RB22
University of Maryland, College Park
University System of Maryland

Capital Budget Summary

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

Projects	*Prior Auth.*	*2016 Request*	*2017 Est.*	*2018 Est.*	*2019 Est.*	*2020 Est.*	*Beyond CIP*
Edward St. John Learning and Teaching Center	$36.280	$70.650	$5.100	$0.000	$0.000	$0.000	$0.000
Campuswide Building System and Infrastructure Improvements	35.000	10.000	0.000	0.000	10.000	10.000	70.000
New Bioengineering Building	16.960	1.000	67.850	88.100	0.000	0.000	0.000
Human Performance and Academic Research Facility	0.000	7.000	6.950	43.050	49.000	49.000	0.000
Brendan Iribe Center for Computer Science and Innovation	3.700	7.100	0.000	45.800	85.950	0.000	0.000
Total	**$91.940**	**$95.750**	**$79.900**	**$176.950**	**$144.950**	**$59.000**	**$70.000**

Fund Source	*Prior Auth.*	*2016 Request*	*2017 Est.*	*2018 Est.*	*2019 Est.*	*2020 Est.*	*Beyond CIP*
GO Bonds	$56.230	$76.650	$50.450	$90.100	$72.550	$25.000	$35.000
Revenue Bonds	15.000	5.000	15.000	15.000	15.000	5.000	35.00
Nonbudgeted Funds	20.710	14.100	14.450	71.850	57.400	29.00	0.000
Total	**$91.940**	**$95.750**	**$79.900**	**$176.950**	**$144.950**	**$59.000**	**$70.000**

CIP: *Capital Improvement Program*
GO: general obligation

For further information contact: Sara J. Baker Phone: (410) 946-5530

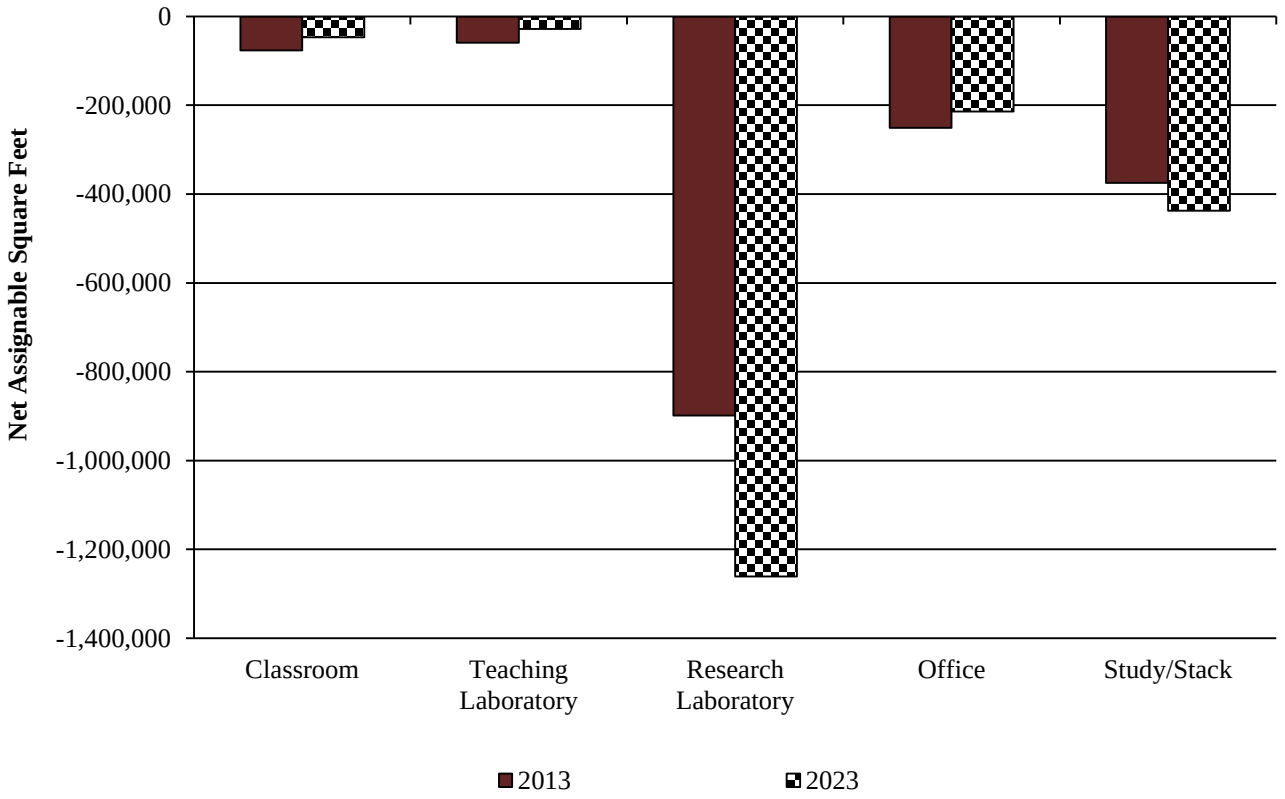
Summary of Recommended Bond Actions

		Funds
1.	Campuswide Building System and Infrastructure Improvements Approve continued funding of improvements to the building system and infrastructure.	
2.	Edward St. John Learning and Teaching Center Approve continued funding of the construction and expansion of the St. John Center.	
3.	Human Performance and Academic Research Facility Reduce funding for design by $3 million.	$3,000,000 GO
4.	New Bioengineering Building Delete funds to begin construction.	$1,000,000 GO
5.	High Speed Data Computing Infrastructure Improvements Add funds to improve computing data network systems.	-$1,017,000 GO
6.	Section 2 – High Performance Computing Data Center Reduce the authorization to allow the funds to be reprogramed.	-$1,017,000 DA
7.	Section 12 – University of Maryland, College Park – Edward St. John Learning and Teaching Center Approve pre-authorization to complete construction.	
8.	Section 12 – University of Maryland, College Park – New Bioengineering Building Approve pre-authorization of $45.5 million for construction.	
9.	Section 13 – University of Maryland, College Park – New Bioengineering Building Approve pre-authorization of $63.1 million to continue construction.	
	Total Reductions	**$2,983,000**

Performance Measures and Outputs

The University of Maryland, College Park (UMCP) has an overall classroom and teaching laboratory space deficit of 135,463 net assignable square feet (NASF) as of fall 2013, as shown in **Exhibit 1**. According to the Maryland Higher Education Commission (MHEC), the classroom deficit will be eased by fiscal 2023 decreasing by 29,943 NASF. However, UMCP will still have a deficit of 46,582 NASF, which is based on MHEC's projection of 0.01% enrollment growth in full-time day equivalent students. Furthermore, it is estimated that UMCP's research space deficit will worsen to 1.3 million NASF by fiscal 2023.

Exhibit 1
Academic and Research Space Deficiency
Fiscal 2013 and Projected Fiscal 2023



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

Budget Overview

Edward St. John Learning and Teaching Center

The Edward St. John Learning and Teaching Center (St. John Center) will provide technologically advanced classroom space, replacing eight large obsolete lecture halls that are located in several buildings. In addition, the St. John Center will include nine general chemistry laboratories. Originally, UMCP planned a multi-phase renovation of the chemistry building that would be completed in small phases due to the lack of permanent relocation and/or surge space. However, the construction of the St. John Center afforded UMCP the opportunity to expand the project and incorporate teaching chemistry laboratories into the design of the facility, thereby allowing for concurrent construction of the projects. In order to facilitate the modifications to the St. John Center, UMPC used $1.5 million of institutional funds to include the teaching laboratories into the design of the facility.

While the 2014 *Capital Improvement Program* (CIP) reflected the change in scope to expand the St. John Center to include the chemistry laboratories, funding for construction of the laboratories was programmed in fiscal 2017 and 2018. As programmed in the 2014 CIP, the expansion would occur a year after construction was completed on the St. John Center, thereby losing economies of scale. This would result in an increase in cost and time, including expenses related to additional site work; demolition of a portion of the exterior wall to connect to the new addition; and due to a lack of integration with the St. John Center, the addition would be larger to accommodate stairs and mechanical space. Furthermore, construction of the expansion would be disruptive to the classes occurring in the St. John Center and most likely would have resulted in a suspension of holding classes in many of the rooms during construction. Due to these factors, language was added to the fiscal 2015 capital budget to align the construction of the St. John Center and the chemistry laboratories, with funding increasing by $11.6 million to complete design and start construction. Furthermore, pre-authorizations for fiscal 2016 and 2017 were amended to $65.7 million and $5.1 million, respectively, to reflect the increase in the costs associated with the expansion of the St. John Center.

Another factor increasing the cost of the project was related to changes in the scope and an escalation in costs due to extending the project schedule. A re-evaluation of the Part II program from 2002 found several issues, such as the original program provided an average size of 18 NASF per seat for classrooms, but in order to provide adequate space for current and future learning (which is more collaborative and makes more use of technology than a decade ago), 24 NASF per seat is required. Additionally, it was determined that the original plan to fully utilize 27,400 gross square feet (GSF) of Holzapfel Hall was not feasible because even the smallest of the planned classrooms were too large to fit within the limited dimensions of Holzapfel Hall. Overall, only about one-third of the facility will be renovated with UMCP using $6.0 million in institutional funds to renovate the front portion of the facility that will be used for offices. Overall, this resulted in a larger project requiring more construction and less renovation, thereby increasing the cost by $11.9 million.

The 2015 capital budget provides $70.7 million to continue construction, and $5.1 million is programmed in fiscal 2017 to finish construction and equip the facility. Besides the $7.5 million of institutional funds, the project leverages $10.0 million in private donations. The total cost of the project is $112.0 million.

The project addresses UMCP's insufficient and poorly configured lecture hall space and poor quality classroom laboratory space. In the currently used lecture halls, sight lines are blocked by support columns causing blind spots. This, combined with low ceilings, prevents installation of audiovisual equipment, requiring faculty to post information in multiple locations to ensure that all students can view the material. Since many of the classrooms were constructed prior to the integration of technology into the buildings, rooms cannot support the use of computers, teleconferencing, or video equipment.

The center will not only address UMCP's classroom deficit by providing 43,152 NASF of classroom space but will also alleviate a shortage in mid- and large size rooms that can accommodate 50 to 500 students. For fall 2014, the room utilization rate was 75% for classrooms with 50 to 74 seats; 71% for classrooms with 150 to 199 seats; 70% for classrooms with 300 to 399 seats; and 87% for classrooms with 400 to 499 seats. The rate indicates the percentage of time that a room is being used between 8:00 a.m. and 5:00 p.m. during the weekdays. The recommended rate for any size classroom is 67%. The higher the percentage, the harder it is to offer classes at convenient times, relocate classes during emergencies, or hold events. Current utilization rates of large classrooms provide little to no flexibility in scheduling, leading to the cancellation of classes due to the lack of usable space.

Classroom laboratories in Wing I of the Chemistry building are heavily used, aging, and require updates or replacement. The ventilation system cannot properly dilute indoor air containments, control odors, reduce humidity, or provide the required number of air changes per hour, creating life safety hazards. Most of the fume hoods and exhaust systems are original and inadequate to provide the level of safety expected in a modern chemistry facility. There is no cooling capacity with temperatures in the research and teaching laboratories exceeding 90 degrees in the summer. While window air conditioners have been installed, the building does not have enough electrical capacity to support the current units or to distribute them throughout the building. Most of the electrical system needs to be replaced; there is no capacity to expand, and the wiring presents a fire hazard. Furthermore, the piping systems are original and, as a result, the potable water system and water pressure is erratic, resulting in flooding and damage to laboratory equipment.

Laboratory space is outdated and does not adequately support the needs of modern chemistry teaching. Many of the teaching laboratories are still configured for the learning pedagogy of the 1950s rather than the discovery-based or group-based teaching methods currently used in chemistry instruction. Some teaching space has been updated to better support modern teaching methods, but the inadequate space does not allow for optimal safety (*i.e.*, limited circulation space around student workstations and fume hoods increases the risk of accidents).

The expanded St. John Center includes the renovation of 27,400 GSF and the construction of 159,015 GSF of new space, resulting in an 186,415 GSF/89,771 NASF facility. The facility will provide 43,152 NASF classroom space, which includes 14 large classrooms and 5 small seminar rooms and 22,082 NASF of teaching laboratory space, which includes 9 laboratories.

Campuswide Building System and Infrastructure Program

The 2015 capital budget provides a fifth year of funding for campuswide building system and infrastructure improvements to address the backlog of deferred maintenance, particularly those related to UMCP's failing infrastructure. Since fiscal 2013, $10 million in funding has been provided annually, equally from general obligation (GO) and revenue bonds, which continues into fiscal 2016. The estimated cost for the upgrades and improvements to the infrastructure totals $135 million over a 14-year period. However, the 2015 CIP defers funding in fiscal 2017 and 2018 to accommodate other university priorities. **The President should comment on the two-year interruption in funding and the impact on current and planned projects and the possibility of using other funds to fund these projects in fiscal 2017 and 2018.**

Projects for fiscal 2016 include the following: $4.7 million for three heating, ventilation, and air conditioning infrastructure improvements; $3.0 million to replace emergency generators; $1.0 million for stormwater draining system repair and replacement; $0.5 million to replace exterior security lighting; $0.5 million for roof repair and replacement; and $0.3 million for elevator systems repair.

This project addresses the urgent needs arising from $907 million in deferred maintenance backlog, which includes $738 million for State-supported buildings and $169 million for exterior infrastructure. Overall, 34% of UMCP's State-supported space had not had a major renovation in more than 40 years. Funding for facilities renewal over the years has not been sufficient to address the steadily increasing needs of an aging campus with a deteriorating infrastructure. Projects are classified into two categories – infrastructure and building systems. Infrastructure includes work outside of the buildings, such as replacing underground heating, cooling, and water piping; repairing building foundations; and replacing exterior security lighting and cameras. Building system projects include the installation or upgrade of the life safety systems. Current systems compromise UMCP's ability to ensure the safety of faculty, staff, students, and visitors.

New Bioengineering Building

The New Bioengineering Building will house the Robert E. Fischell Department of Bioengineering and the Institute for Biomedical Devices providing needed space allowing for the continued expansion and growth of the Bioengineering program. Since the 2014 CIP, the projected cost of the facility increased $37.0 million from $137.0 million to $174.0 million due to the addition of a sixth floor, which will house an animal care facility. The project leverages $20.0 million in private donations and $1.9 million in institutional funds.

The General Assembly included $5.0 million in each of the 2012 and 2013 capital budgets to complete design of the facility. In neither instance were these funds programmed in the CIP, but instead, the funding was advanced by the General Assembly. As such, the funds programmed in the 2013 CIP to complete design were not needed and were taken out of the 2014 CIP. Construction funding was deferred from fiscal 2015 to 2017 in the 2014 CIP and was programmed to be split funded over fiscal 2017 and 2018, totaling $108.6 million. However, the General Assembly accelerated the

project schedule and added language in the 2014 capital budget to provide $2.5 million to begin construction and also required UMCP to provide an equal and matching fund from either UMCP or a nonbudgeted fund source. In addition, language was included to provide pre-authorizations of $42.2 million and $41.4 million for the Maryland Consolidate Capital Bond Loan of 2015 and 2016, respectively. However, the 2015 capital budget only provides $1.0 million for construction in fiscal 2016 to show a continued commitment of the State to fund the project. **Since these funds are not sufficient to start construction the Department of Legislative Services (DLS) recommends deleting $1.0 million provided for construction in the 2015 capital budget bill.** Construction funding of $65.4 million and $68.8 million is programmed in the 2015 CIP for fiscal 2017 and 2018, respectively.

The facility will include research and instructional laboratories, classrooms, office space, and animal care facilities addressing several issues constraining the growth of the Bioengineering program including the following: lack of space and specialized facilities; separated location of functions; and inadequate and insufficient animal care space. The rapid expansion of the Department of Bioengineering has led them to outgrow their current space. It is projected the department will increase from 34 faculty, 10 staff, and 398 majors in fiscal 2012 to 58 faculty, 19 staff, and 600 majors by fiscal 2021. The newly created Fischell Institute of Biomedical Devices is expected to have 24 faculty and 18 staff by fiscal 2021. Research expenditures are also projected to increase from $5.4 million in fiscal 2011 to $24.5 million in fiscal 2021.

Currently, the department is housed in four buildings totaling 30,926 NASF, which lack state-of-the-art research space and equipment it needs to be competitive. There is also a lack of innovation space that is an open, flexible laboratory and construction space where faculty, students, and industrial partners can construct prototypes of their ideas while working on commercializing their products. It will include classrooms, laboratories, and conference rooms designed to support innovation creation. The facility will provide collaboration and display space for project-based curriculum that requires student, faculty, and researchers to work together to develop ideas, solve problems, and engage in collaborative activities, as well as, space to display student research projects. Furthermore, being located in multiple buildings requires faculty and staff to travel between buildings to conduct administrative procedures and hinders collaboration. The department will vacate 23,845 NASF of existing space in four buildings that will be used to address other space needs.

The facility will include team-based project space. All engineering majors participate in one or more team-based design courses in which teams build prototypes of their designs. Current space is overcrowded, and bioengineering students do not have any dedicated space for fabrication and prototyping.

Bioengineering research is increasingly relying on the use of small animals, but the program has no dedicated small animal holding and procedure space. When space is needed, researchers borrow space from other researchers, and if space is available, it is not adequate to meet their needs, thereby limiting the type of research that can be conducted. Furthermore, UMCP has multiple animal care facilities located across campus. This makes animal care difficult and inefficient in implementing quality care and consistent rearing conditions and requires redundant support facilities increasing the operational costs. If the current inadequacies of its current facilities are not addressed, UMCP is at risk of losing its Association for Assessment and Accreditation for Laboratory Animal Care accreditation.

This would impede UMCP's ability to secure research funds and weaken its efforts in the biosciences in areas, such as neuroscience that require the use of mammals and other vertebrates in research. This will be the first phase in a two-project solution to address animal care space deficiencies and will replace three existing facilities.

The facility will provide 184,572 GSF/99,849 NASF that will alleviate shortages in research and classroom laboratory space by reducing deficits by 42,403 NASF and 12,048 NASF, respectively. It will also provide 19,774 NASF of office and conference space and 16,500 NASF of animal care space.

Human Performance and Academic Research Facility

This project will renovate and expand the Cole Student Activities building, creating a Human Performance and Academic Research facility that will house a Center for Sports Medicine, Health, and Human Performance, the Academy for Innovation and Entrepreneurship, an indoor sports practice facility, and a football training complex. UMCP will partner with the University of Maryland, Baltimore (UMB) and the University of Maryland Medical System to create the center.

The General Assembly added language to the 2014 capital budget pre-authorizing $5.0 million to begin design of the facility in fiscal 2016. The project was added to the 2015 CIP with $7.0 million programmed in fiscal 2016 for design, of which $5.0 million is GO and $2.0 million is nonbudgeted funds. The 2015 CIP programs $20.0 million in GO for construction in fiscal 2020 with State funding only to be used to fund the academic portion of the project. As programmed in the 2015 CIP, the estimated construction and equipment cost of the project is $139.5 million of which $20.0 million, or 14%, is funded with GO bonds. **Since the GO portion of the design cost should be proportional to the State's share of the total cost of the facility, DLS recommends reducing the fiscal 2016 appropriation of $5.0 million for design by $3.0 million.**

The project leverages $130.0 million in private funding of which $105.0 million will be from a combination of private donations, institutional funds, and clinical revenues generated from the center. The remaining $25.0 million will come from Big Ten revenues. The CIP programs nonbudgeted funds of $7.0 million in fiscal 2017 to finish design and $43.1 million and $49.0 million in fiscal 2018 and 2019, respectively, for construction. A total of $49.0 million is programmed to finish construction and equip the facility in fiscal 2020 of which $29.0 million are nonbudgeted funds. The estimated cost of the project is $155.0 million.

The center will be led by UMCP's School of Public Health and UMB's Center for Orthopedics in partnership with UMCP's Department of Intercollegiate Athletics. The center, along with the state-of-the-art facility that it will be located in, will elevate the academic reputation of the participating institutions and enhance their ability to recruit clinical scientists and faculty, compete for research funding, promote innovation, and better serve students. The center will include revenue generating clinical space and research space that will not only serve athletes but also police, firefighters, military, and others that have physically rigorous jobs.

The project will convert a portion of the Cole building and expand it to create the proposed facilities. The former basketball arena will be converted into a 100-yard indoor practice field of approximately 90,400 GSF. The facility will be expanded to the north, and the existing concrete seating will be excavated and concourse floor lowered to the level of the former basketball court to provide the volume required for the facility. Existing space around the former arena will be renovated and expanded to create the new football training complex and the center of approximately 191,000 GSF.

Brendan Iribe Center for Computer Science and Innovation

This project was added to the 2015 CIP. While State funding is not programmed until fiscal 2018, UMCP used $3.7 million in private donations to initiate the design of the Brendan Iribe Center for Computer Science and Innovation and will use $7.1 million of private donations in fiscal 2016 to complete design of the facility. The 2015 CIP programs $45.8 million and $86.0 million in fiscal 2018 and 2019, respectively, to construct and equip the facility of which $27.0 million and $68.0 million of GO is programmed in those years. The project is estimated to cost $142.6 million consisting of $94.6 million of GO, $10.0 million in revenue bonds, and $38.0 million in private gifts.

The facility will house the Department of Computer Science and the University of Maryland Institute for Advanced Computer Studies. The facility is needed to support the growth of the computer science teaching and research programs and facilitate the integration of modern teaching and research activities. The facility will include classrooms, research laboratories, offices, conference rooms, collaborative classrooms, study space, and a multi-purpose community room. The building will be designed with flexible space to maximize space use efficiency and be adaptable to the changing future needs of the department.

High Speed Data Computing Infrastructure Improvements

In order to improve UMCP's existing high computing data network system to accommodate the new High Performance Computing Data Center (HPDC), a collaboration with The Johns Hopkins University, $1 million is reprogrammed from prior authorizations made to JHU for the design, construction, and equipping of the HPDC.

Operating Budget Impact Statement

Executive's Operating Budget Impact Statement
($ in Millions)

		FY 2016	*FY 2017*	*FY 2018*	*FY 2019*	*FY 2020*
Edward St. John Learning and Teaching Center						
	Estimated Operating Cost	$0.000	$1.103	$1.909	$3.987	$4.042
	Estimated Staffing	0	3	4	4	4
New Bioengineering Building						
	Estimated Operating Cost	$0.000	$0.000	$0.870	$2.228	$4.791
	Estimated Staffing	0	0	2	5	5

Summary of Other Projects in the Capital Improvement Program

Projects Deferred in Fiscal 2016

Funding for chemistry facility expansion, replacement, and renovation has been deferred beyond fiscal 2020 due to other university priorities. A description of the project is provided in **Exhibit 2**. It should be noted that six of the general chemistry laboratories are being relocated to the St. John Center, which will also include an additional three laboratories. Wing 1 of the Chemistry building will be replaced and Wing 2 will be renovated, these are the oldest of the five wings, constructed in 1952 and 1968, respectively. Due to cost efficiencies, Wing 1 will be replaced, and portions of Wing 2 (including the basement, third floor, and portions of the other floors that have not been renovated) will be renewed. Wing 1 and portions of Wing 2 have not had any significant renovations since the original construction, and many of the building's systems are aging and require updates.

Exhibit 2
Projects Deferred
Fiscal 2016

Project	*Description*	*Reason for Deferral*
Chemistry Facility Expansion, Replacement, and Renovation	Replace Wing 1 and renovate Wing 2 of the chemistry building.	Other university priorities.

Source: Department of Budget and Management, 2015 *Capital Improvement Program*

Pre-authorizations

Exhibit 3 shows the pre-authorizations for the St. John Center and the New Bioengineering Building as previously discussed.

Exhibit 3
Pre-authorizations
Fiscal 2017-2019
($ in Millions)

Project	2017	2018	2019	Reason
Edward St. John Learning and Teaching Center	$0.500	-	-	Allows completion of construction.
New Bioengineering Building	46.4	$63.1	-	Allows for the bidding and awarding of the construction contract in fiscal 2017.

Source: Department of Budget and Management, 2015 *Capital Improvement Program*

GO Bond Recommended Actions

1. Approve $10 million ($5 million general obligation and $5 million revenue bonds) to continue funding for the Campuswide Building System and Infrastructure Improvements.

2. Approve $65.7 million in general obligation bonds to continue partial demolition and renovation of existing buildings and continue construction of the Edward St. John Learning and Teaching Center.

3. Reduce funding for design by $3 million.

RB22C	Human Performance and Academic Research Facility.	$ 2,000,000

Allowance	**Change**	**Authorization**
5,000,000	-3,000,000	2,000,000

Explanation: Reduces the funding for design of the Human Performance and Academic Research Facility by $3 million to reflect the State's share of the overall cost of the facility.

4. Delete funds to begin construction.

RB22D	New Bioengineering Building	$ 0

Allowance	**Change**	**Authorization**
1,000,000	-1,000,000	0

Explanation: Deletes $1 million to begin construction of the New Bioengineering Building since the funds are insufficient to initiate construction in fiscal 2016.

5. Add funds to improve computing data network systems.

RB22E	High Speed Data Computing Infrastructure Improvements.....	$ 1,017,000

Add the following language:

(E) Campuswide Computing Network Infrastructure Improvements. Provide funds to design, construct, and equip infrastructure improvements to existing high computing data network systems..... 1,017,000

Allowance	**Change**	**Authorization**
0	1,017,000	1,017,000

Explanation: This actions adds an authorization to fund improvements to existing high computing data network systems at the University of Maryland, College Park (UMCP), to accommodate the university's collaboration with The Johns Hopkins University (JHU) new High Performance Computing Data Center (HPDC). The funds added are reprogrammed from prior authorizations made to JHU for the design, construction, and capital equipping of the HPDC.

6. Reduce the authorization to allow the funds to be reprogramed.

ZF4550 Section 2 – High Performance Computing Data Center. $ 0

Add the following language:

(K) High Performance Computing Data Center. Provide a grant to the Board of Trustees of Johns Hopkins University for the construction, and capital equipping of a High Performance Computer Data Center (HPDC), provided that $15,000,000 of this authorization may not be expended until Johns Hopkins University develops, in consultation with University of Maryland, College Park, a plan to provide access to Maryland's 4-year public and nonprofit private institutions of higher education, including Morgan State University and the University System of Maryland. Further provided the plan shall be submitted to the budget committees, and the committees shall have 45 days to review and comment (Baltimore City)..... **[**15,000,000**]**

13,983,000

Explanation: This actions reduces the amount of general obligation bond funds authorized for the High Performance Computing Data Center (HPDC). A separate action reprograms the funds to be used by the University of Maryland, College Park (UMCP) for infrastructure improvements to UMCP existing on-campus data processing and computing networks to adequately accommodate data transmission needs associated with the HPDC project.

7. Approve pre-authorization of $0.5 million in general obligation bond fund for fiscal 2017 to complete construction of the St. John Learning and Teaching Center.

8. Approve pre-authorization of $45.5 million in general obligation bond fund for fiscal 2017 to construct the New Bioengineering Building.

9. Approve pre-authorization of $63.1 million in general obligation bond for fiscal 2018 to continue construction of the New Bioengineering Building.

Total General Obligation Bonds Reduction **$2,983,000**