

**RB36**  
**University System of Maryland Office**  
**University System of Maryland**

***Capital Budget Summary***

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**State-owned Capital Improvement Program**  
(\$ in Millions)

<b>Projects</b>	<b>Prior Auth.</b>	<b>2017 Request</b>	<b>2018 Est.</b>	<b>2019 Est.</b>	<b>2020 Est.</b>	<b>2021 Est.</b>	<b>Beyond CIP</b>
Southern Maryland Regional Higher Education Center	\$4.200	\$3.061	\$0.000	\$36.100	\$38.600	\$0.000	\$0.000
Biomedical Sciences and Engineering Facility	14.016	0.000	0.000	0.000	16.000	122.500	30.484
<b>Total</b>	<b>\$18.216</b>	<b>\$3.061</b>	<b>\$0.000</b>	<b>\$36.100</b>	<b>\$54.600</b>	<b>\$122.500</b>	<b>\$30.484</b>

<b>Fund Source</b>	<b>Prior Auth.</b>	<b>2017 Request</b>	<b>2018 Est.</b>	<b>2019 Est.</b>	<b>2020 Est.</b>	<b>2021 Est.</b>	<b>Beyond CIP</b>
GO Bonds	\$17.216	\$3.061	\$0.000	\$36.100	\$54.600	\$122.500	\$30.484
Nonbudgeted Funds	1.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>Total</b>	<b>\$18.216</b>	<b>\$3.061</b>	<b>\$0.000</b>	<b>\$36.100</b>	<b>\$54.600</b>	<b>\$122.500</b>	<b>\$30.484</b>

CIP: *Capital Improvement Program*  
GO: general obligation

**Grant and Loan *Capital Improvement Program***  
 (\$ in Millions)

<b>Program</b>	<b>2015 Approp.</b>	<b>2016 Approp.</b>	<b>2017 Request</b>	<b>2018 Est.</b>	<b>2019 Est.</b>	<b>2020 Est.</b>	<b>2021 Est.</b>
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Capital Facilities Renewal	\$17.000	\$17.000	\$17.000	\$17.000	\$17.000	\$17.000	\$17.000
<b>Total</b>	<b>\$17.000</b>	<b>\$17.000</b>	<b>\$17.000</b>	<b>\$17.000</b>	<b>\$17.000</b>	<b>\$17.000</b>	<b>\$17.000</b>

<b>Fund Source</b>	<b>2015 Approp.</b>	<b>2016 Approp.</b>	<b>2017 Request</b>	<b>2018 Est.</b>	<b>2019 Est.</b>	<b>2020 Est.</b>	<b>2021 Est.</b>
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Revenue Bonds	\$17.000	\$17.000	\$17.000	\$17.000	\$17.000	\$17.000	\$17.000
<b>Total</b>	<b>\$17.000</b>	<b>\$17.000</b>	<b>\$17.000</b>	<b>\$17.000</b>	<b>\$17.000</b>	<b>\$17.000</b>	<b>\$17.000</b>

### ***Summary of Issues***

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**Research Space Guidelines:** The State guidelines used to calculate research space needs at institutions have not been reevaluated or revised since developed in 1999 and do not reflect current research practices. This results in the research space needs of an institution being significantly overestimated.

### ***Summary of Recommended Bond Actions***

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1. University of Maryland System  
 Adopt committee narrative requesting revised research space guidelines.
2. Southern Maryland Regional Higher Education Facility  
 Approve continued funding of the Southern Maryland Regional Higher Education Center.

## ***Budget Overview***

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### **Southern Maryland Regional Higher Education Center**

This project will provide a third academic facility on the Southern Maryland Higher Education Center (SMHEC) campus to support new education, research, and professional training programs. Language was included in the 2013 capital budget providing \$1.5 million to the University System of Maryland Office and \$250,000 grant to the Southern Maryland Navy Alliance and Board of Commissioners of St. Mary's County to design the new facility. Restrictive language was placed on the \$1.5 million appropriation requiring a formal agreement between the Southern Maryland Higher Education Council and the Southern Maryland Navy Alliance on the roles and responsibilities of each in the construction and operation of the facility and a report assessing the educational needs in Southern Maryland. The Memorandum of Understanding and report were submitted in December 2013, in which it was recommended that the scope of the project be expanded from 38,121 gross square feet (GSF)/23,108 net assignable square footage (NASF) to 84,388 GSF/50,633 NASF to include more engineering teaching laboratories and research space. As a result, the estimated cost of the project increased from \$13.4 million to \$78.3 million as programmed in the 2015 *Capital Improvement Program* (CIP). Language was added in the 2014 and 2015 capital budget providing \$1.0 million and \$0.5 million, respectively, to continue design of the project. The cost of the project increased to \$82.0 million in the 2016 CIP due to the inclusion of the auditorium, which will be funded with a \$1.0 million contribution from St. Mary's County, and an increase in equipment costs.

The facility will support local and regional initiatives related to Unmanned Autonomous Systems (UAS) which, due to its location near the Naval Air Warfare Center Aircraft Division at Patuxent River, is expected to generate significant UAS activity in the tri-county region of Calvert, Charles, and St. Mary's counties. In addition, the University of Maryland, College Park (UMCP) has established a test site for UAS at the St. Mary's County Regional Airport as part of the Mid-Atlantic Aviation Partnership with Virginia and New Jersey.

The facility will increase the availability of undergraduate engineering programs by expanding existing programs and offering new programs. UMCP plans to start offering an undergraduate electrical engineering program in fall 2016, primarily for Navy personnel, limiting enrollment to 10 students. The Naval Air Weapons Aviation Center has agreed to provide 10 full scholarships when the program begins in fall 2016. While the current facilities do not have the research or laboratory space needed to support the electrical engineering program, UMCP will retrofit existing classroom space into laboratory space. While not ideal or a permanent solution, the retrofitted laboratory can work for the short term. Once the new facility is completed, UMCP plans to expand enrollment in the electrical engineering program to 20 students. Specialized research space is needed to conduct flight testing of UAS, which needs space that has 20-foot ceilings. Research conducted at the new facility will support UMCP UAS test site and the Navy, in which it is estimated that within 8 to 10 years, research funding could range from \$3 million to \$5 million annually.

Classrooms in the two buildings at SMHEC are too small with only three rooms able to accommodate a maximum of 32 students. However, institutions offering programs at SMHEC require larger classrooms that can accommodate 36 students. The new facility includes five classrooms that can hold 36 students. Furthermore, the additional classroom space will allow for the expansion of other academic programs, increasing the number of program offerings from 86 to 105 graduate and upper-division bachelor degree programs.

The facility will also provide additional conference space to accommodate demand for training programs and conferences. SMHEC held 1,262 training programs serving approximately 87,500 people between fiscal 2011 and 2015. In fiscal 2015, SMHEC turned away 31 events due to the lack of space. The facility includes a 330-seat auditorium that will be funded by St. Mary's County.

Overall, the facility will provide 12,797 NASF and 6,230 NASF of classroom and instructional laboratory space, respectively; 14,175 NASF of research space; 5,280 NASF of conference space; and 4,903 NASF of office space.

## **Capital Facilities Renewal**

This annual facilities renewal program provides funding for infrastructure improvements at various facilities at the University System of Maryland (USM) institutions. Capital facilities renewal funds are allocated among institutions on a pro rata share of self-reported replacement costs for all State-funded academic facilities. Funding for fiscal 2017 includes \$17 million in revenue bonds that will enable USM to undertake 32 projects at 11 institutions.

The consequences of not keeping up with facilities renewal projects are that aging buildings need more frequent and expensive maintenance work; electrical and mechanical systems become less effective, impacting academic and research activities; and the eventual failure of the facility leading to closure or loss of space. As of fall 2013, the GSF of all USM facilities totaled 39.0 million, of which 21.9 million GSF are State-supported space with a replacement value of \$7.5 billion. UMCP has the most square footage of any institution, totaling 13.9 million, including 7.8 million GSF of State-supported space. The University of Maryland, Baltimore (UMB) has the second highest square footage totaling 6.5 million, which includes 4.0 million GSF of State-supported space. USM estimates that the current backlog of deferred maintenance is \$1.8 billion, with UMCP comprising 37.9%, or \$670.9 million, of the backlog as shown in **Exhibit 1**.

A priority of USM is to maintain an adequate annual investment in the maintenance and renewal of its capital assets, and its policies are intended to reduce the existing backlog of deferred maintenance. To this end, the USM Board of Regents (BOR) adopted a policy for annual operating facility renewal spending based on a target guideline of 2.0% of the replacement value of campus buildings in which the institution's annual operating expenditures increase by 0.2% unless there are "systemwide funding constraints." However, facility renewal operating expenditures from fiscal 2007 to 2016 grew, on average, only 0.5% and declined 27.8%, or \$17.5 million, between fiscal 2010 and 2014, as shown in **Exhibit 2**. This is partly because in times of budget shortfalls, institutions typically first turn to reducing spending on facilities renewal projects. In fiscal 2014, total expenditures, including Academic

Revenue Bonds (ARB), reached a low of \$62.3 million. While the amount of operating expenditures increased by \$6.2 million in fiscal 2015, it decreased by \$4.4 million in fiscal 2016. In fiscal 2017, spending on facilities renewal is budgeted to increase by \$10.0 million reflecting renewal as a priority of BOR and the Chancellor, in which Presidents will be held accountable for meeting the BOR target of annually increasing expenditures on renewal until it reach the 2.0% target.

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**Exhibit 1**  
**Building-related Deferred Maintenance Backlog**  
**(\$ in Thousands)**

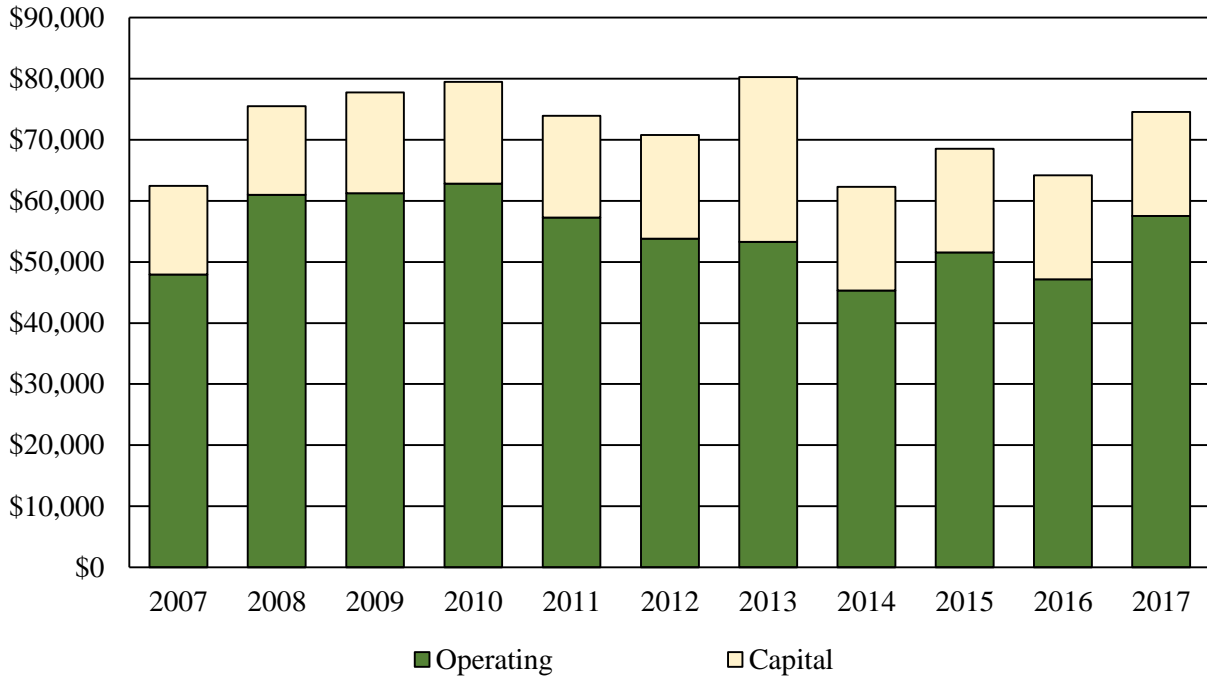
University of Maryland, College Park	\$670,947,171
University of Maryland Baltimore County	189,354,795
Towson University	182,275,000
University of Maryland, Baltimore	220,387,093
Salisbury University	119,133,315
Bowie State University	100,342,905
Coppin State University	85,183,000
University of Maryland Eastern Shore	60,266,520
University of Baltimore	55,886,136
Frostburg State University	45,207,750
University of Maryland Center for Environmental Science	43,023,420
<b>Total</b>	<b>\$1,772,007,105</b>

Note: Estimated backlog reflects maintenance/repairs and required replacements delayed to the future for budgetary reasons. Maintenance is preventative work, and repair is to restore damaged or worn-out facilities or systems to normal operating condition. Capital renewal amount is for facilities and systems that are past their useful life and, therefore, in a “deferred” status. Does not include planned capital maintenance or corrections to address programmatic obsolescence and modernization.

Source: University System of Maryland

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**Exhibit 2**  
**Operating and Capital Spending on Facility Renewal**  
**Fiscal 2007-2017**  
**(\$ in Thousands)**

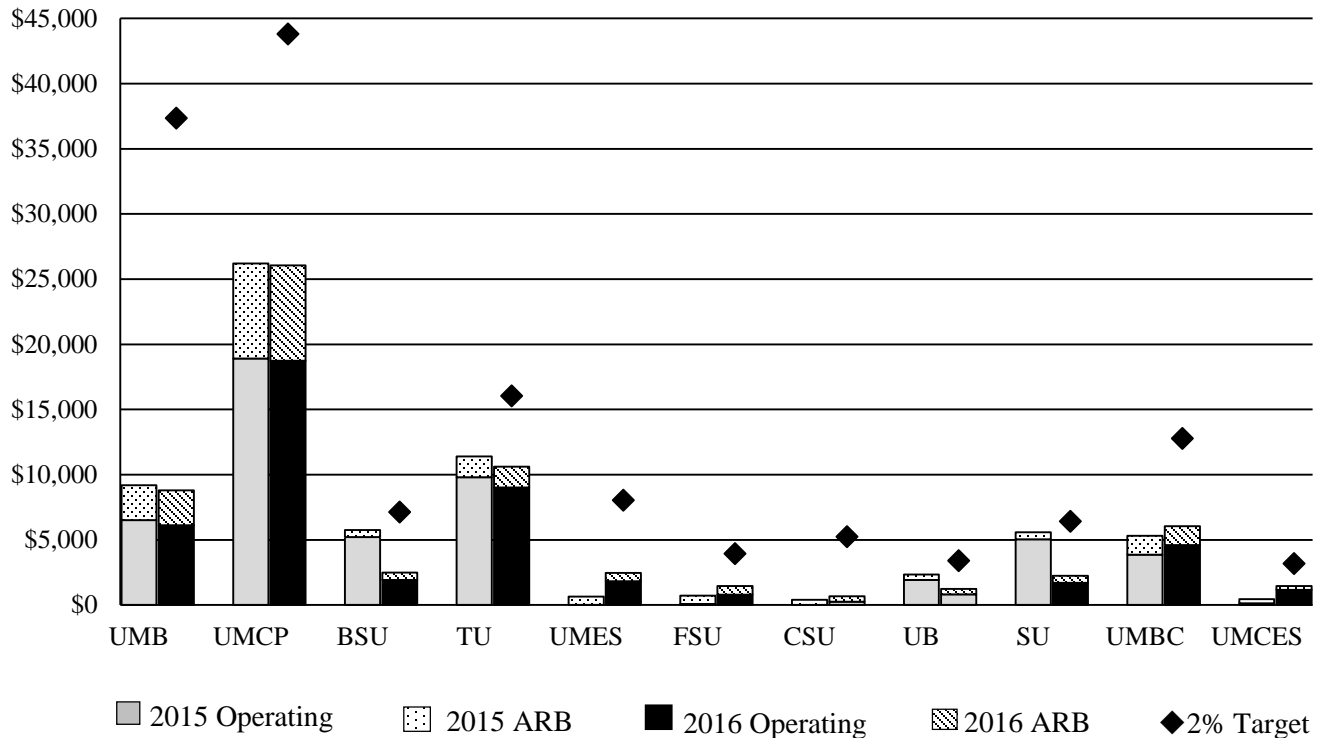


Note: Fiscal 2013 includes a one-time \$10 million authorization of general obligation bond funding to fund renewal projects at institutions.

Source: University System of Maryland

**Exhibit 3** shows the allocation of the fiscal 2015 and 2016 operating expenditures and ARBs for facilities renewal and the 2.0% target. In order for USM to meet the 2.0% target, institutions would need to spend a total of \$150.6 million on deferred maintenance. In fiscal 2016, expenditures totaled \$64.2 million, equivalent to 0.9% of the replacement value of State-supported assets, which is \$4.4 million less than was spent in fiscal 2015. UMCP and Towson University (TU) accounted for 54.9% of the facility renewal expenditures in fiscal 2015, but in fiscal 2016, both decreased expenditures by 0.6% and 6.8%, respectively. Despite this reduction, spending in fiscal 2016 is equivalent to 1.2% and 1.3% of the replacement values to State-supported space at UMCP and TU, respectively. Coppin State University and the University of Maryland Eastern Shore did not use any operating budget funds in fiscal 2015 for facility renewal and, instead, relied on their shares of the ARBs to fund projects.

**Exhibit 3**  
**University System of Maryland**  
**Operating and Capital Facility Renewal Expenditures**  
**Fiscal 2015-2016**  
**(\$ in Thousands)**



ARB: Academic Revenue Bonds  
 BSU: Bowie State University  
 CSU: Coppin State University  
 FSU: Frostburg State University  
 SU: Salisbury University  
 TU: Towson University

UB: University of Baltimore  
 UMB: University of Maryland, Baltimore  
 UMBC: University of Maryland Baltimore County  
 UMCES: University of Maryland Center for Environmental Sciences  
 UMCP: University of Maryland, College Park  
 UMES: University of Maryland Eastern Shore

Note: UMCP includes \$5 million in general obligation bonds and \$5 million in ARBs to fund campuswide building system and infrastructure improvements; UMUC does not have a spending target due to the unique nature of its facilities profile, which includes leased buildings and buildings that are off-campus or outside of the State.

Source: University System of Maryland

Institutions also transfer operating funds to the plant fund to be used on deferred maintenance projects that will address the \$1.8 billion backlog. Plant funds are a group of accounts similar to a savings account, in which institutions can set aside funds from the operating budget to be used for

anticipated capital expenditures. As shown in **Exhibit 4**, the total State-supported plant fund balance for deferred maintenance totals \$87.6 million in fiscal 2016 with TU and Bowie State University accounting for 52.0%, or \$45.5 million, with \$27.3 million and \$18.3 million, respectively, in the plant fund. These funds are designated for specific renewal projects such as infrastructure upgrades; window replacement; and replacement of heating, ventilation, and air conditioning systems.

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**Exhibit 4**  
**State-supported Plant Fund for Deferred Maintenance**  
**Fiscal 2016**  
**(\$ in Thousands)**

University of Maryland, Baltimore	\$13,016
University of Maryland, College Park	13,347
Bowie State University	18,253
Towson University	27,279
University of Maryland Eastern Shore	7,286
Frostburg State University	1,445
Coppin State University	0
University of Baltimore	1,301
Salisbury University <sup>1</sup>	0
University of Maryland University College	0
University of Maryland Baltimore County	5,655
<b>Total</b>	<b>\$87,581</b>

<sup>1</sup> Salisbury University lists specific projects rather than categorize funds as part of the deferred maintenance funds.

Source: University System of Maryland

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## *Issues*

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### **1. Research Space Guidelines**

The purpose of facilities planning is to develop an affordable, feasible plan that will meet the future needs of an institution by identifying type, quantity, and location of spaces needed by departments. In order to develop a plan, an institution needs to accurately evaluate the current and projected space needs of a program or department. The first step is to inventory the current space and compare it to guidelines to determine if a department has a space surplus or deficit. Guidelines are then used to project space needs based on projected growth of a department, *i.e.*, enrollment growth is used to calculate future need for classroom space. However, determining the current and future research space needs is more complex than calculating classroom space needs due to the diverse types of research conducted among departments, in which some require large, specialized laboratory space while others need space for computer workstations.

#### **Maryland Guidelines**

In Maryland, the public four-year institutions are required to annually submit their current space inventories through the *Facilities Inventory Report* to the Maryland Higher Education Commission (MHEC). Data in this report is used as a basis to calculate the current and projected academic and research space needs in the Space Guidelines Application Program. Projected space inventories are calculated by adding or deleting space based on capital projects expected to be completed within 10 years. Current and projected 10-year enrollment growth is used to calculate the academic space needs of institutions. Research space needs are based on full-time (FT) faculty and the projected growth in research faculty. Once the space allowance for academic and research space is calculated, it is compared to the current inventory to determine if an institution has a surplus or deficit in a particular category (*i.e.*, classroom, teaching laboratory, research, and office space).

In 2006, MHEC reevaluated and revised the space guidelines for academic space because similar factors were used to determine needs and calculate projections. The standards for research space were not reviewed because it required the use of other factors for measurement and projections that “have never been completely reviewed to determine whether they are the best and most valid factors to use.” The current research space guidelines were developed in 1999 and are not reflective of the current practices such as the increase in collaborative research between disciplines or do not account for the varying research space needs of programs, which can range from computer workstations to a large engineering laboratory. As shown in **Exhibit 5**, the guidelines are based on two modules that are determined by the discipline of the FT faculty member, prorated by the terminal degree offered in that discipline.

Using outdated guidelines could result in the research space deficit at an institution being overstated, as illustrated in **Exhibit 6**. In fiscal 2013, UMB’s deficit is twice the current inventory, while UMCP’s deficit exceeds the current inventory.

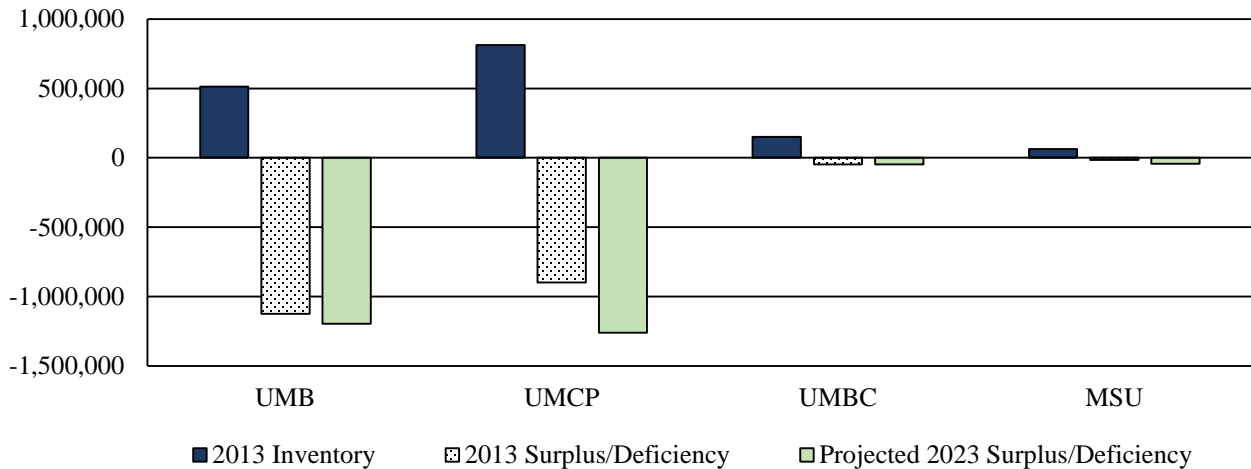
### Exhibit 5 Maryland’s Research Space Guidelines

<u>Module</u>	<u>Discipline</u>	<u>Limits</u>
1,000 NASF	Agriculture and Natural Resources; Biological Sciences; Engineering; Fine and Applied Arts	One module per full-time faculty in disciplines that award doctorates; one-half for those with master’s as the highest degree; and one-tenth when a bachelor’s is the highest degree awarded
650 NASF	Architecture and Environmental Design; Health Professions; Home Economics; Physical Science; and Psychology	

NASF: net assignable square footage

Source: *Maryland Capital Improvement Planning Process and Capital Facilities Space Guidelines for Higher Education*, 2006; Maryland Higher Education Commission

### Exhibit 6 Research Space Inventory and Deficit Fiscal 2013 and Projected 2023



MSU: Morgan State University  
UMB: University of Maryland, Baltimore

UMBC: University of Maryland Baltimore County  
UMCP: University of Maryland, College Park

Source: Maryland Higher Education Commission, *Four-year Public Colleges and Universities Space Surplus/Deficiency*, Fall 2013, Projected 2023

## Other Approaches

In developing space guidelines, other states and systems reviewed procedures and standards used at other research institutions. In general, research space guidelines are either calculated based on (1) research expenditures per faculty (FT or equivalent); or (2) discipline per faculty, for example, the allowance for economics faculty is 20 assignable square footage (ASF), while mechanical engineering is 300 ASF. **Exhibit 7** provides a comparison of research space guidelines at a few systems and research institutions.

### Exhibit 7 Selected Systems and Institution’s Research Space Guidelines

<u>System/Institution</u>	<u>Approach</u>	<u>Allowance</u>
Utah	ASF/FTE varies by type of institution; applied at an institutional level; and considered averages	Research institutions: 465 ASF/FTE Nonresearch institutions: 35 ASF/FTE
Minnesota	ASF/headcount faculty involved in research	20 to 600 ASF depending on discipline
California (Berkeley)	ASF/FT faculty and student researcher; six categories based on type of research	50 to 750 ASF; total includes office and research space
Stanford (Private)	Space module per principle investigator based on one of five types of research laboratory	Modules based on type of research laboratory <i>i.e.</i> , wet, dry, computer, and instrumentation laboratories

ASF: assignable square footage  
FTE: full-time equivalent

Source: University System of Maryland

At the request of the Department of Legislative Services (DLS), USM calculated the research space needs at its three research institutions using the Maryland model and one of the models shown in Exhibit 7. As shown in **Exhibit 8**, the Maryland guidelines greatly over estimate the amount of research space needed when compared to other models. **Given these preliminary results, DLS recommends that USM, MHEC, the Department of Budget and Management, and Morgan State University develop research space guidelines that more accurately reflect the space needs of the research being conducted at the institutions.**

**Exhibit 8**  
**Projected Research Space Deficit**  
**Comparison of Maryland to Other Models**

<u>Institution</u>	<u>Model</u>	<u>Maryland</u>	
University of Maryland, Baltimore	Utah	-834,575 ASF	-1,618,188 NASF
University of Maryland, College Park	Minnesota	Ranges from 98,520 ASF to -385,630 ASF	-884,673 NASF
University of Maryland Baltimore County	California	-102,458 ASF	-203,000 NASF

Source: University of Maryland, Baltimore; University of Maryland, College Park; University of Maryland Baltimore County

***Summary of Other Projects in the Capital Improvement Program***

**Projects Deferred in Fiscal 2017**

As shown in **Exhibit 9**, initial construction funding for the Biomedical Sciences and Engineering Facility at the Universities of Shady Grove is deferred from fiscal 2017 to 2020. The General Assembly included language in the 2012 capital budget pre-authorizing \$5.0 million in fiscal 2014 to begin design of the facility. The 2013 CIP programmed \$6.0 million in fiscal 2015 to continue design of the facility; however, based on the expected cash flow requirement, only \$4.3 million was needed. In fiscal 2016, \$4.7 million was provided to complete design of the facility. The 2016 CIP programs \$16.0 million for construction in fiscal 2020.

The Governor’s rationale for moving the commencement of the construction phase back four years reflects the decision to make room for other capital priorities identified by the Administration while also remaining within limits established for new GO bond authorization. The Governor’s 2016 CIP, which limits new GO bond authorizations to \$995.0 million for each of the five years of the plan, results in a significant reduction from what was programmed in the 2015 CIP. This necessitated reprogramming the timing of planned funding for some projects. In as much as this project was programmed in the 2015 CIP to receive a significant level of funding, \$72.0 million in fiscal 2017 and another \$56.0 million in fiscal 2018, it was easier to move this project further back in the five-year CIP than to revise the timing of funding for a multiple number of other smaller projects. While the decision to defer the Biomedical Sciences and Engineering Facility at the Universities of Shady Grove may have been consistent with the drafting of a five-year CIP that stays within the Governor’s limits for new GO bond authorizations while funding other priorities, the project is cued up to begin the construction

phase at the beginning of fiscal 2017. Delaying the start of construction for this project until the tail end of fiscal 2020 is estimated to require an additional \$21.5 million, which reflects both the need to extend the design contract through project completion as well as the impact of an additional four years of inflationary increases used by the cost centers in determining estimated total project costs.

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**Exhibit 9  
Projects Deferred  
Fiscal 2017**

<b><u>Project</u></b>	<b><u>Description</u></b>	<b><u>Reason for Deferral</u></b>
Biomedical Sciences and Engineering Facility	Construct a new building to provide specialized laboratory space for new and existing programs.	To remain within State debt affordability ratios.

Source: Department of Budget and Management, 2016 *Capital Improvement Program*

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## ***GO Bond Recommended Actions***

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1. Adopt the following committee narrative:

**Revising Research Space Guidelines:** Public four-year institutions are required to annually submit their current space inventories through the Facilities Inventory Report to the Maryland Higher Education Commission (MHEC). This data is used as the basis to calculate the current and projected academic and research space needs of an institution. While the academic space standards were reevaluated and revised in fiscal 2009, the research space guidelines have not been reevaluated or revised since being developed in fiscal 1999 and, therefore, are not reflective of current research practices such as the increase in collaborative research between disciplines or do not account for the varying research space needs of programs, which can range from computer workstations to a large engineering laboratory. When comparing the results of Maryland’s model to that used by other systems or institutions, the Maryland model greatly overestimates the needed research space. Therefore, the budget committees request that the University System of Maryland, MHEC, the Department of Budget and Management, and Morgan State University develop and recommend research space guidelines that more accurately reflect the space needs for researchers. The report should be submitted to the budget committees by December 15, 2016.

<b>Information Request</b>	<b>Authors</b>	<b>Due Date</b>
Revising research space guidelines	University System of Maryland MHEC Morgan State University Department of Budget and Management	December 15, 2016

2. Approve \$3.1 million in general obligation bonds to continue design of a third building on the Southern Maryland Regional Higher Education campus.