footage per student, or site size requirements. Eight states, including Maryland, have requirements related to completing a district-level EFMP.

The number of states with policies or guidelines for each of the facility planning components discussed above is presented in Table 1. Appendix B provides a list of states that have enacted guidelines for each of the facility planning components.

Table 1: Number of States with Requirements For Each Facility Planning Component

Facility Planning Component	Number of States that have a Statute, Published Guideline, or Recommendation
Classroom Size	29
Site Size	28
Square Foot/Student	22
Educational Facilities Master Plan	8
School Size	2

Best Practices Regarding School Size and Facility Planning

Of the policies identified above, the development of EFMPs is consistently recognized as a best practice, particularly for public entities that have a fiduciary responsibility to taxpayers to protect and manage capital assets. Organizations such as the Government Finance Officers Association promote EFMPs as a best practice tool for K-12 school systems to correlate physical capital needs with educational goals, and for direct governments, both local and state, to make capital investments aligned with long-term needs.

Because the education environment is ever-changing, an annual EFMP documents the current and forecasted environments, the respective building needs, and the associated operational and capital expenditures for changes in the following realms:

- National, state, and local policies, including district policies on the use of temporary portable buildings, boundary changes, facility utilization (enrollment to capacity ratio) targets, and optimal school size requirements;
- Population and enrollment forecasts;
- The physical needs related to the aging of buildings; and
- The needs related to changing educational programs, such as implementation of special programs in Career and Technical Education (CTE), Science, Technology, Engineering, and Math (STEM), magnet programs for the performing arts, and other programs with a specialized focus.

School Size Policy in Maryland

Since publishing the first in the series of reports on school size, the study team has spoken to facilities staff from 19 LEAs and emailed staff from the remaining five. To help guide the interviews, the research team searched each LEA website for a school-size policy—either within the policies of the Board of

Education or in the published EFMP—prior to contacting the facilities staff. Based on the information found on an LEA website, the team developed a semi-structured questionnaire to guide the interview. The questionnaire included inquiries on school size policies, the impact of school size on educational outcomes, facilities costs, the involvement of the public in school-size policy decisions, and other factors potentially influencing the size of schools in the LEA. The findings from the survey and interviews follow.

Adequate Public Facilities Ordinances in Maryland

Maryland statutes (Art. 66B, § 3.01(a) and Art. 66B, § 10.01(a)) allow for municipal governments to adopt an Adequate Public Facilities Ordinance (APFO). An APFO ensures that infrastructure, including public schools, necessary to support proposed new residential developments is built concurrently with, or prior to, a proposed development. As of 2012, 14 counties and 26 municipalities in Maryland had adopted APFOs. Table 2 below identifies these counties and their respective adequacy standards. Nationally, APFOs are considered a best practice to ensure smart growth.

APFOs in Maryland include a variety of devices to link development growth to adequate infrastructure. These devices range from holding a moratorium period on the construction of new developments to providing land for schools, to providing for impact fees for the construction of the necessary infrastructure. APFOs in Maryland do not include school size requirements - school size decisions are left up to the LEAs. The APFO requirements are based on current and forecasted utilization of the existing schools. Hence, APFOs are linked to potential capital funds available to construct new schools or add to existing schools if and when there is a forecasted need for additional space to address growth.

According to a study completed by the National Center for Smart Growth in 2006, APFOs in Maryland are often inadequately linked to capital improvements. The required level of service that needs to be met prior to development is inconsistent among the counties that have adopted APFOs. Counties may use either the state-rated capacity (SRC) or a local-rated (city or county) capacity (LRC) as a basis for adequacy. Most counties utilize the SRC to determine if space is available to accommodate the anticipated growth that will come with development. The SRC is the number of students that an individual school has the physical capacity to enroll, according to the Interagency Committee on School Construction (IAC). The IAC determines this number using a formula for the number of students per classroom, typically on a per grade, or grade range, basis. Some jurisdictions have chosen to adopt their own capacity formulas for purposes of evaluating capital requests as well as development requests. These are referred to as LRC. To determine if the proposed development meets the level of service defined as adequate, counties compare the forecasted enrollment—which includes current enrollment combined with additional, projected enrollment from the proposed development—with the designated, rated capacity of the schools that serve the development area. If the forecasted enrollment is equal to or less than the percentage identified in the ordinance, then the proposed development meets the level of service defined as adequate. As shown in Table 2 below, these utilization percentages vary significantly, ranging from 100 percent to 120 percent of a school's identified capacity. Some counties could authorize a development that would potentially cause schools to be 20 percent over capacity, as is the case in Montgomery County. Washington County, in contrast, does not allow for development that would take the school capacity of an elementary school beyond 90 percent of capacity.

The moratorium periods are inconsistent as well, ranging from seven years in Calvert County to three years in Harford and St. Mary's counties. A shortcoming of some APFOs is that the moratorium period can elapse before capital funds have been approved for the required school construction. LEAs are then required to add portable classrooms to accommodate the actual growth.

Table 2 below identifies the counties that have adopted APFOs and notes the counties' respective levels of service requirements before commencing development.

Table 2: Counties with Adequate Public Facilities Ordinances

County	Adequate Public Facilities Provisions Level of Service Standard 2012
Anne Arundel	100% of SRC; does not include temporary or portable structures; 6-year wait period
Baltimore	115% of SRC or adequacy in Capital Improvement Plan (CIP) in district or adjacent district
Calvert	100% of LRC; 7-year wait period
Caroline	100% of LRC
Carroll	109% of SRC is adequate; conditional approval if adequacy in 6-year CIP; 110-119% of SRC is approaching inadequate and subject to permit restrictions
Charles	100% of SRC; considers portable classrooms and CIP
Frederick	100% of SRC; includes school construction fee option
Harford	110% of SRC within 3 years
Howard	Open/closed chart defined by school region, approved by County Council
Montgomery	120% of SRC; school facilities fee option for 105%-120%; does not include portable structures, considers first 5 years of CIP
Prince George's	105% of SRC
Queen Anne's	100% of SRC; option to propose mitigation plan, but cannot include temporary or portable structures
St. Mary's	Elementary schools 107% of SRC, Middle schools 109% of SRC, High Schools of 116% SRC; based on capacity within 3 years
Washington	Elementary schools 90% of SRC, Middle and High schools 100% of SRC; options to request redistricting or create improvements

Source: *Adequate Public Facilities Ordinance (APFO) Inventory for Maryland Jurisdictions*, prepared by Philip LaCombe, Maryland Department of Planning, May 10, 2012.

In an effort to ensure that school facilities are constructed prior to new development, municipalities can also require impact fees. Impact fees serve as a funding source to offset some of the costs of required infrastructure and the costs of executing Developer's Rights and Responsibilities Agreements (DRRA). A DRRA is an agreement between a property owner and the county that describes the property owner's rights to develop a property under the zoning requirements and other regulations in place at the time of the agreement. In return, the property owner must accept responsibility for the manner and condition in which the property is to be developed. By executing a DRRA with a county, a property owner locks in the zoning codes and regulations current at the time of the agreement. A property owner can thereby avoid having to adhere to any changes that may occur in ordinance or zoning requirements after the DRRA's effective date.

State School Size Policy Findings

In the *Summary of School Size Report,* the study team identified nine LEAs that have adopted a Board of Education (BOE) policy or a published guideline addressing maximum school size. Since the submission of the *Summary of School Size Report* in September, the study team has identified one additional LEA that has a published school size guideline, bringing the total to 10 LEAs. Of these 10 LEAs, five have their school size policies documented in their posted board policies and five have included a policy only in their posted Educational Facilities Master Plan (EFMP). The study team gathered this information through reviews of the LEA websites and follow-up conversations with 19 of the 24 LEA facilities directors. The study team has not, however, been able to schedule a follow-up discussion with the five remaining facilities representatives to clarify whether those LEAs have school size policies that are not published as part of their BOE policies or their EFMP.

For reference, Table 3 below provides the range of maximum school sizes and the median of the recommended maximum school sizes for each school type for the 10 LEAs with confirmed school size policies.

Table 3: Maryland LEA Maximum School Size Policies

School Type	Range of Maximum School Size Policies	Median of Maximum School Size Policies
Elementary School	550-750	647
Middle School	700-1,200	875
High School	1,200-2,000	1,500

Of the 10 LEAs we have identified as having adopted a school size policy, six have listed both a minimum and a maximum school size for each of the school types. Table 4 below provides the range of minimum school sizes and the median size for each school type for these six LEAs.

Table 4: Maryland LEA Minimum School Size Policies

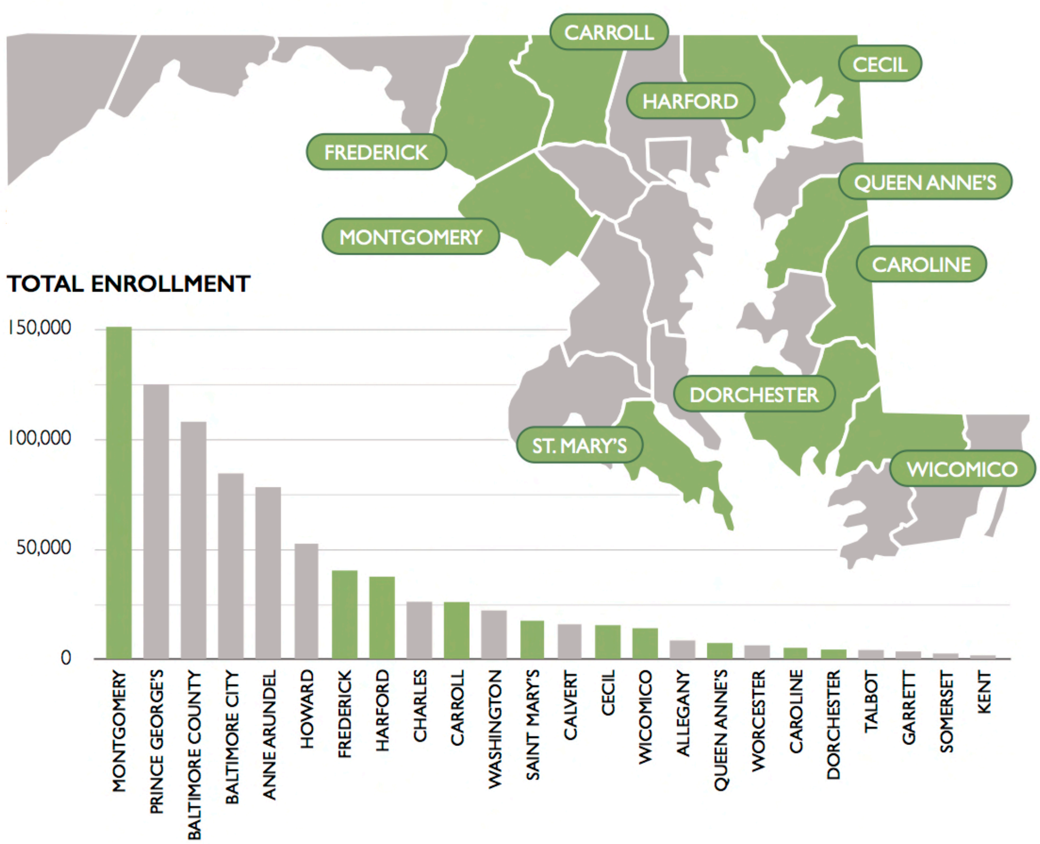
School Type	Range of Minimum School Size Policies	Median of Minimum School Size Policies
Elementary School	200-500	350
Middle School	400-900	550
High School	700-1,575	900

Of the 10 LEAs that have confirmed school size policies, there is a significant amount of variation in the recommended school sizes. In some cases, the minimum size established in one LEA's policy is larger than maximum from another LEA. For example, the minimum middle school size for Harford County is 900 students, while the maximum middle school size specified in the policies of six of the other LEAs is equal to or fewer than 900 students. In Queen Anne's County, the minimum high school size of 1,575 is larger than the recommended maximum school size in five LEAs.

Appendix C presents the school size policies for each of those LEAs that have a published school size policy, either in BOE policy or in their EFMP, while Appendix D provides a graph showing the recommended school size, by school level, for each of the 10 districts with a confirmed school size policy.

Figure 1 below graphically shows those LEAs with school size policies. The embedded chart at the bottom of the figure showing total LEA enrollment helps illustrate the relationship between LEA size and adoption of school size policies. Figure 1 shows that about half of the LEAs adopting school size policies are smaller LEAs, located on the Eastern Shore of Maryland. The remaining LEAs with confirmed school size policies tend to be larger and are distributed across the central part of the state. Additional research on why some LEAs have not chosen to adopt a school size policy will be carried out for the final school size report.

Figure 1: Map of Maryland LEAs with School Size Policies*

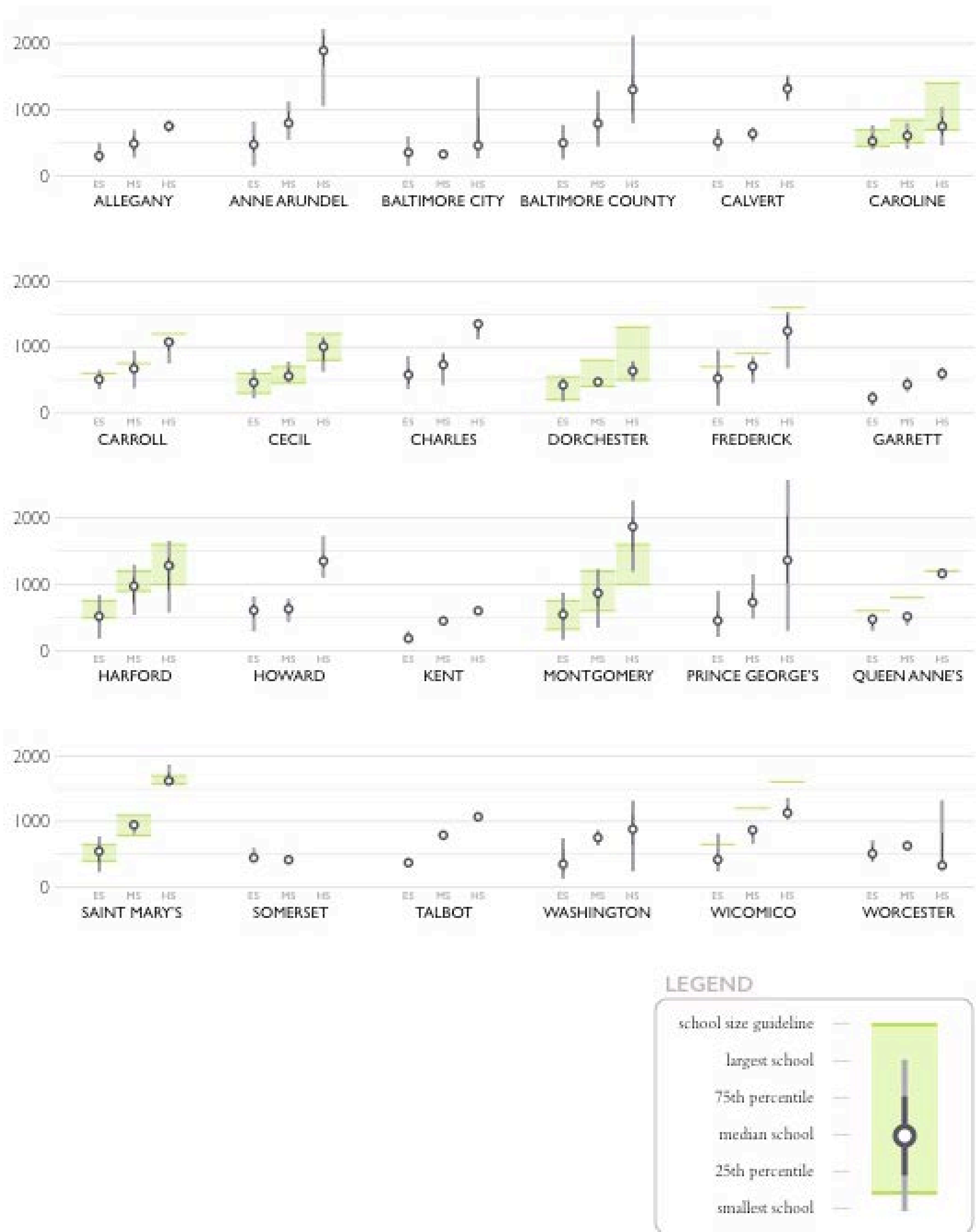


**Based on 19 responding LEAs.*

Figure 2 shows the range of actual enrollment by school type in each of the 24 LEAs. The maximum (and where applicable minimum) recommended school size is also shown for those LEAs with a confirmed school size policy. The vertical line shows the range of enrollment for each of the school types (elementary, middle, and high school) with the median school size presented as a dot on the vertical line. In those LEAs with a maximum school size policy, the maximum enrollment is shown as a horizontal line for each facility type. In those LEAs with a policy specifying both a maximum and minimum school size, the maximum and minimum enrollments are shown as horizontal lines and the range between the two is shaded. The figure shows that school size generally increases with grade levels. However, the amount of increase varies among LEAs. The median Baltimore City enrollment is 354 students at the elementary level and 460 students at the high school level—a difference of 106 students. Anne Arundel County has an elementary school median enrollment of 474 students and a high school median enrollment of 1,894 students—a difference of 1,420 students. Figure 2 clearly identifies the LEAs that have a large range of enrollment by facility type, as shown by the longer vertical lines. For example, the figure shows that Anne Arundel County's high school enrollments range from 1,066 in the smallest high school to 2,224 at its largest high school. Figure 2 also shows how actual school sizes compare to school size limits in those LEAs with school size policies. Finally, Figure 2 shows that in a majority of LEAs with a maximum school size policy, actual enrollment exceed the recommended maximum enrollment for at least one school type.

This analysis does not include alternative schools. It does, however, include magnet and focus schools, which are typically smaller than traditional comprehensive high schools. The study team will complete further analysis prior to the final report to segregate and analyze magnet and focus schools to the extent possible.

Figure 2: Variation in School Enrollment and School Size Policies



Models for Creating Smaller Schools

Following a survey of Maryland LEAs and a national review of state education codes, the study team learned that there is a paucity of state and local policies guiding the creation of smaller school environments. In the early 2000s, a number of funders invested in smaller learning communities and smaller schools as a strategy to boost student achievement. These funders, including the U.S. Department of Education and the Bill and Melinda Gates Foundation, were guided by the hypothesis that smaller schools lead to better academic outcomes. Efforts were undertaken to determine if smaller, more personalized education settings would lead to improved academic achievement. In some cases small schools did improve achievement, particularly for children in poverty. Overall, however, research shows school size as merely one factor in improving student achievement. Parallel reforms and actions taken to help implement and support smaller school size models can also contribute greatly to overall improvements in student achievement.

Several models have emerged for creating smaller schools or smaller learning environments. A number of factors—students, facilities, operating autonomy, and instructional philosophy—guide LEAs as they select models for smaller and more personalized learning environments. Some models, such as career academies and magnet schools, are learner-focused and seek to create community by bringing together students and staff who share particular interests and goals. Other models, like clusters and pods, are supported by facility design. These schools have been intentionally designed to accommodate a team-driven model of instruction. The terms *school within a school* and *school within a building* have subtle differences, indicating varying levels of autonomy among multiple school administrators. Finally, some smaller learning communities are guided by alternative educational philosophies. These communities include Montessori schools and foreign language immersion schools, among others.

A variety of terms have been used to describe small school models. Some of these terms are duplicative. In 2001, Cotton defined a number of common and relevant small school models. The broad categories of these models are described below.

School within a School/School within a Building

This model brings several small schools under one roof. More specifically, in a *school within a school* model, there is a building administrator or principal responsible for the entire physical plant and all schools, students, and teachers on a campus. In the *school within a building* model, principals are more autonomous and report directly to an LEA. Baltimore City has several schools that have adopted a *school within a school* model. The district calls these co-located schools.

Smaller Learning Communities

A smaller learning community is a term used to define an individual learning unit within a larger school. Teachers and their students are scheduled together and typically hold classes in shared, common areas of the school (Cotton, 2001).

Career Academies

Career academies provide a specialized, focused curriculum to support career exploration and preparation during high school, sometimes leading to job certification or receipt of credentials. The result is a *school within a school* environment that unites a group of peers with common long-term goals and interests. Other terms used to describe these smaller learning communities include *career clusters* and *career pathways.*

Autonomous Small Schools

Autonomous small schools, also referred to as *freestanding schools,* have independent governance and budget control. These schools also have the ability to select both teachers and students. An autonomous small school sets its own schedule and defines its own learning program. It may share a building with another school, or may simply be a *historically small school,* located in a small building that limits enrollment. Maryland LEAs have experimented with autonomous small schools, namely in Baltimore City, where a contract was awarded to Edison Schools to manage a number of small schools in need of reform. The Edison Schools received per-pupil funding from Baltimore City Schools, but had complete autonomy over staffing, curricula, and budget decisions that are normally approved at the LEA level. Charter schools are autonomous schools.

Alternative Schools

Alternative schools often provide nontraditional curriculum and educational methods, such as credit recovery or night school. Students have more flexibility in their programs of study and/or class schedules than they would in a traditional school. In the Maryland context, alternative schools often serve the needs of students who are not successful behaviorally in a traditional school setting, and who may require isolation from traditional classroom and school settings. These schools may be physically located within another school or in a separate building.

Magnet Schools or Theme-based Schools

Magnet and theme-based schools design curriculum and school activities around a particular area of study, or a particular theme. For these schools, community is built around shared interest and experience regarding a particular subject. All classes are taught using the school's subject focus. For example, a visual arts magnet school might teach social studies concepts in the context of art history and geographic variations in artistic styles. Popular themes and subjects for theme-based schools include STEM, performing or visual arts, international studies, and world languages. Several Maryland LEAs have magnet schools, including foreign language immersion schools.

Strategies for Creating Smaller Learning Environments

A common strategy for creating smaller school environments is the organization of grade-level teams. This *school within a school* strategy brings together a team of students, teachers, and support staff (e.g. counselors) to personalize the learning experience. Academic subjects and activities are team-specific, allowing a team of teachers to get to know students and students' families very well over the course of an academic year. The learning community can house several teams within a central administration. In some cases, teams have their own physical learning spaces within a school, but share common areas such as the library, cafeteria, and gym.

The division of a school into smaller learning communities by grade or by interest is sometimes called a *house plan.* Other terms used to refer to similar arrangements are defined by school design—*cluster* or *pod. Clusters* and *pods* both feature a set of classrooms organized around a large common area. The common areas are often used for daily or weekly large group meetings to discuss student governance, climate, and discipline issues.

Additional terms used to describe *school within a school* configurations include *minischool, multiplex, multischool,* and *scatterplex.* There are no industry-standard definitions for these terms; individual districts define how they use each term. In Maryland*,* some LEAs have large schools clustered in a multischool or multiplex complex, such as the Old Mill Educational Complex in Anne Arundel County, The former Frederick Douglass High School in Baltimore City was transformed into a multiplex/multischool complex of small high schools.

As noted previously, several LEAs in Maryland have implemented or piloted one or more of the small school reform models listed above. From foreign language immersion elementary schools, to magnet middle schools, to alternative schools, to career academies in high schools, there are numerous examples of smaller learning communities in Maryland. As additional information becomes available on the specific smaller school models operating in Maryland, the study team will further analyze their form, academic achievement, and operating efficiencies in the final report.

Construction Funding and Financing in Maryland

Maryland LEAs do not have taxing authority. They are therefore dependent on the county governments and, in the case of Baltimore City Schools, on the City of Baltimore, for revenue to fund capital expenses. LEAs must submit their budgets, which include capital construction, to the county government, or the City of Baltimore government in the case of Baltimore City Schools. LEA funding flows from the county and city general fund to the LEAs. Capital construction funding for schools is also available through the state of Maryland, primarily through the Public School Construction Program (PSCP) administered by the Interagency Committee on School Construction (IAC). The proportion of state and local funds varies greatly depending on the local wealth of an LEA and the specific facility and construction needs.

To obtain state construction funding support, LEAs submit requests to the IAC for review and approval. The IAC consists of five members including the Superintendent of Schools, the Secretaries of the Department of General Services and the Maryland Department of Planning, and two members of the public appointed by the Speaker of the House and the President of the Senate. The program's purpose is to provide local property tax relief; to relieve governmental subdivisions of the high costs of school construction; to address the considerable backlog of new construction, renovation and replacement schools; and to equalize educational facilities and opportunities throughout the state. Since 1971, the IAC has approved over $6.8 billion in construction funding support, with the most recent approved amount (fiscal year 2015) totaling $325.3 million for the Capital Improvement Program (Public School Construction Program, 2013).

Other funding programs for school construction include other PSCP-administered programs, such as the Aging Schools Program (ASP), the Relocatable Repair Fund (RRF), and the Qualified Zone Academy Bond (QZAB) program. During the 2013 legislative session, special legislation was also passed to support school construction and renovation in the Baltimore City Schools. The following list provides brief explanations of each of these programs:

- The ASP was established in 1997 to address the needs of aging school buildings. The fiscal year 2015 allocation for the ASP totals $7.9 million.
- The RRF provides limited funding to repair and renovate state-owned relocatable classrooms.
- The federal government authorizes the QZAB program for capital improvements, repairs, or deferred maintenance at eligible public schools and requires a 10 percent private equity contribution. Construction of new schools is not allowed under this program. QZAB requires the issuer, the state of Maryland, only to repay the principal (Public School Construction Program, 2013). Beginning in fiscal year 2012, the PSCP began distributing QZAB funds on a competitive basis based on project priority, scope and eligibility. All 24 LEAs have at least one school that is eligible based on its FARM population (35 percent or greater) and the age of the facility. For fiscal year 2015, the State Board of Public Works allocated more than $4.6 million to 13 LEAs for 38 projects.
- The Baltimore City Public Schools Construction and Revitalization Act of 2013 was passed by the Maryland Legislature in April 2013, to provide up to $1.1 billion in bond funding to support new and modernized school buildings in the City of Baltimore. The Maryland Stadium Authority, the

City of Baltimore and the Baltimore City Public Schools will contribute $60 million annually over the next 30 years to service the bond debt. This program was enacted to help address the city's identified capital facility needs of over $2.4 billion.

In addition to the programs described above, two financing mechanisms that are gaining popularity across the country are also utilized in Maryland. These are Public Private Partnerships (P3) and the Energy Saving Performance Contracting (ESPC) program. These financing options allow LEAs to utilize general funds, rather than capital funds, to pay for facility improvements and construction. The following provides a brief description of both of these options.

- P3 allows LEAs to transfer ownership and management of a public facility—including capital improvements and construction—to a private entity. The LEA then makes an annual lease payment to the private firm for use of the facility. The lease payment is a general fund obligation rather than a long-term debt obligation to the LEA.
- ESPC is a self-funding financing program that provides infrastructure improvements; energy and water savings; monitoring and verification of effectiveness; training; maintenance; and environmental benefits. LEAs can finance the costs of an ESPC through the state's Master Lease Program or through funding from the State Agency Loan Program. The financing costs are paid for through guaranteed energy savings, which are a result of the improvements that do not require capital dollars.

Areas of Further Study

During the next phase of the school size study, the study team will engage in a number of analyses to update study findings presented in the first two school size reports and to provide additional findings as required by the MSDE Request for Proposals. These analyses are summarized below.

Updating Maryland LEA School Size Policies

The study team will complete the survey of LEA school size policies in the state to ensure that all LEAs with school size policies have been identified and represented in our research findings.

Analyze the Impacts of School Size in Maryland

This analysis will explore the impacts of school size in Maryland on: 1) student outcomes, with a focus on achievement on state assessments; 2) operating efficiencies; 3) student participation in extracurricular activities; and 4) school climate.

(1) Student Outcomes

The analysis of school size and student outcomes will consist of both correlational and regression analyses. These analyses will determine whether there is a measurable difference in student achievement among different schools sizes while controlling for student demographics and other characteristics. The study team will use state achievement data for the Maryland School Assessment and High School Assessment as the primary measure of student outcomes.

(2) Operating Efficiency

The analysis of school size operating efficiency will use school-level staff salary data provided by the state, augmented by the school-level expenditure data collected in the case studies described above, to determine if there is a consistent relationship between school size and school expenditures.

(3) Extracurricular Participation

The study team has already completed a preliminary analysis of the level of participation in extracurricular activities in LEAs across Maryland by examining the extent to which the level of participation correlates with school size.

According to the National Federation of State High School Associations annual High School Athletics Participation Survey, participation in high school athletics in Maryland as a percentage of the student population has steadily increased over the past decade. Total participation in extracurricular activities in the 2013-14 school year was 116,104, or 15.4 percent of total high school enrollment. This represents an increase over participation in the 2004-05 school year, which totaled 100,305 students, or 12.8 percent of total high school enrollment.

The final report will include a more in-depth analysis, for which the study team will collect additional data on LEA-level participation from each of the LEAs. This will include data on student participation in middle and high school student government associations across the state, collected from the Maryland Association of Student Councils (MASC). It will also include data from other state organizations supporting extracurricular activities, such as the Maryland State Music Teachers Association. The data collected will cover membership counts as well as the breakdown of participation by school enrollment. This data will be used to assess the impact of school size on participation in student government and other activities at the middle and high school levels.

(4) School Climate

The study team is just beginning to unpack MSDE-provided school-level data, which can be used as a proxy to explore the relationship between school size and school climate in Maryland. The study team will use school-level data on attendance, disciplinary data, mobility rates, and graduation rates to analyze the relationship between school size and:

- Rates of chronic absenteeism;
- Student mobility; and
- Four-year cohort graduation rates.

Models for Smaller Learning Environments in Maryland

This report presents information on various models used nationally for creating smaller learning environments. For the final report, the study team will explore models currently operating within the state for creating smaller learning environments. The study team will identify these school models with the assistance of MSDE. The study team will use interviews to obtain information about the schools' governance systems, instructional programs, and costs.

Analyze the Impact of Attendance Boundaries and Zoning Laws on School Size

For this analysis, the study team will obtain school attendance boundary GIS data files for each of the 24 LEAs to examine the relationship between attendance boundaries and school size. The team will also complete its study of local zoning ordinances that require adequate school facilities, examining the potential impact of these ordinances on school sizes and facility costs.

Identify Drivers of Variations in District Capital Costs

The study team has already completed a preliminary analysis of LEA expenditure data for fiscal years 2004 through 2011. For this analysis, the team extracted and summarized school construction expenditures for individual LEAs. The initial results suggest that, over the time period from 2004 to 2011, there was a wide range of per-student capital expenditures across districts, ranging from $511 to $2,033 per student, with a state average of $1,166 per student. This information provides only a snapshot in time, and includes only the state-funded portion of capital construction in the LEAs. Further analyses will be conducted for the final report to collect more complete expenditure data, including data on local funding sources, and to isolate the causes driving this variation in capital spending.

Modeling the Impacts of School Size on State Operating and Capital Funding

The study team will develop models for estimating the impact of changing school sizes on state spending for school construction and operations. To create the models, the team will use LEA-level data from MSDE, as well as findings from the LEA case studies.

Recommendations for School Sizes

Based on the analyses conducted throughout the school size study, the final study will present recommendations on optimal school sizes. The final study will also present potential strategies for implementing these optimal school sizes while still minimizing costs to the state and to LEAs.

Summary

The study team's analysis of the literature suggests that smaller school size may have limited impact on student achievement and operational efficiency, absent other initiatives designed to take advantage of a smaller learning environment. As the literature notes, small school settings that use educational strategies such as strong school leadership, parent and community engagement, personalized instruction, and engaging curricula can make a measurable, positive difference in student achievement outcomes. Emerging findings from the research suggest that students most in need of support—those from low-income households, those receiving special education services, and those who are English language learners—may indeed benefit the most from smaller, more personalized learning environments.

This report also provides a survey of models for smaller learning environments that have been utilized across the country over the past decade and a half. These models range from variations of multiple schools or programs co-located within a single facility to autonomous, freestanding small schools.

This report also summarizes the programs available in the state of Maryland for supporting capital construction in LEAs, primarily through the state's Public School Construction Program.

Finally, more research and analysis is warranted before the study team can confidently make recommendations on the optimal size of elementary and secondary schools in Maryland. The final school size report will provide a more nuanced look at the relative benefits and challenges of smaller schools as related to student achievement and operational efficiency. This final report will provide Maryland policy-makers with policy options to ensure optimal student outcomes in a fiscally responsible and sustainable manner.

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Appendix A: School Size Study Components and Study Elements

Study Element	Data Collection – State, LEA & Local Municipalities	Data Collection - Facility Planner Professionals	Literature Review	Analysis of Data & Recommendations
Local policies regarding size of schools	X			
Best and/or common practices in other states regarding school size	X	X		
Educational and extracurricular impacts of school size, and the impact, if any, on the surrounding neighborhoods	X	X		
Factors that contribute to large school size and recommendations for mitigating those factors	X	X		X
Recommendations for the ideal school size	X	X	X	X
Processes that can assist in ensuring public input into school size standards or guidelines		X	X	X
Models for the creation of smaller schools, including the subdivision of existing schools into multiple administrative units within the same campus, which share common areas such as cafeterias and sports fields		X	X	X
The costs and impacts of zoning laws that require new schools to be built to accommodate new development and how those costs can be reduced	X	X		X
The potential impacts on the Maryland Public School Construction program of establishing stricter policies regarding smaller schools, such as higher costs	X			X
How school boundaries and attendance areas affect school size	X		X	X
Whether opportunities are available for alternative methods to create space for smaller schools, including the purchase and renovation of existing buildings where available and including suburban and rural school design	X	X		X

Appendix B: State Policies and/or Guidelines for School Facility Planning

State Policy/Best Practice	State
School Size Guidelines	Arizona, North Carolina
Classroom Space Guidelines	Alaska, Arizona, Arkansas, California, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Virginia, West Virginia
Square Footage/Student Guidelines	Alaska, Arizona, Arkansas, California, Florida, Kentucky, Massachusetts, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, West Virginia
Site Size Guidelines[1]	Alabama, Alaska, Arizona, California, Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Kentucky, Maine, Minnesota, Mississippi, Missouri, New Hampshire, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, Utah, Virginia, Washington, West Virginia, Wyoming
EFMP Requirement	Arizona, Arkansas, Colorado, Florida, Maryland, New Jersey, North Carolina, Ohio

[1] Site size guidelines are taken from Weihs, 2003.

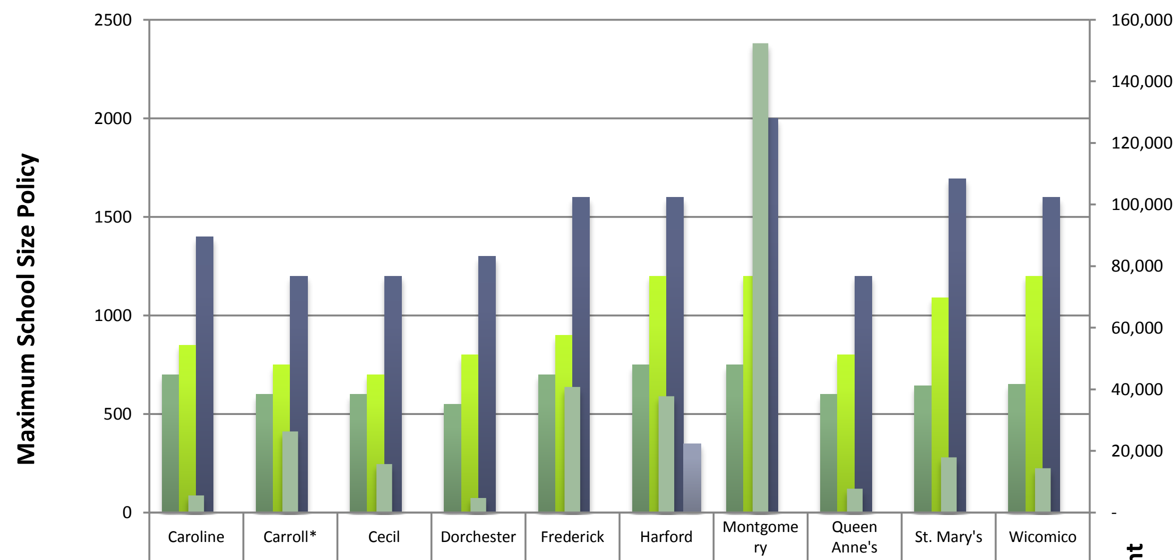
Appendix C: Maryland School Size Policies by LEA

LEA	BOE School Size	EFMP School Size	BOE Policy and/or Comments
Allegany	No	No	
Anne Arundel	No	No	BOE is updating all policies
Baltimore City	NA	NA	Has prototype educational specifications for three sizes for each school type
Baltimore County	NA	NA	
Calvert	No	No	
Caroline	Yes	Yes	Preferred school enrollment: 450 to 700 students in elementary schools 500 to 850 students in middle schools 700 to 1,400 students in high schools Also has acreage for school sites policy
Carroll	No	Yes	Has a utilization policy 600 students in elementary school 750 students in middle school 1200 students in high school
Cecil	Yes	No	300-600 students in elementary school 450-700 students in middle school 800-1,200 students in high school
Charles	No	No	
Dorchester	No	Yes	200-550 students in elementary school 400-800 students in middle school 500-1,300 students in high school
Frederick	Yes	Yes	For new construction: 700 students in elementary schools 900 students in middle schools 1,600 students in high schools
Garrett	No	No	
Harford	Yes	Yes	500 to 750 students in elementary schools 900 to 1,200 students in middle schools 1,000 to 1,600 students in high schools 200 to 350 special schools Also has class size policy
Howard	NA	NA	Has educational specifications for each school type, including site size[2] requirement, and has utilization criteria
Kent	NA	NA	
Montgomery	Yes	Yes	300 to 750 students in elementary schools 600 to 1,200 students in middle schools 1,000 to 2,000 students in high schools

[2] Site size refers to the number of acres required for each school size.

LEA	BOE School Size	EFMP School Size	BOE Policy and/or Comments
			Special and alternative program centers will differ from the above ranges and generally be lower in enrollment
Prince George's	NA	NA	
Queen Anne's	No	Yes	600 students in elementary schools (PK-5) 800 students in middle schools (6-8) 1,200 students in high schools (9-12)
Somerset	No	No	
St. Mary's	No	Yes	400 to 644 students in elementary schools 790 to 1,090 students in middle schools 1,575 to 1,695 students in high schools
Talbot	No	No	
Washington	No	No	
Wicomico	No	Yes	Referenced in facility task force document 650 students in elementary schools (PK-5) 1,200 students in middle schools (6-8) 1,600 students in high schools (9-12)
Worcester	No	No	

Appendix D: Maryland LEAs with School Size Policies



	Caroline	Carroll*	Cecil	Dorchester	Frederick	Harford	Montgomery	Queen Anne's	St. Mary's	Wicomico
Elementary	700	600	600	550	700	750	750	600	644	650
Middle	850	750	700	800	900	1200	1200	800	1090	1200
High	1400	1200	1200	1300	1600	1600	2000	1200	1695	1600
Alternative						350				
2014 Enrollment	5,547	26,305	15,747	4,768	40,750	37,792	152,371	7,727	17,930	14,347