

UB00
Maryland Environmental Service

Capital Budget Summary

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

Description	2015 Approp.	2016 Approp.	2017 Request	2018 Est.	2019 Est.	2020 Est.	2021 Est.
State Water and Sewer Infrastructure Improvement Fund	\$9.079	\$16.471	\$24.825	\$18.105	\$13.702	\$16.046	\$13.360
Total	\$9.079	\$16.471	\$24.825	\$18.105	\$13.702	\$16.046	\$13.360

Description	2015 Approp.	2016 Approp.	2017 Request	2018 Est.	2019 Est.	2020 Est.	2021 Est.
GO Bonds	\$9.079	\$16.471	\$24.825	\$18.105	\$13.702	\$16.046	\$13.360
Total	\$9.079	\$16.471	\$24.825	\$18.105	\$13.702	\$16.046	\$13.360

GO: general obligation

Summary of Updates

Master Plan Update: The Maryland Environmental Service (MES) completed a revision of its Water and Wastewater Master Plan in September 2011. Staff was planning to complete an update and distribute a revised plan in January 2014. MES now notes that the 2014 Master Plan update was sent to the Department of Budget and Management (DBM) on February 26, 2016.

Cost-benefit Analysis of the Proposed Third Boiler for the Eastern Correctional Institution – Co-generation Plant: The Department of Legislative Services (DLS) recommended that MES prepare and deliver to DBM a cost-benefit analysis on the proposed fiscal 2020 low-pressure steam boiler procurement. The analysis determined that the present value of the current facility’s operation and maintenance costs without the third boiler are lower than the present value of the new facility’s operating and maintenance costs with the capital costs for the additional boiler. However, it appears that the 8% discount rate used for the cost-benefit analysis may have skewed the results in favor of eliminating the new boiler from the plan.

New Department of Juvenile Services Detention Center’s Wastewater Treatment Options: The Department of Juvenile Services (DJS) is constructing a new detention center on the site of the former Thomas O’Farrell Youth Center in Carroll County. New water and sewer utilities are needed because the previous service deteriorated to the point that it needed to be abandoned. MES and its consultant determined new service lines connecting to the Carroll County system could be constructed and only three easements from private property owners are needed, not 19 as determined by the previous consultant; all other easements are on State-owned property.

Summary of Recommended Bond Actions

1. Infrastructure Improvement Fund

Approve the \$24,825,000 general obligation bond authorization for the Infrastructure Improvement Fund.

2. SECTION 12 – Maryland Environmental Service – Infrastructure Improvement Fund

Approve the pre-authorization of \$6,767,000 in general obligation bonds for split-funded Infrastructure Improvement Fund construction projects in fiscal 2018.

3. SECTION 13 – Maryland Environmental Service – Infrastructure Improvement Fund

Approve the \$702,000 general obligation bond pre-authorization in fiscal 2019 for a split-funded Infrastructure Improvement Fund construction project.

Program Description

MES was created by statute (Chapter 240 of 1970) as an independent agency. Executive Order 01.01.1971.11 stipulated that MES has responsibility for the operation and maintenance of all State-owned sewage treatment and solid waste disposal facilities. MES then became incorporated into the Department of Natural Resources (DNR) in 1972. During the 1993 session, the General Assembly adopted legislation (Chapter 196 of 1993) that created MES as an instrumentality of the State and a public corporation independent of DNR. MES provides technical services including engineering, design, financing, construction, and operation of water supply and wastewater treatment facilities, among other activities.

The State Water and Sewer Infrastructure Improvement Fund was established to provide for capital improvements of State-owned and operated water treatment and wastewater treatment plants (WWTP); water distribution and sewer collection systems; and water towers. Since fiscal 1999, funding for capital maintenance projects relating to water and WWTPs has been budgeted under MES. Prior to this, the State budgeted capital maintenance funds for these projects in the Department of General Services' Facilities Renewal Program. Facilities renewal funds pay for major rehabilitation activities at State-owned facilities. This change was made in order to display more clearly the capital cost of MES-operated State facilities. As of February 2016, MES operates and maintains 963 projects; however, an individual facility may have multiple projects going on at any time. Some of the 963 projects are at 261 State-owned facilities, such as the Poplar Island Environmental Restoration Project, the Hart-Miller Island Dredged Material Containment Facility, Cox Creek Dredged Material Containment Facility, and a regional yard debris composting facility.

Performance Measures and Outputs

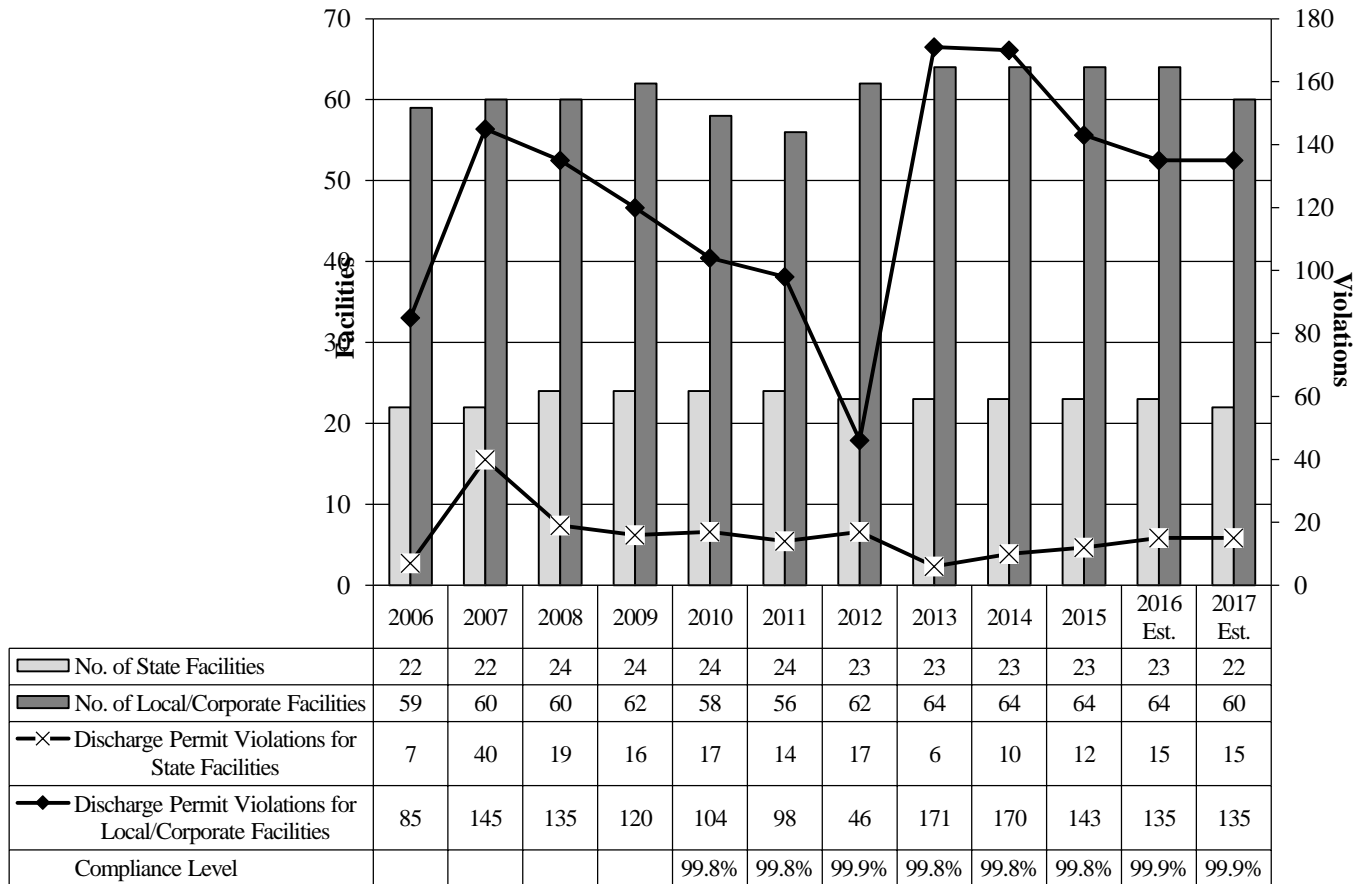
The MES performance measures relate to three goals, one of which is to improve the environment through MES activities. One output for this goal is a reduction in the number of local/corporate and State National Pollutant Discharge Elimination System violations. In addition, while not necessarily a performance measure, the discharge permits for the WWTPs that MES operates is a critical factor in its capital budget plan.

State National Pollutant Discharge Elimination System Violations

Exhibit 1 shows that MES has a greater number of local/corporate clients than State clients and that, in general, local/corporate discharge permit violations are a higher percentage of overall violations than would be indicated by their share of the total number of facilities. Previously, this measure specified National Pollutant Discharge Elimination System violations, but MES notes that the violations include groundwater discharges as well and so the more general category of discharge permits is used instead. The number of local/corporate facility violations increased substantially between fiscal 2012 (46) and 2013 (171). MES indicates that the increase in the number of local/corporate facility violations in recent years is primarily due to two troublesome facilities. MES

notes that construction was completed at one of the troublesome facilities and the other facility is no longer being operated by MES. As a result, the number of local/corporate facility violations has decreased in fiscal 2015 (143).

**Exhibit 1
Local/Corporate and State Discharge Permit Violations
Fiscal 2006-2017 Est.**



Source: Governor’s Budget Books, Fiscal 2007-2016; Maryland Environmental Service

Between fiscal 2006 and the 2017 estimate, State facilities have averaged 12% of the total violations while accounting for 27% of the facilities handled by MES. MES has indicated in the past that the reason for this low percentage of violations at State facilities is MES’s ability to use State funding to make improvements at State treatment facilities. In contrast, MES is dependent upon its corporate clients, including small municipalities, to fund improvements, which they may not always have the resources to do.

Budget Overview

The *Capital Improvement Program* (CIP) has changed between the 2015 and 2016 editions, as shown in **Exhibit 2**. The 2015 CIP amount programmed for fiscal 2017 was \$25.250 million, which has been reduced to \$24.825 million in the 2016 CIP due to updated projected schedules and cash flow needs. For the out-years, the major difference is the estimated cost for the Eastern Correctional Institution (ECI) – Co-generation Plant Upgrades project as shown in **Exhibit 3**. The estimated ECI – Co-generation Plant Upgrades cost has been reduced from \$21,345,000 to \$4,321,000, or \$17,024,000, as a result of a number of items being removed from the program including a third boiler.

Exhibit 2
2015 and 2016 Capital Improvement Program Comparison
 (\$ in Millions)

<u>Projects</u>	<u>2017</u> <u>Request</u>	<u>2018</u> <u>Est.</u>	<u>2019</u> <u>Est.</u>	<u>2020</u> <u>Est.</u>	<u>2021</u> <u>Est.</u>
2016 CIP	\$24.825	\$18.105	13.702	\$16.046	\$13.360
2015 CIP	25.250	25.500	11.950	23.850	–
Difference	-\$0.425	-\$7.395	\$1.752	-\$7.804	\$13.360

CIP: *Capital Improvement Program*

Note: The State Water and Sewer Infrastructure Improvement Fund is funded by general obligation bonds. No funding is reflected beyond the CIP because that is the five-year planning period used by the Administration. Estimates for programmed funding for fiscal 2021 for the 2015 CIP are outside the five-year planning period.

Source: *Capital Improvement Program, 2015 and 2016*

Exhibit 3
Project Cost Estimate Differences
Fiscal 2016 and 2017
(\$ in Thousands)

<u>Subdivision</u>	<u>Title</u>	<u>2015 CIP</u>	<u>2016 CIP</u>	<u>Difference</u>	<u>Explanation</u>
Somerset	ECI – Co-generation Plant Upgrades	\$21,345	\$4,321	-\$17,024	Program revised resulting in decrease of funds requested.
Somerset	ECI – WWTP Upgrade	27,133	26,730	-403	Reduction in escalation rate.
Allegany	WCI – Wastewater Pump Station Improvements	1,730	1,693	-37	Reduction in escalation rate.
Washington	MCI-H – WWTP Upgrade	13,614	13,582	-32	Reduction in escalation rate.
Baltimore County	Camp Fretterd – Water and WWTP and Water Distribution System Upgrades	2,670	2,670	0	
Charles	Southern Pre-Release Unit – WWTP Improvements	4,198	4,198	0	
Frederick	Cunningham Falls State Park – Water Treatment Plant	4,000	4,000	0	
Queen Anne’s	Eastern Pre-Release – WWTP	4,450	4,450	0	
Prince George’s	Cheltenham Youth Center – WWTP Plant	7,050	7,115	65	Change in estimated midpoint date.

UB00 – Maryland Environmental Service

<u>Subdivision</u>	<u>Title</u>	<u>2015 CIP</u>	<u>2016 CIP</u>	<u>Difference</u>	<u>Explanation</u>
Regional	State Well Upgrades	500	1,060	560	Inclusion of two additional wells: Backbone Mountain and Meadow Mountain wells join the existing Savage Mountain and Dan's Mountain wells.
Totals		\$86,690	\$69,819	-\$16,871	

CIP: *Capital Improvement Program*

ECI: Eastern Correctional Institution

MCI-H: Maryland Correctional Institution – Hagerstown

WCI: Western Correctional Institution

WWTP: wastewater treatment plant

Source: Maryland Environmental Service; Department of Legislative Services

Fiscal 2016 Project Status

MES's plan is to encumber \$22,545,549 in fiscal 2016. The current encumbrance status is shown in **Exhibit 4**. The majority of projects appear to be making progress in their respective project phases. The two exceptions are the Cunningham Falls State Park – Collection and Distribution System project, which is in the construction phase but MES is still negotiating costs with a bidder, and the Rocky Gap State Park – WWTP Improvements project, which is also funded for construction but project design is only 95% complete. Of note, the program for the ECI – Co-generation Plant Upgrades project has been modified, although MES notes that design is in progress.

**Exhibit 4
Status of Encumbering Funding in Fiscal 2016**

<u>Project</u>	<u>Current Activity</u>	<u>2016 (Planned)</u>	<u>Est. Cost</u>	<u>Status</u>
ECI – WWTP Upgrade	Construction	\$6,271,000	\$27,133,000	Project design complete and awaiting MDE construction permit before advertising.
MCI – Hagerstown – WWTP Upgrade	Construction	4,372,531	7,652,531	Project under construction.
Southern Pre-Release Unit – WWTP Improvements	Construction	3,719,000	4,198,000	Project under construction.
Rocky Gap State Park – New WTP	Construction	1,805,000	6,173,000	Project completed and balance to be used for WWTP.
ECI – Co-generation Plant Upgrades	Planning and Construction	1,681,000	10,065,000	Project CIP program revised with design in progress and boiler feed pumps procured.
Rocky Gap State Park – WWTP Improvements	Construction	1,461,000	4,514,000	Project design 95% complete.
Freedom WWTP Upgrade	Construction	1,131,000	25,661,000	Project under construction.
Charlotte Hall Veterans Home – WWTP Improvements	Construction	1,000,000	4,100,000	Project under construction.
Cheltenham Youth Center – WWTP	Planning	1,000,000	7,650,000	Project under design.
Cunningham Falls State Park – Collection and Distribution System	Construction	988,035	1,238,000	Negotiating costs with bidder.
Western Correctional Institution – Wastewater Pump Station Improvements	Construction	750,000	1,730,000	Project under construction.
New DJS Female Detention Center – Water and Sewer Utilities	Planning	400,000	4,610,000	Project under design.
Cunningham Falls State Park – WTP	Planning	350,000	4,000,000	Project under design.
Eastern Pre-Release – WWTP	Planning	350,000	4,450,000	Project under design.
State Well Upgrades	Planning	50,000	500,000	Project under design.

UB00 – Maryland Environmental Service

<u>Project</u>	<u>Current Activity</u>	<u>2016 (Planned)</u>	<u>Est. Cost</u>	<u>Status</u>
Camp Fretterd – WTP, WWTP, and Water Distribution System Upgrades	Planning	16,983	2,670,000	Project under design.
Cash Flow Adjustment	Planning, Construction, Equipment	-2,800,000	0	Not applicable.
Totals		\$22,545,549	\$116,344,636	

CIP: *Capital Improvement Program*
DJS: Department of Juvenile Services
ECI: Eastern Correctional Institution
MCI: Maryland Correctional Institution

MDE: Maryland Department of the Environment
WTP: water treatment plant
WWTP: wastewater treatment plant

Note: The ECI – Co-generation Plant Upgrades project cost has been reduced since last year.

Note: The estimated cost for two projects reflects funding that is not in the 2016 CIP for the Maryland Environmental Service as follows: MCI – Hagerstown – WWTP Upgrade includes funding from the Bay Restoration Fund through MDE, and Freedom WWTP Upgrade includes funding from the Bay Restoration Fund and from Carroll County.

Source: Department of Budget and Management; Maryland Environmental Service

Fiscal 2017 Funding and Projects

The MES fiscal 2017 authorization includes \$24.8 million in general obligation (GO) bonds for 14 projects, including State well upgrades, and the \$2.8 million adjustment funding from fiscal 2016. As introduced, the 2016 session capital budget bill includes pre-authorizations for fiscal 2018 and 2019 to provide the funding authority for the Board of Public Works (BPW) to approve construction contracts without all of the funds authorized in fiscal 2017. The 14 projects included in the fiscal 2017 allowance, as well as the \$2.8 million adjustment funding from fiscal 2016, are shown in **Exhibit 5**. Exhibit 5 reflects the projects that are completed with fiscal 2017 funding, the projects that are in the construction phase that need fiscal 2018 pre-authorizations to be completed, the 1 project that requires fiscal 2019 funding to be completed – ECI – Co-generation Plant Upgrades, and all the projects that are in the planning stage and thus do not need pre-authorized funding to bid out construction contracts.

**Exhibit 5
Fiscal 2017 Project Funding**

<u>State Unit</u>	<u>Project</u>	<u>Jurisdiction</u>	<u>Est. Cost</u>	<u>Prior Approp.</u>	<u>2017 Request</u>	<u>Phase</u>	<u>Future Req.</u>
<i>Projects Completed in Fiscal 2017</i>							
Maryland Correctional Institution – Hagerstown	WWTP Upgrade	Washington	\$13,582,000	\$5,090,000	\$2,000,000	Construction	\$0
Western Correctional Institution	WW Pump Station Improvements	Allegany	1,693,000	900,000	793,000	Construction	0
State Water Storage	Greenbrier State Park Tanks	Washington	339,000	0	339,000	Planning and Construction	0
Southern Pre-Release Unit	WWTP Improvements	Charles	4,198,000	3,913,000	285,000	Construction	0
<i>Projects Receiving Fiscal 2018 Pre-authorization</i>							
Eastern Correctional Institution	WWTP Upgrade	Somerset	26,730,000	15,015,000	8,943,000	Construction	2,772,000
Cunningham Falls State Park	WTP	Frederick	4,000,000	350,000	2,555,000	Construction	1,095,000
Eastern Pre-Release	WTP	Queen Anne’s	4,450,000	350,000	3,000,000	Construction	1,100,000
Camp Fretterd	W&WWTP and Water Distribution System Upgrades	Baltimore County	2,670,000	197,000	1,473,000	Construction	1,000,000
<i>Projects Receiving Fiscal 2018 and 2019 Pre-authorizations</i>							
Eastern Correctional Institution	Co-generation Plant Upgrades	Somerset	4,321,000	1,681,000	1,138,000	Planning and Construction	1,502,000
<i>Projects Not Receiving Pre-authorizations</i>							
Cheltenham Youth Center	WWTP	Prince George’s	7,115,000	400,000	305,000	Planning	6,410,000
Victor Cullen	WWTP Upgrades	Frederick	4,742,000	0	373,000	Planning	4,369,000
Woodstock	WWTP Upgrades	Baltimore County	4,077,000	0	356,000	Planning	3,721,000
Fair Hill Natural Resources Management Area	WTP and Distribution System Upgrades	Cecil	1,963,000	0	180,000	Planning	1,783,000

<u>State Unit</u>	<u>Project</u>	<u>Jurisdiction</u>	<u>Est. Cost</u>	<u>Prior Approp.</u>	<u>2017 Request</u>	<u>Phase</u>	<u>Future Req.</u>
State Well Upgrades	State Well Upgrades	Regional	1,060,000	50,000	285,000	Planning and Construction	725,000
<i>Other</i>							
Cash Flow Adjustment		Statewide	0	-2,800,000	2,800,000		0
Total			\$80,940,000	\$25,146,000	\$24,825,000		\$24,477,000

WTP: water treatment plant

WW: wastewater

W&WWTP: water and wastewater treatment plants

WWTP: wastewater treatment plant

Source: Department of Budget and Management Capital Budget Worksheets

Projects

- **Maryland Correctional Institution – Hagerstown – Wastewater Treatment Plant Upgrade:** The requirement to upgrade to enhanced nutrient removal (ENR) technology as 1 of the 67 major WWTPs and the need to provide for other upgrades to support the following improvements: install denitrification filters, an ultraviolet disinfection system, a plant effluent supply line to the press building, a carbon source for further denitrification, a lime silo, an automated control system, and a new belt filter press; rehabilitate the headworks; and upgrade two clarifiers and launder covers for the remaining two clarifiers. The fiscal 2017 allowance includes \$2,000,000 in GO bonds for construction for the third year of three years of split funding. In last year's analysis, MES noted that shifting funding into fiscal 2017 was of concern due to the timeframe to meet the calendar 2017 Watershed Implementation Plan commitment to upgrade all 67 major WWTPs to enhanced removal technology. It is also noted in the fiscal 2017 Maryland Department of the Environment's (MDE) capital analysis that the project may not be completed on time. However, it appears that the project could still be completed by the June 30, 2017, deadline since construction is estimated to end in June 2017. The project completion date appears to have been extended somewhat due to only one bid being received for the project in April 2015, as a result of a short four-week bid period. The bid period was extended to six weeks in August 2015, and seven bids were received. The overall project cost has decreased from \$13,614,000 to \$13,582,000, or \$32,000, due to a reduction in the escalation rate. Of note, the overall project cost reflects \$6.492 million in Bay Restoration Fund funding from MDE.
- **Western Correctional Institution – Wastewater Pump Station Improvements:** The age and overall condition of the wastewater pump station supports the following improvements: install two climber screens and two compactors to address large debris, build a 12-foot by 12-foot headworks building extension to house the new screen system, upgrade the control system and relocate it above ground, rehabilitate and retrofit the existing concrete wet well in order to address hydrogen sulfide corrosion, install new submersible pumps to replace the dry pit submersible vacuum pumps, and install necessary valves and connection fittings to provide for a bypass pump in case of an emergency. The overall project cost has decreased by \$37,000 due to a reduction in the escalation rate, which was 6.5% but has been reduced to 4.0%. The fiscal 2017 authorization is \$793,000 in GO bonds to complete construction.
- **State Water Storage – Greenbrier State Park Tanks:** Two water storage tanks at Greenbrier State Park are in need of reconditioning due to coating failure and corrosion on the interior of the tanks. Fiscal 2017 funding of \$339,000 in GO bonds is provided for planning (\$45,000) and construction (\$294,000) in order to demolish and remove the existing tanks and to construct a new welded steel pressure tank for water storage and distribution. As part of an established water tank evaluation program, MES inspected the tanks in 2014 and found them to have coal tar – a possible carcinogen – coating on the interior of the tanks. The architectural and engineering basic services are 16.0%, which is rather high but MES notes that the fee for basic design services generally tends to be higher for small capital projects and that the basic design

includes estimated fees that may be necessary for testing and certification of the pressurized structural steel to ensure it meets American Society of Mechanical Engineers standards.

- **Southern Pre-Release Unit – Wastewater Treatment Plant Improvements:** Several wastewater treatment process problems identified in a recent field assessment and a new discharge permit support the following improvements: rehabilitate and upgrade the extended aeration package treatment plant; install an ultraviolet disinfection system; and replace pumping and piping equipment. As noted in last year’s analysis, the original scope has changed, more stringent WWTP standards are needed because the decision has been made to discharge to a stream all-year round instead of to a spray field from spring through fall. This change was necessitated by interference with the Charles County Police Department shooting range operations. MES notes that discharge limits were revised on January 16, 2014, and the final discharge permit was issued by MDE in June 2014. As a result of the updated discharge limits and perhaps other factors, the project timeline appears to have slipped again from a November 2016 completion date to a September 2017 completion date. The fiscal 2017 allowance includes \$285,000 in GO bonds for completing construction.
- **Eastern Correctional Institution – Wastewater Treatment Plant Upgrade:** The ECI WWTP upgrade project is required by a consent order. More specifically, funding is needed in order to meet a discharge permit issued on March 1, 2012, that will be effective on January 1, 2018. The overall project has been divided into four phases. To date, the project has received funding as follows: \$269,000 in fiscal 2008, \$6,961,000 in fiscal 2009, \$1,514,000 in fiscal 2013, and \$6,271,000 in fiscal 2016. The fiscal 2008 and 2009 funding provided for the completion of the first phase – the design and construction of a new equalization tank, which was completed in December 2010 – and the second phase – the design and construction of a new headworks, the area for the screening out of debris that can cause problems for equipment in later stages of treatment. The fiscal 2013 funding provided for design of the third and fourth phase of the improvements – the construction of a new membrane bioreactor WWTP – and included the following specific activities: replacement of the existing Carrousel plant with the membrane bioreactor, construction of postmembrane bioreactor denitrification and effluent filtration phosphorus removal, refurbishment of the ultraviolet disinfection system, improvement of the biosolids handling systems, upgrade of the electrical and process control systems, and upgrade of the reclaimed water use system. The fiscal 2016 funding of \$6,271,000 provided for beginning construction of the third and fourth phases. Fiscal 2017 funding of \$8,943,000 in GO bonds provides for additional funding for the third phase – primarily the construction of bioreactor process train 1. The final plant is designed to treat 1,140,000 gallons per day, which consists of 720,000 gallons per day for treatment of wastewater and 420,000 gallons per day for treatment of ammonia and phosphorus in the rejected water from the reverse osmosis drinking water process that has to be treated before it can be discharged. There is a pre-authorization of \$2,772,000 in GO bonds for fiscal 2018.
- **Cunningham Falls State Park – Water Treatment Plant:** The deteriorated condition of the existing water treatment plant (WTP) has required the purchase of water; between June 16, 2014, and July 12, 2014, water purchase costs were \$11,784. In order to resolve the

unreliable system, MES intends to install a WTP system, upgrade the electrical system and controls, modify piping and valves to allow flexible operation, and install an appropriately sized clear well to ensure sufficient water to clear the filter of particles through a process called backwashing. MES notes that the schedule to complete design in July 2016 and to begin construction in December 2016 has slipped a couple of months since it has taken longer than expected to receive test results from several years ago as well as information on the classification of the system, which determines the level of treatment required. The fiscal 2017 funding is \$2,555,000 in GO bonds for beginning construction. There is a pre-authorization of \$1,095,000 in GO bonds for fiscal 2018. **DLS recommends that MES comment on the updated schedule anticipated to be received from the architect/engineer.**

- **Eastern Pre-Release – Wastewater Treatment Plant:** The Eastern Pre-Release WWTP is not capable of meeting its discharge permit, issued in November 2013. Of note, MES was required to submit a Wastewater Capacity Management Plan to MDE because flow at the WWTP has exceeded 80% of its capacity for more than three years. The fiscal 2017 funding of \$3,000,000 in GO bonds is programmed to begin construction of elements of the plan submitted to MDE. The funding would be used to begin construction of the WWTP, which includes adding a new facility consisting of an equalization tank, wastewater screens, a new treatment process, and a new ultraviolet disinfection system, and expand the treatment capacity. Fiscal 2018 funds are planned for completing construction of the WWTP and both dredging the existing 1.5-acre lagoon treatment system and decommissioning it such that the site is restored to its pre-existing condition. The replacement of the lagoon is intended to protect groundwater, which would need to be pumped and treated if contaminated. MES notes that design is ahead of schedule and is expected to be completed in June 2016 instead of October 2016. There is a pre-authorization of \$1,100,000 in GO bonds for fiscal 2018.
- **Camp Fretterd – Water and Wastewater Treatment Plants and Water Distribution System Upgrades:** The Camp Fretterd Water and WWTPs and Water Distribution System project last received funding in fiscal 2015. Design was initially anticipated to begin in July 2014 but MES had difficulty locating utility and other records for the facilities at the project site and also had to wait until the Maryland Military Department had completed an evaluation of the proposed expansion of their facilities. The evaluation is complete and the revised flow projections are included in the design of this project. Water source, distribution, treatment deficiencies, and wastewater treatment deficiencies support the following improvements: construct a new backup well and new elevated water tank or a booster station with automated controls and install an advanced onsite wastewater treatment system and miscellaneous improvements. The fiscal 2017 allowance includes \$1,473,000 in GO bonds to begin construction. The new discharge permit for the facility was issued in July 2015 and requires total nitrogen be reduced to a yearly maximum loading of 320 pounds with a monthly average total nitrogen concentration of 20 milligrams per liter that must be met by July 2017. MES notes that design is still on track to be completed by April 2016. There is a pre-authorization of \$1,000,000 in GO bonds for fiscal 2018.

- **Eastern Correctional Institution – Co-generation Plant Upgrades:** The upgrade is necessitated by the wear-and-tear on the co-generation plant and the frequent power lapses because the plant is only able to generate 78% of the ECI’s electricity needs. As of last year, this multi-phase (four phases) project was estimated to cost \$21,345,000. The project has since been reduced substantially in scope – elimination of a third boiler, three of the four planned boiler feed pump replacements, and other components – to \$4,321,000 due to the outcome of a cost-benefit analysis of adding a third boiler, the availability of operating and contingency funds, and MES’s interest in not reducing available funding for other projects. The fiscal 2017 authorization of \$1,138,000 is split between design (\$212,000) and construction (\$926,000) funding, which will complete Task 2 – replacement of oil cooled breakers, utility yard transformer, and retubing the dump condenser. There is a pre-authorization of \$800,000 in GO bonds for fiscal 2018 and \$702,000 in GO bonds for fiscal 2019.
- **Cheltenham Youth Center – Wastewater Treatment Plant:** A new DJS detention center was anticipated to begin design in fiscal 2017, and the existing WWTP was anticipated to have elevated ammonia levels due to concentration of urine in low-flow water fixtures. This supported the following improvements: replace the existing rotating biological contactors; upgrade the chemical storage and feed system; upgrade the sanitary collection system; upgrade the electrical, communication, and supervisory control and data acquisition systems; and upgrade the control building to provide adequate office space, laboratory space, and lockers in accordance with the latest building codes. The fiscal 2017 allowance includes \$305,000 in GO bonds for completing design of the project, which MES notes is planned for December 2016.
- **Victor Cullen Wastewater Treatment Plant Upgrades:** The Victor Cullen WWTP Upgrades project consists of upgrades to the headworks, equalization tank, primary clarifiers, solids handling process, control building, reclamation of the original WWTP site, and rehabilitation of the wastewater collection system. These upgrades are recommended since the plant is over 25 years old and is designed around an outdated trickling filter wastewater treatment system. The fiscal 2017 funding of \$373,000 in GO bonds funds design of the project. Construction funding has been delayed until fiscal 2019 and 2020, due to fiscal 2018 budget constraints. Of note, the current permit essentially expired January 31, 2016, and MDE has not issued a draft permit. MES notes that delaying construction funding means that there is the possibility that a more stringent permit will be issued that cannot be met by the existing facility.
- **Woodstock – Wastewater Treatment Plant Upgrades:** The existing WWTP at the Woodstock Job Corp Training Center is nearing the end of its usefulness as indicated by the corrosion of its steel tanks and the sewage treatment process failing its National Pollutant Discharge Elimination System permit. The fiscal 2017 capital budget includes \$356,000 in GO bonds to design the project. Improvements include the replacement of the existing plant with a new compact WWTP that will include a screening and grit removal system, an equalization basin, a biological treatment system with clarification and sludge management system, and the installation of security fence to prevent vandalism. MES notes that a new more

stringent permit will be issued after the current permit expires in September 2019, but that the planned upgrade will meet the ENR-level requirements.

- **Fair Hill Natural Resources Management Area – Water Treatment Plant and Distribution System Upgrades:** The water treatment system at Fair Hill Natural Resources Management Area has deficiencies as follows: the water treatment plant lacks a heating and ventilation system, the water storage tank is corroded and must be drained every year or it will freeze, and the water distribution system is in poor condition and does not have an adequate amount of control/isolation valves or fire hydrants. The fiscal 2017 design funding of \$180,000 in GO bonds will eventually provide for the construction of the following: a new water treatment building with laboratory area, heating and ventilation system, and room for chemical storage; new water lines throughout the complex and fire hydrants for water distribution; and an elevated water storage tank. Of note, MES will need to coordinate with DNR on the upgrade project since the fiscal 2017 capital budget also includes design funds for a project to upgrade camping facilities at Fair Hill Natural Resources Management Area.
- **State Well Upgrades:** Fiscal 2017 funding of \$285,000 in GO bonds is programmed for the construction of new wells at Dan’s Mountain State Park and for design of the new wells at Meadow Mountain Youth Center and Backbone Mountain Youth Center. The current wells are either inadequate or inoperable relative to the goal of meeting the demand for potable water. The project includes the review of hydrogeological data, performance of hydrogeological surveys, implementation of test borings and possible surface geophysical methods to find water bearing fracture zones, and construction of potable water wells at each park. MES notes that architect and engineer (A/E) basic services are 12.8% because the rate also includes the cost of the hydrogeologists for groundwater investigation and siting of the well location and necessary laboratory testing of the water quality.

Updates

1. Master Plan Update

MES completed a revision of its Water and Wastewater Master Plan in September 2011. Staff was planning to complete an update and distribute a revised plan in January 2014. MES now notes that the 2014 Master Plan update was sent to DBM on February 26, 2016.

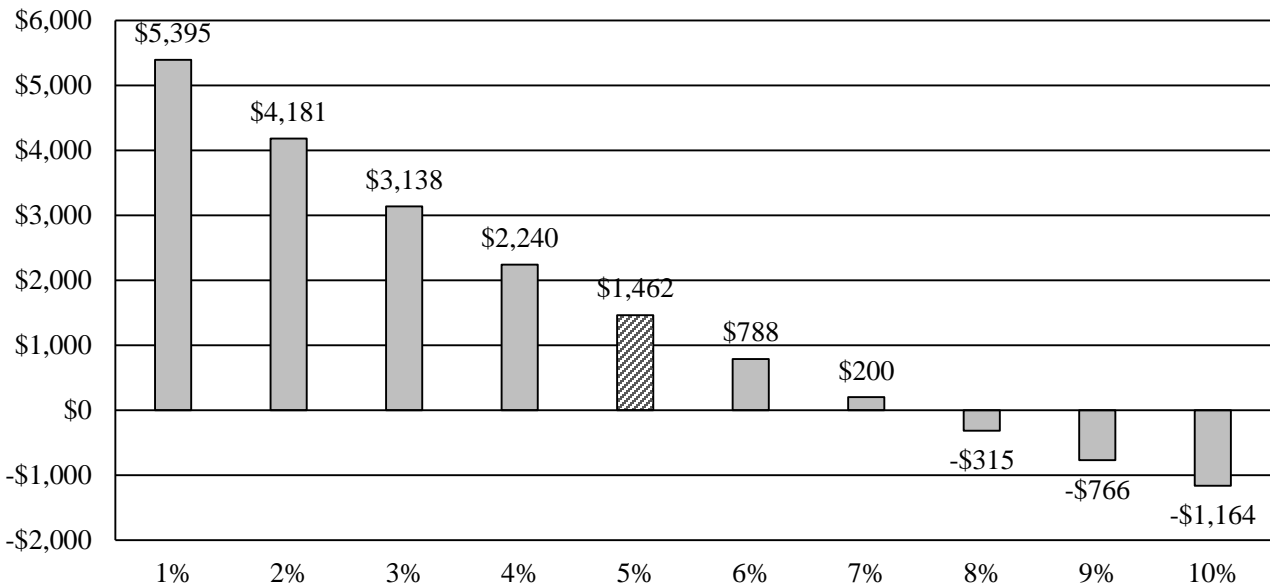
2. Cost-benefit Analysis of the Proposed Third Boiler for the Eastern Correctional Institution – Co-generation Plant

In MES’s fiscal 2016 capital budget analysis, DLS recommended that MES prepare and deliver to DBM a cost-benefit analysis on the proposed fiscal 2020 low-pressure steam boiler procurement as part of MES’s fiscal 2017 request package. MES anticipated at the time that the addition of the

proposed low-pressure steam boiler in fiscal 2020, at a cost of \$7,700,000, would address the low-pressure/low-temperature steam needs of the ECI – Co-generation plant and allow the high-pressure/high-temperature steam to be used for power generation. Furthermore, MES noted that the combined heat and power generation facility’s benefits outweigh those of the utility grid even though a cost-benefit analysis comparing the power cost from the electrical grid and the co-generation plant had not been conducted in years.

MES contracted with HDR, Inc. to conduct a cost-benefit analysis of the addition of a third boiler at the co-generation plant. The analysis determined that the present value of the current facility’s operation and maintenance costs without the third boiler are lower than the present value of the new facility’s operating and maintenance costs with the capital costs for the additional boiler. However, the 8% discount rate used for the cost-benefit analysis may have skewed the results in favor of eliminating the new boiler from the plan. A more reasonable discount rate is the State’s coupon rate for debt which is in the 5% range. As shown in **Exhibit 6**, the net benefit of a third boiler using a 5% discount rate is \$1.5 million. MES notes that, even using a 5% discount rate, there is sufficient volatility in the energy market and risk of a service disruption while installing a third boiler that reduces the net benefit from the third boiler. MES recommends that the proposal to add a third boiler be reevaluated after the current round of upgrades to the plant are completed and energy markets stabilize.

Exhibit 6
Net Benefit of New Boiler on Operations Costs Compared by Discount Rate
 (\$ in Thousands)



Note: A reasonable estimate of the coupon rate on the State debt that would support the new boiler is 5%.

Source: Maryland Environmental Service; Department of Legislative Services

3. New Department of Juvenile Services Detention Center’s Wastewater Treatment Options

DJS is constructing a new detention center on the site of the former Thomas O’Farrell Youth Center in Carroll County. New water and sewer utilities are needed because the previous service deteriorated to the point that it needed to be abandoned. For fiscal 2016, \$400,000 in planning funding was requested. This funding would be used to complete the design of the project, which was evaluated according to five options shown in **Exhibit 7**. MES and its consultant determined new service lines connecting to the Carroll County system could be constructed and only 3 easements from private property owners are needed, not 19 as determined by the previous consultant; all other easements are on State-owned property. MES notes that the A/E basic services for the project are 12.7%, or \$500,147, because of the need to develop and chart the piping alignment and prepare plats for easements. For the initial evaluation, the A/E was given a notice to proceed on January 28, 2015, with a contract end date of June 30, 2015. The A/E contract scope included evaluation of all five options in terms of costs and feasibility, and recommendation of a solution. BPW approved the design contract on February 26, 2016, and the MES Board of Directors approved it on February 29, 2016. MES held a kickoff meeting with the A/E, Department of General Services, DJS, and DJS’ design team on March 7, 2016.

Exhibit 7
**New Department of Juvenile Services Detention Center –
Wastewater Treatment Plant Improvements Options**

<u>Option</u>	<u>Description</u>	<u>Comment</u>	<u>Cost</u>
Option A	Run water and sewer traveling through roadway to the nearest water and sewer connections.	Requires only three easements from private property owners and is the preferred option due to the lowest annual operation and maintenance costs	\$2,521,675
Option B	Run water and sewer along the alignment of the abandoned water main.	Difficult to maintain.	2,712,645
Option C	Run the sewer along the same route as the existing abandoned force main and run water main the same as Option B.	Difficult to maintain.	2,528,370
Option D	Run water main the same as Option A and the sewer the same as Option C.	Difficult to maintain.	2,349,425
Option E	Construct onsite water and wastewater treatment systems.	Highest annual operating and maintenance costs	To be determined.

Source: Maryland Environmental Service

Operating Budget Impact Statement

Executive’s Operating Budget Impact Statement – State-owned Projects (\$ in Millions)

	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Camp Fretterd – Water and Wastewater Treatment Plants and Water Distribution System Upgrades					
Estimated Operating Cost	\$0.000	-\$0.043	-\$0.052	-\$0.052	-\$0.052
Estimated Staffing (Contractual Full-time Equivalents (FTE))	0	0	0	0	0
Explanation: The Camp Fretterd – Water and Wastewater Treatment Plant and Water Distribution System Upgrades project reflects the savings from no longer needing to transport wastewater for offsite treatment.					
Cheltenham Youth Center – Wastewater Treatment Plant					
Estimated Operating Cost	\$0.000	\$0.000	\$0.000	\$0.013	\$0.003
Estimated Staffing (Contractual FTEs)	0.0	0.0	0.0	0.0	0.0
Explanation: The Cheltenham Youth Center – Wastewater Treatment Plant project reflects increased power and chemical use after the upgrade and the need to outfit new office space.					
Cunningham Falls State Park – Water Treatment Plant					
Estimated Operating Cost	\$0.000	\$0.000	\$0.002	\$0.002	\$0.002
Estimated Staffing (Contractual FTEs)	0	0	0	0	0
Explanation: The Cunningham Falls State Park – Water Treatment Plant reflects the need for increased power use and chemicals due to installation of an advanced wastewater treatment plant system.					
Eastern Correctional Institution – Wastewater Treatment Plant Upgrade					
Estimated Operating Cost	\$0.000	\$0.000	\$0.000	-\$0.010	-\$0.010
Estimated Staffing (Contractual FTEs)	0	0	0	0	0
Explanation: The Eastern Correctional Institution – Wastewater Treatment Plant Upgrade reflects the reduced cost (a decrease from \$72/ton to \$50/ton because of the shift from an unstabilized sludges that would need to be disposed of at a landfill to a lime-stabilized, class B sludge, which can be land applied) for sludge disposal after the upgrade, which is offset partially by an increase for chemicals for membrane cleaning and biosolids stabilization.					

UB00 – Maryland Environmental Service

	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Eastern Pre-Release – Wastewater Treatment Plant					
Estimated Operating Cost	\$0.000	\$0.000	\$0.000	\$0.004	\$0.005
Estimated Staffing (Contractual FTEs)	0	0	0	0	0
Explanation: The Eastern Pre-Release – Wastewater Treatment Plant reflects the need for increased power and chemical use as a result of the upgrade.					
Maryland Correctional Institution – Hagerstown – Wastewater Treatment Plant Upgrade					
Estimated Operating Cost	\$0.000	\$0.006	\$0.006	\$0.006	\$0.006
Estimated Staffing (Contractual FTEs)	0	0	0	0	0
Explanation: The Maryland Correctional Institution – Hagerstown – Wastewater Treatment Plant Upgrade reflects the need for increased electricity for ultraviolet disinfection and chemical supplies such as methanol or MicroC as a supplemental carbon source.					
Southern Pre-Release Unit – Wastewater Treatment Plant Improvements					
Estimated Operating Cost	\$0.000	\$0.001	\$0.001	\$0.001	\$0.001
Estimated Staffing (Contractual FTEs)	0	0	0	0	0
Explanation: The Southern Pre-Release Unit – Wastewater Treatment Plant Improvements reflects the need for increased electricity for ultraviolet disinfection and chemical supplies for membrane cleaning.					
Victor Cullen Wastewater Treatment Plant Upgrades					
Estimated Operating Cost	\$0.000	\$0.000	\$0.000	\$0.001	\$0.001
Estimated Staffing (Contractual FTEs)	0	0	0	0	0
Explanation: The Victor Cullen Wastewater Treatment Plant Upgrades reflects the increased cost of utilities and increased chemical use.					
Western Correctional Institution – Wastewater Pump Station Improvements					
Estimated Operating Cost	\$0.000	-\$0.001	-\$0.001	-\$0.001	-\$0.001
Estimated Staffing (Contractual FTEs)	0	0	0	0	0
Explanation: The Western Correctional Institution – Wastewater Pump Station Improvements reflects the assumption of electricity savings due to new high efficiency motors.					

UB00 – Maryland Environmental Service

	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Woodstock – Wastewater Treatment Plant Upgrades					
Estimated Operating Cost	\$0.000	\$0.000	\$0.000	\$0.000	\$0.001
Estimated Staffing (Contractual FTEs)	0	0	0	0	0
Explanation: The Woodstock – Wastewater Treatment Plant Upgrades reflects the need for additional chemicals.					
Total Operating Impact					
Estimated Operating Cost	\$0.000	-\$0.037	-\$0.044	-\$0.037	-\$0.045
Estimated Staffing (Contractual FTEs)	0	0	0	0	0

**Consolidated Administrative Expenses – All Programs
(\$ in Millions)**

	FY 2015 Actual	FY 2016 Estimated	FY 2017 Estimated
--	---------------------------	------------------------------	------------------------------

Sources:			
Special Funds			
DNR – Maryland Park Service	\$0.151	\$0.162	\$0.164
Subtotal – Special Funds	\$0.151	\$0.162	\$0.164
General Funds (Other State Reimbursable Projects)	\$0.545	\$0.614	\$0.582
Total Funds	\$0.696	\$0.776	\$0.746

Uses:			
Direct Expenses	\$0.635	\$0.757	\$0.727
Indirect Expenses (Legal, Marketing, Asset Management)	0.061	0.019	0.019
Total Direct and Indirect Expenses	\$0.696	\$0.776	\$0.746

DNR: Department of Natural Resources

MES’s administrative expenses increase from \$695,752 in fiscal 2015 to \$776,071 in fiscal 2016. Costs decrease to \$746,117 in fiscal 2017. MES’s administrative expenses are divided into (1) work on capital improvement projects; and (2) staff charges for the annual budget request, master plan updates, and questions posed by DBM and DLS. The main reason for the reduction in administrative expenses between fiscal 2016 and 2017 is a reduction in the overhead rate charged for capital improvement projects. This was offset partially by an increase in funding for salary increases, fringe benefits, and overhead.

Pre-authorizations and De-authorizations

The fiscal 2017 capital budget bill includes the pre-authorization of \$6,767,000 for fiscal 2018 and \$702,000 for fiscal 2019, as reflected in **Exhibit 8**. **DLS recommends that the pre-authorization of \$6,767,000 for fiscal 2018 and \$702,000 for fiscal 2019 be approved.**

Exhibit 8 Pre-authorizations and De-authorizations

Pre-authorizations

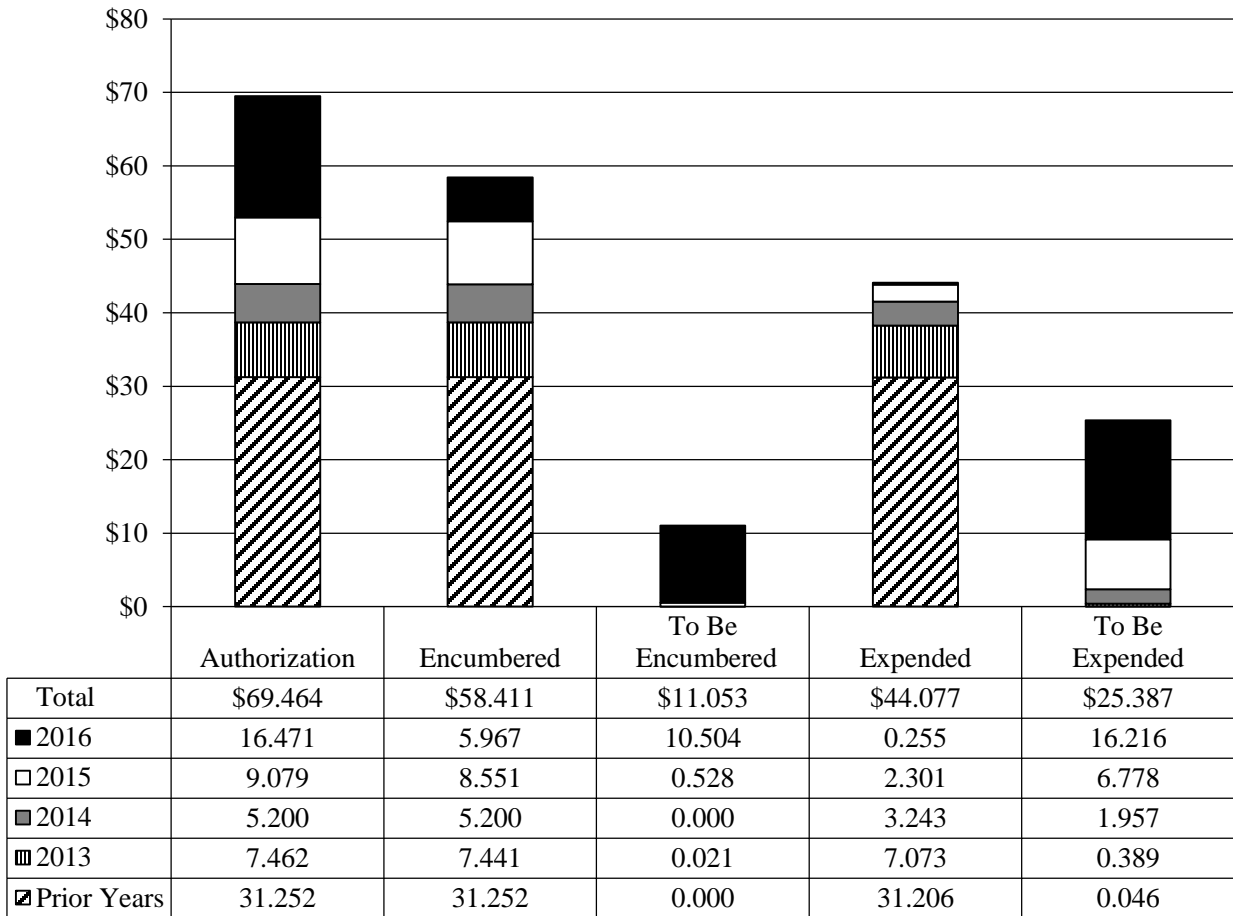
<u>Project</u>	<u>FY 18</u>	<u>FY 19</u>	<u>FY 20</u>	<u>Reason</u>
Eastern Correctional Institution – Wastewater Treatment Plant	\$2,772,000	\$0	\$0	Allow for split funding of construction over fiscal 2017 and 2018
Eastern Pre-Release – Wastewater Treatment Plant	1,100,000	0	0	Allow for split funding of construction over fiscal 2017 and 2018
Cunningham Falls State Park – Water Treatment Plant	1,095,000	0	0	Allow for split funding of construction over fiscal 2017 and 2018
Camp Fretterd – Water and Wastewater Treatment Plants and Water Distribution System	1,000,000	0	0	Allow for split funding of construction over fiscal 2017 and 2018
Eastern Correctional Institution – Co-generation Plant Upgrades	800,000	702,000	0	Allow for split funding of construction over fiscal 2017, 2018, and 2019
Total	\$6,767,000	\$702,000	\$0	

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

Encumbrances and Expenditures

The MES encumbrance and expenditure history for the State Water and Sewer Infrastructure Improvement Fund is shown in **Exhibit 9**. Overall, \$69.5 million in GO bonds have been authorized. Of this amount, MES has encumbered \$58.4 million; \$11.1 million remains to be encumbered. The majority of the funding remaining to be encumbered was authorized in fiscal 2015 and 2016.

Exhibit 9
Infrastructure Improvement Fund Encumbrances and Expenditures
Program Inception through January 2016
(\$ in Millions)



Note: No funding was provided in either fiscal 2011 or 2012.

Source: Maryland Environmental Service

GO Bond Recommended Actions

1. Approve the \$24,825,000 general obligation bond authorization for the Infrastructure Improvement Fund to provide funds to design, construct, and equip water and wastewater facility improvements for State institutions.
2. Approve the pre-authorization of \$6,767,000 in general obligation bonds for split-funded Infrastructure Improvement Fund construction projects in fiscal 2018. The projects include Camp Fretterd – Water and Wastewater Treatment Plants and Water Distribution System Upgrades (\$1,000,000), Cunningham Falls State Park – Water Treatment Plant (\$1,095,000), Eastern Correctional Institution – Co-generation Plant Upgrades (\$800,000), Eastern Correctional Institution – Wastewater Treatment Plant (\$2,772,000), and Eastern Pre-Release – Wastewater Treatment Plant (\$1,100,000).
3. Approve the \$702,000 general obligation bond pre-authorization in fiscal 2019 for a split-funded Infrastructure Improvement Fund construction project – Eastern Correctional Institution – Co-generation Plant Upgrades.