

Maryland Department of the Environment
Physical Capacity Questionnaire for Municipal Separate Storm Sewer
System (MS4) Permittees as Part of a Maximum Extent Practicable (MEP)
Analysis April 12, 2019

Submitted by Baltimore County, June 4, 2019

Revised June 28, 2019

- 1) What is the typical implementation time frame (from planning through construction) for a restoration project? Provide a typical Gantt chart for the following three main classes of BMPs and break down into planning, design, and construction phases: 1. Large upland stormwater projects (e.g., new and retrofits for ponds, bioretention, infiltration basins, etc.); 2. Instream restoration projects; and, 3. Alternative projects (not annual) (e.g., tree planting). Provide a written justification to explain the time frames for each BMP class and phase.

Gantt charts are provided in the attached Excel file "Physical Capacity Gantt Charts Baltimore County 20190604.xlsx." These Gantt charts show the minimum, typical, and maximum expected durations for each task/phase. For project tasks/phases that cannot run concurrently, the Gantt charts show each project phase beginning at the end of the typical duration of the prior project phase. Tasks/phases that can run concurrently use a typical timing relative to the other tasks/phases. When tasks/phases take longer than is typical, the subsequent task/phase will begin later than shown in the Gantt chart, and the project completion will occur later than is shown.

Stream Restoration – the timeframe for implementation is currently averaging 4.5 – 5 years from technical project selection/design to as-built approval. This timeframe does not include pre-project planning, 3-year budget gap or incidental hardships (included below). Incidental Hardships can add up to an additional +/-3 years. The following detailed implementation milestones are:

- Pre-project planning: In-house watershed evaluations, stream complaint assessments, SWAPs and mandate Guidance.
- Technical project selection and prioritization (6-12 months prior to budget prep).
- Project named in the capital budget, usually 3 FY out (3 year time-gap)
- Planning and preparations for project initiation (3 months).
- Design process: consultant assignment, scope & cost negotiation, full topo survey, assessment, conceptual development, design, reviews, permitting & approvals, community involvement and access approvals, budgeting, and final P/S/E documents (e.g. best case scenario 24 months).
- Incidental Hardships: private property approvals or special permitting issues (+/-12-24 months).
- Construction contract process (3-4 months).
- Incidental Hardship: Stream closure avoidance (If Applicable +3-12 months).

- Construction (average 9-12 months).
- Planting (seasonal limits +/- 4 months).
- As-built Survey Approval (+/- 6-9 months post construction).

Shoreline Enhancement/Restoration – the timeframe for implementation is currently averaging 3.5-4 years from technical project selection/design to as-built approval. This does not include pre-project planning, 3 year budget gap or incidental hardships (included below). Incidental Hardships can add up to an additional +/-3 years. The following detailed implementation milestones are:

- Pre-project planning and preparation: Projects are prioritized based on opportunities identified in watershed/coastal management plans, staff assessment/evaluations, and citizen interest/concerns/complaints.
- Technical project selection and prioritization (6-12 months prior to budget prep).
- Project named in the capital budget, usually 3 FY out (3 year time-gap).
- Design process – consultant assignment, scope & negotiation, hydrographic and topographic, geotechnical investigation surveys, basis of design, data collection, coastal modeling, alternative analysis, technical memorandum, concept development (30%), design (50%, 90%, 100%), permitting, final plans, specifications and engineer's cost estimate (2½-3 years).
- Permitting and approvals – JPA for MDE Tidal Wetland License (offshore borings), ACOE Permit and MDE TWL for shoreline construction, MDE Non-Tidal review & approval, MDE Hearings, Grading Permit, Grading Plan Review, EIR, SCD, CAC, NOI and Coast Guard Private Aids to Navigation (12-18 months).
- MDE Tidal Wetland License must go to Board of Public Works for approval prior to authorization.
- Construction contract process (3-4 months).
- Construction (5-6 months).
- Planting (seasonal limits +/- 4 months).
- As-built survey approval (+/- 9 months).
- Incidental Hardships: Time of year restrictions, hearings, interdepartmental review and approval (Property Management/Recreation & Parks), loss of production due to weather and/or tides.

Stormwater BMPs (Conversions & Retrofits) – the timeframe for implementation is currently averaging 1-4.5 years from the technical project selection/design to as-built approval. This timeframe does not include pre-project planning or incidental hardships. Funding approval is on an annual basis under one bulk budget item based on the higher number of projects. The following detailed implementation milestones are:

- Pre-project planning and preparation: Projects are prioritized based on opportunities identified in the watershed management plans and staff assessment/evaluations of existing SWM ponds.
- Technical project selection and prioritization (6 months prior to budget prep).
- Projects named in the capital budget approximately 1-2 FYs out.

- Design process – determine in-house design process or consultant assignment with scope & cost negotiation, H/H analysis, and topographic survey, concepts to full design, access approvals, permitting, final plans, specifications and engineer's cost estimate (1-2 years).
- Construction contract process (3-4 months).
- Construction (5 months).
- Planting (seasonal limits +/- 2 months)
- As-built survey approval (+/- 8 months)

Private Property Reforestation – the timeframe for implementation is currently averaging 4.75 months – 1.5 years. The time of the year the contract is awarded can delay the project by several months as trees are typically planted between October and December in the fall and April and May in the spring. After the trees are planted, there is a 3-year maintenance period for reforestations. The following detailed implementation milestones are:

- Planning: Identification sites with reforestation potential and solicit private property owners (1 – 3 months).
- Design Process: Receive request to plant, internal EPS review, site visit, map reforestation area, develop planting plan, confirm planting location, and receive entry agreement from property owner (2 weeks to 3 months).
- Contractor Procurement Process (2 – 3 months).
- Construction: Begin planting during current or next planting season (1 – 9 months).
- Planting Inspection (1 – 2 weeks post construction).
- 3 – Year maintenance warranty.

Private Property Trees Over Turf (HOAs, Business) – the timeframe for implementation is currently averaging 6.25 months – 1.7 years. The time of the year the contract is awarded can delay the project by several months as trees are typically planted between October and December in the fall and April and May in the spring. Scheduling meeting with HOA boards can also delay project development. After the trees are planted, there is a 1-year maintenance period for reforestations. The following detailed implementation milestones are:

- Planning: Identification sites with reforestation potential and solicit private property owners (1 – 3 months).
- Design Process: Receive request to plant, internal EPS review, meeting with property owner/HOA representative, site visit with property owner/HOA representative, map tree locations, develop planting plan, HOA/property owner approves planting plan (2 – 5 months).
- Contractor Procurement Process (2 – 3 months).
- Construction: Begin planting during current or next planting season (1 – 9 months).
- Planting Inspection (1 – 2 weeks post construction).
- 1 – Year maintenance warranty.

Street Trees – the timeframe for implementation is currently averaging 6.25 months – 1.7 years. The time of the year the contract is awarded can delay the project by several months as trees are typically planted between October and December in the fall and April and May in the spring. If property owners are not interested in planting trees, the project is cancelled. After the trees are planted, there is a 1-year maintenance period for reforestations. The following detailed implementation milestones are:

- Planning: receive planting request from community, meet with community, and identify locations on street with tree planting potential, internal County review. Preliminary approval is required from the County's Arborist in DPW (2 weeks – 2 months).
- Design Process: Solicit private property owners (send letters to property owners detailing potential project, community member goes door to door requesting permission to plant a tree, receive entry agreements, check planting locations and utilities, map tree locations, and develop planting plan (2.5 – 5 months).
- Contractor Procurement Process (2 – 3 months).
- Construction: Begin planting during current or next planting season (1 – 9 months).
- Planting Inspection (1 – 2 weeks post construction).
- 1 – Year maintenance warranty.

Public Property Rural and Urban (Landscape) Reforestations – the timeframe for implementation is currently averaging 6 months – 2.5 years. The time of the year the contract is awarded can delay the project by several months as trees are typically planted between October and December in the fall and April and May in the spring. After the trees are planted, there is a 1 to 3-year maintenance period for reforestations. The following detailed implementation milestones are:

- Planning: Identification sites with reforestation potential and internal County review (request preliminary approval from land managing agency) (1 – 3 months).
- Design Process: Site visit, utilities check, map reforestation area, develop planting plan, send planting plan to land managing agency approval (2 weeks to 1.5 months).
- Landowner Coordination (if required): Community meetings/mailings, revise planting plan per community request, receive letter of support from community (2 months to 11.5 months)
- Contractor Procurement Process (2 – 3 months).
- Construction: Begin planting during current or next planting season (1 – 9 months).
- Planting Inspection (1 – 2 weeks post construction).
- 1 to 3 – Year maintenance warranty.

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- 2) Provide the average time to authorize capital improvement project (CIP) budgets for the initial project planning phase and for the design phase of a typical restoration project (assumes CIP approval for each phase is required). Do you have the ability to combine these two phases or do you have to get CIP approval for each phase consecutively?

The average time for restoration projects to become authorized in the Baltimore County EPS Capital Improvement Program (CIP) budget is approximately 2-3 years depending on the source of revenue supporting the allocations. Most projects in the CIP funded by general obligation bonds, general funds and grants take 3 years and are phased in the budget by first initiating the design funding after final project identification and then phasing the proposed construction funding two years later. This process provides an important balance of staff and contractor workloads, but most important for the timely and efficient use of authorized funds. Another source of funding is provided by the Metropolitan District where the project phases (design & construction) are combined most fiscal years for the purpose of annual distributions from the fund.

- 3) Provide the average time to procure professional planning, design, and construction services. Is procurement done in phases(e.g., procurement for planning, then procurement for design, and then procurement for construction)? How would a pay for performance type of contract or a design-build-operation-maintenance contract affect these time frames? Please provide information on any innovative contracting mechanism you use to reduce procurement timeframes and what those reduced time frames are.

Average times to procure professional planning/design and construction services are as follows:

- On-call Planning Services (Watershed Analysis and Small Watershed Action Plans-SWAPS) - 1 year & 8 months.
- On-call Professional Design Services – 1 year & 8 months.
- On-call Time and Material Design/Build – 1 year & 8 months.
- Construction Contracts process – takes 4 months to initiate every project (advertisement to bid).

On-call maximum term is 7 years for each planning/design services contract. Baltimore County is currently researching the IDIQ (Indefinite Quantity) method and other request for proposal (RFP) approaches.

For reforestation, the procurement phase is typically done once per project. For larger projects that require more intensive site prep, we may ask for a site prep/planting proposal separately from the maintenance proposal. Long-term maintenance after the initial three years will be done through a new procurement process. We are currently working on a long-term maintenance contract for reforestation

Our current reforestation contracts are similar to a design-build-operation-maintenance contract. The County finds and approves the site locations and may or may not design the planting plan. The contractor preforms the site prep, maintenance, and initial three years of maintenance for reforestations and one year of maintenance for landscape style trees. Whether or not the County designs the planting plan does not affect the overall time frame of the project. The time frame for a pay for performance type would be the same or increased. A pay for performance contract would be handle similar to how the County deals with mitigation banks under the Forest Conservation Act. The time frame for a mitigation bank from initial request to planting ranges from six months to two years.

- 4) Provide the number of requests for proposals (RFPs) for BMP construction and for BMP design advertised during the past 5 year permit term. Of these, how many bids were submitted for each RFP and how many required re-advertising? Was there a trend over the permit term in the number of bid submittals received? How many unique companies provided bids for all RFPs?

There were 4 requests for proposals for professional design services (Stream and Shoreline Restoration, Stormwater BMP) over the past 5 years and 19 firms selected for this work out of approximately 55 submittals. Construction services are mostly done by competitive bid with 28 projects awarded out of 73 bidders during this timeframe. In Baltimore County (probably others too) we have the following 3 types of solicitation for construction services:

RFPs – specialized on-calls and reviewed for technical performance, such as reforestation services.

RFBs – (Request for bids) used for specialized and complex work and competitively bid such as environmental or SWM on-call services.

Construction Competitive Bid – Baltimore County contractor specialized prequalification process is used for competitive bids involving large shoreline and stream projects.

All of the design and construction companies are unique given the specialized work they do, but more importantly consultants and contractors are required to follow the County’s engineering design approval process through the Department of Public Works (DPW) Professional Services Selection Committee (PSSC) and the contractor prequalification construction process for submitting competitive bids.

For reforestation BMPs the County has three on-call contracts for planting and maintaining reforestations, including an on-call forester contract, an on-call rural reforestation contract, and an on-call urban reforestation (landscape tree) contract. The County’s on-call forester contract was bid prior to the 5 year permit term.

Contract	# RFPs	# Bids
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On-call Reforestation	1	3
On-call Landscape	1	3
Individual Project RFPs for Reforestation BMPs	127	212

For reforestation BMPs, 4 companies have provided bids for the RFPs.

- 5) Provide information on contracting limitations that result in longer project implementation times. Examples: Limited qualified construction contractors; Woman owned business enterprise (WBE) or minority owned business enterprise (MBE) requirements limit available qualified construction contractors and/or engineering contractors. Describe the issue and provide the time extension that results due to the issue.
- High bid costs exceed available budget with trickle-down effect to other budgeted projects. Requires a revised allotment (4-6 week delay).
 - High bids costs that exceed 20% of engineers estimate require letter of justification and approval from County Administration. (4-8 week delay).
 - Low number of Bidders from pool of Baltimore County prequalified contractors (2 bids or less is not uncommon and can also require an additional bid analysis and justification process). Typically 3 out of a possible 10-12 actually bid on the project.
 - Bidders making careless mistakes in bid submissions, incomplete MBE forms, or late bid submissions, require process of disqualification and appeals (+2-3 months – can affect delay project with pending stream closure).
 - 30% MBE requirement - delays in MBE submissions back to prime, limited availability of qualified contractors to perform specific tasks, lack of direct control by the prime, and 30% substantial percentage making Baltimore County projects less appealing to pre-qualified contractors.
 - Construction contractors are busy/spread thin which can result in slow construction progress, inexperienced crews, sub-par work product, and slow progress. This requires workmanship corrections, more construction inspection and oversight time and money commitment, and higher probability of post construction repairs associated with a final as-built.
 - Contractors are unavailable because of on-call or bid projects in other local jurisdictions with the same type of work.
 - Contractors must comply with State prevailing wage requirements for projects receiving \$500,000 or more State funded grants.
 - Decreasing availability of materials with increased costs result in bid delays, as well as during construction.

Impacts on reforestation BMPs - The main issue impacting the timing of reforestation BMPs is the property owner approval and the season. If we don't receive approval before the planting season, we cannot guarantee a Delivery Order in time for planting and the project is pushed to the next season. We have a 2 – 3 months to plant each fall and spring. While MBE requirements limit planting diversity and tree availability, they do not typically delay reforestation implementation. Lack of community and property owner support can cancel projects

- 6) Provide a typical time frame required to obtain permits from local, State, and federal agencies for the three main BMP project classes (i.e., upland stormwater ponds, instream restoration, and alternative projects) prior to construction. Describe how these time frames affect the overall project implementation time frames described in Question #1. How can these time frames be reduced to help get these projects out the door faster?

Permit timeframes for local, State, and federal agencies affect the overall implementation timeframes and sometimes take between 1-1.5 years to obtain authorization (see project flow chart – Question #1). Listed below are the affects and recommendations to reduce permit times:

- ACOE thresholds in MS4 GP are for minor projects and should be increased more than 2,000 linear feet.
- Agencies should consider our implementation schedule and the drop dead dates for hitting construction windows.
- Excessive Local SCD reviews, with nitpicky comments – such as where the pump around hose is shown on the plan. Provide greater flexibility in the field, without flexibility it trickles down to rigid inspections by Sediment Control Inspectors (local and state) requiring every minor modification be sent back through MDE and SCD. A lack of stream and shoreline restoration construction experience by the local SCD reviewers restricts adaptations to comply with the sediment control regulations. Training is needed so that applied knowledge can be integrated into the review of these designs, allowing for a better understanding of project intent to the local SCD.
- Wetland impacts should not always require mitigation and are sometimes inevitable - consider the entire system.
- Agencies need to respect significant staff experience and the local assessment and prioritization process.
- Understand projects they see for permitting today were developed & designed under best available guidance 5+ years ago (Consider 3-year gap in budget cycle + 2 years of design).
- FEMA process for local review has become a new permitting/approval issue and processed through our DPW. This should be noted to the agencies for it has added costs and another review to the timeline.

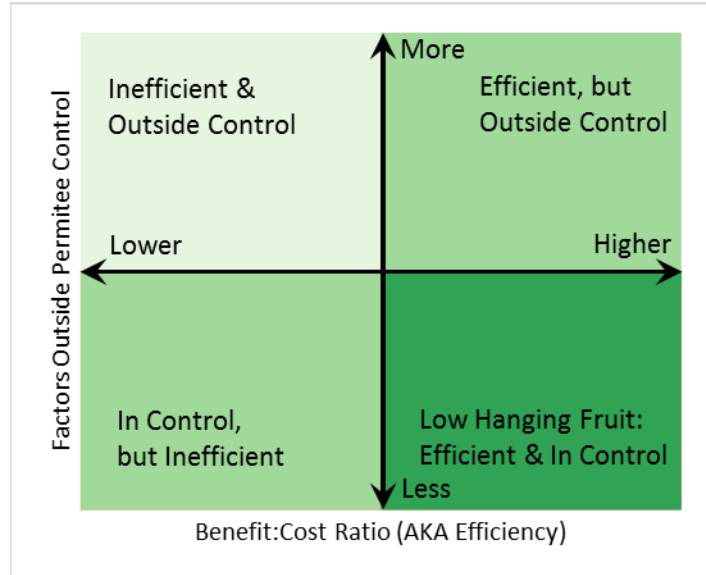
At this time we do not have to obtain permits from local, state, and federal agencies for our reforestation BMPs. In the future we may pursue local easements which will increase the time frames of implementing our projects. For reforestation projects planted on public land we are required to get approval from the agency who maintains the property. This can take anywhere from 2 weeks to a year.

- 7) What type of a project do you consider as “low-hanging fruit”? What is your remaining capacity of available “low-hanging fruit” projects (estimate the number and impervious acre treatment total)?

Just as any given piece of fruit on a tree may be easier or harder to reach than any other, restoration projects may be characterized by their accessibility and efficiency. Rather than a single scale, water quality restoration projects should be considered on at least two

dimensions: benefit to cost ratio AKA efficiency, and the degree of control permittees exercise over implementation. This concept is illustrated in Figure 1 below. Low-hanging fruit are projects with high benefit:cost ratios and which the permittee has complete or nearly-complete control over design and implementation. When benefit to cost or implementation control fall below some threshold, the project is not low-hanging fruit.

Figure 1: Efficiency, Control, and Low Hanging Fruit



Factors that reduce control over design and implementation:

- Permittee must request permission from other landowners to use or acquire land.
- Permittee must balance competing uses for land.
- Project is contingent on work of others, e.g.:
 - Redevelopment SWM facilities will not occur without all the other components of a redevelopment project falling into place (plan and permit approvals, capital funding, etc.)
 - External entity responsible for project tasks (design, construction, or both)
 - Homeowner or property owner must complete tasks (e.g. grant or permit applications, hiring of contractors, etc.)

Factors that reduce benefit:cost ratios:

- Small project size (e.g. small tree planting area, small SWM pond drainage area, small degraded stream reach, low number of houses to be connected to sewer, etc.)
- Access challenges (acquisition of easements or land for access, long/steep path from public rights of way)
- Material shortages
- Contractor shortages
- Project complexity (number of property owners, staff, contractors to coordinate and manage)
- More requirements written into permits

It is important to distinguish volunteered water quality BMPs from those under the direct control of the County. Volunteered BMPs include voluntary tree planting, septic pumpouts, stormwater retrofits, redevelopment projects, and any other BMPs that are not directly implemented by the County for water quality purposes. The County actively encourages and supports volunteered BMPs, for example via outreach and education, capacity building grants to non-profit private sector watershed associations, and enforcement of development regulations (stormwater management, forest conservation act, zoning, etc.). These BMPs are important because they do impact water quality and therefore should be included in water quality models (e.g. TMDLs). Because they are the outcome of efforts by the citizens and governments of Baltimore County and the State of Maryland, they count towards TMDL compliance. While volunteered BMPs have high benefit:cost ratios because the costs to the County are either small or are incurred for reasons external to MS4 permit compliance (e.g. required by law), they are not low-hanging fruit because the County has little control over the actions of the volunteers.

Stream Restoration Low Hanging Fruit

- Streams that can provide water quality benefits and are contained on County owned, floodplain reservation, with adequate space to implement the best approach and where structural elements can be minimized to the greatest extent possible.
- Projects where 100-Yr WSE expansion is not an issue and exhibits manageable hydrology along with full community support.
- Mid-sized projects between 2,000-3,500 LF that can be completed by in one construction season.
- Very limited natural resource constraints including wetlands and tree removal, as well as limited civil impact such as sewer, outfalls, and road culverts.
- An estimate of the quantity of low hanging fruit stream restoration opportunities is not currently available. Additionally, MDE has indicated that stream restoration will not generate impervious surface restoration under the next MS4 permit.

Shoreline Restoration Low Hanging Fruit

- Projects that provide improved water quality and the opportunity for ecological uplift.
- Tidal reaches that are owned by Baltimore County or State of Maryland.
- Projects which are easy to access for with minimal disturbance (avoidance of wetlands and tree removal).
- Shorelines with reaches of sufficient length to have the benefit of the economy of scale e.g. short reaches are almost as expensive as longer reaches to design/permit/construct. Cost benefit ratio.
- Projects which can be constructed in one season so contractor does not need to mobilize twice and have sufficient space for stock piles.
- Projects with community support and exhibit active erosion.
- Limited conflicts with current and future use of the property. For example, converting turf fields to upland forest or removing parking spaces

(imperviousness) at a county park would change the use of the park which in most instances would not be supported by the management or community.

- An estimate of the quantity of low hanging fruit shoreline management opportunities is not currently available. Additionally, MDE has indicated that stream restoration will not generate impervious surface restoration under the next MS4 permit.

Stormwater Facility Conversion Low Hanging Fruit

- Existing detention and extended detention stormwater facilities under County ownership.
- Currently 1500 facilities need to be evaluated for conversion to incorporate the water quality component. About a third are expected to be excellent candidates for conversion. Conversion of 500 dry detention or dry extended detention ponds to shallow marshes is expected to yield 843.75 acres of impervious surface restoration.

New Stormwater Facility Retrofit Low Hanging Fruit

- County owned property that can support the required size of stormwater retrofits without conflicting with existing County plans for the property. Such "surplus" property is currently scarce in Baltimore County. School property is now often reserved for school construction purposes. Baltimore County has maintained its urban growth controls (e.g. the Urban Rural Demarcation Line and Resource Conservation Zoning) even as the population has increased, leading to increasing demands on recreational open space within the urbanized areas of the County, even as open space (e.g. vacant lots) is replaced by development through infill.
- Compared to conversions, these projects have much lower benefit:cost ratios. Until the conversions are completed, new stormwater facility retrofits cannot be considered low hanging fruit.

Reforestation Low Hanging Fruit

- County owned property that can support large reforestation plantings without conflicting with existing County plans for the property. Such "surplus" property is currently scarce in Baltimore County. School property is now often reserved for school construction purposes. Baltimore County has maintained its urban growth controls (e.g. the Urban Rural Demarcation Line and Resource Conservation Zoning) even as the population has increased, leading to increasing demands on recreational open space within the urbanized areas of the County, even as open space (e.g. vacant lots) is replaced by development through infill.
- An estimate of the quantity of low hanging fruit shoreline management opportunities is not currently available. Additionally, MDE has indicated that stream restoration will not generate impervious surface restoration under the next MS4 permit.

- 8) Complete the spreadsheet provided for restoration projects to be planned, designed, and/or constructed from 2020 through 2027. Include for each restoration project the estimated impervious acres treated, estimated total nitrogen (TN) reduction, and estimated total suspended sediments (TSS) reduction; any local total maximum daily load (TMDL) parameter (or other water quality objective) addressed; estimated cost; implementation status; and projected completion year. Include projects that will be in the planning or design phase but will not be completed until after 2025. This information should be more specific for the first reporting year but may be more generalized for the remaining reporting years.
- 9) Provide a copy of your 5 year CIP for restoration projects (2020-2027).

The restoration project capital budget includes the capital budget for Baltimore County's Waterway Improvement Fund, plus \$10 million per year in funds (typically bonds) from the Baltimore County Metropolitan District (sewer and water utility) for stormwater restoration projects that are protective of the sanitary sewer infrastructure and drinking water quality and infrastructure. The FY2020 Waterway Improvement Fund and Storm Drains capital budgets, adopted May 23, 2019, are shown below:

SOURCE OF FUNDING SUMMARY							
CAPITAL BUDGET FY 2020							
CAPITAL IMPROVEMENT PROGRAM FY 2021 - FY 2025							
Stage 3							
	TOTAL FOR 6 YR PROGRAM	BUDGET YEAR 2020	FIVE YEAR CAPITAL IMPROVEMENT PROGRAM				
			FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
221 - WATERWAY IMPROVEMENT FUND							
9331R - GENERAL FUNDS	10,000,000	0	10,000,000	0	0	0	0
9441R - CURRENT/FUTURE G O BONDS	55,000,000	10,000,000	0	25,000,000	0	20,000,000	0
9449R - REALLOCATED G O BONDS	1,733,075	1,733,075	0	0	0	0	0
9650R - STORM WATER WAIVER FEE	400,000	400,000	0	0	0	0	0
9690R - REFORESTATION WAIVER FEE	400,000	400,000	0	0	0	0	0
TOTAL 221 - WATERWAY IMPROVEMENT FUND	67,533,075	12,533,075	10,000,000	25,000,000	0	20,000,000	0
SOURCE OF FUNDING SUMMARY							
CAPITAL BUDGET FY 2020							
CAPITAL IMPROVEMENT PROGRAM FY 2021 - FY 2025							
Stage 3							
	TOTAL FOR 6 YR PROGRAM	BUDGET YEAR 2020	FIVE YEAR CAPITAL IMPROVEMENT PROGRAM				
			FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
204 - STORM DRAINS							
9441R - CURRENT/FUTURE G O BONDS	17,550,000	5,850,000	0	5,850,000	0	5,850,000	0
9560R - DEVELOPERS RESPONSIBILITY	1,500,000	500,000	0	500,000	0	500,000	0
TOTAL 204 - STORM DRAINS	19,050,000	6,350,000	0	6,350,000	0	6,350,000	0

The total capital budget for stormwater restoration for 2020-2024, including the \$10 million per year in metro funds, is \$117,533,075 or \$23,506,615 per year. The total capital budget for storm drain and flood control for 2020-2024 is \$19,050,000, or \$3,810,000 per year. The total capital budget for all stormwater infrastructure and restoration for 2020-2024 is \$136,583,075, or \$27,316,615 per year.

- 10) Provide a copy of your operating budget for annual restoration projects (FY2019).

The costs shown in the FY2019 annual BMP operating budget table below are incomplete and thus conservative. The numbers provided here represent the primary Baltimore County operating staff and programs. However, the operation of these annual BMP programs requires smaller secondary contributions from a large number of County personnel and other resources funded by the County's overall operating budget. These smaller secondary costs are not presented here.

Annual BMPs	FY2019 Operating Budget
Street Sweeping	\$921,274
Storm Drain Cleaning	\$160,408
IDDE*	\$146,789
Septic Pumpouts**	\$15,808
Total	\$1,244,279

*IDDE costs reflect the time and materials of EPS staff. Additional time and materials costs are incurred by staff in other agencies who receive referrals from EPS and follow up on and correct illicit discharges...due to the complexity of IDDE referrals and corrective actions, it was not possible to assemble cost information in time for this report.

**Septic pumpout costs reflect the time and materials of EPS staff. Additional time and materials costs are incurred by staff in DPW Bureau of Utilities, however an estimate of this cost was not available at the time of writing. Also not included are the costs of operating and maintaining the pumping stations that accept septic pumpout materials, or any of the costs borne by the septic system owners.

- 11) Provide a copy of your operating and maintenance budget for all BMPs implemented under the MS4 permit? (FY2019)

The costs shown in the FY2019 perennial BMP operating and maintenance (O&M) budget table below are incomplete and thus conservative. The numbers provided here represent the primary Baltimore County operating staff and programs, subject to the caveats beneath the table. However, the operation of these annual BMP programs requires smaller secondary contributions from a large number of County personnel and other resources funded by the County's overall operating budget. These smaller secondary costs are not presented here.

Perennial BMPs	FY2019 O&M Budget
Stormwater Ponds*	\$4,795,651
Reforestation and Landscape Trees	\$112,499
Stream Restoration	\$24,660
BAT Septic Systems	\$17,615
Shoreline Management	\$9,394
Total	\$4,959,819

*The stormwater pond costs are for tasks performed by EPS and the Baltimore County Public Schools. Additional stormwater pond costs are incurred by other County agencies (e.g. property management and community colleges), but information was not available at the time of writing. Additional costs are incurred by private entities to maintain the thousands of stormwater facilities in non-County maintenance. The costs presented include capital budget expenditures on stormwater pond repairs, excluding the cost to convert stormwater ponds to shallow marshes (which are included in the restoration portfolio as new restoration project costs.)

Septic connections to the public sewer require substantial County staff time investments. Estimates of these costs were not available at the time of writing.

And Funded from FY 2019 through FY 2024
Baltimore County, Maryland
June 4, 2019
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Remaining Unmet Restoration Obligation from
Previous Permit (Impervious Acres):

REST BMP ID	REST BMP TYPE¹	BMP CLASS²	NUM BMP	IMP ACRES	TSS REDUCTION (lbs/year)	TN² REDUCTION (lbs/year)	IMPLEMENTATION COST	IMPLEMENTATION STATUS²	PROJECTED IMPLEMENTATION YEAR	TMDL PARAMETER OR WQ OBJECTIVE ADDRESSED	GENERAL COMMENTS³
Remaining Unmet Restoration Obligations from Previous Permit											
Annual Operational Programs (Unmet Obligations from Previous Permit)³,⁴											
Street Sweeping		A									
		A									
Catch Basin Cleaning		A									
		A									
Septic Sytem Pumping		A									
		A									
Subtotal Operations⁵			0	0			\$0				
Capital Projects (Unmet Obligations from Previous Permit Term)											
Subtotal Capital			0	0			\$0				
Other (Unmet Obligations from Previous Permit Term)											
Subtotal Other			0	0			\$0				
Total of Remaining Obligations from The Previous Permit			0	0			\$0				
Obligations from Previous Permit That Must Be Continued											
Annual Operational Programs Required to be Maintained from Previous Permit³,⁴											
TBD000670	MSS	A	0		0	2,250.3	\$921,274	Planning	2019	Flooding, Trash TMDL, Trash Reduction Strategy	2019: 2250.3 + 138.4+ 164.5 lb TN from annual BMPs + 1230.6 lb TN from replacement perennil BMPs = 3783.8 lb TN to be maintained from prior permit annual BMPs. 2019: 0 lb TSS from annual BMPs + 857399 lb TSS from replacement perennil BMPs > 691565 lb TSS to be maintained from prior permit annual BMPs. Curbs swept at least 2 times per year
TBD000334	MSS	A	0		0	211.0	\$815,169	Planning	2020	Flooding, Trash TMDL, Trash Reduction Strategy	2020: 211.0 + 13.0 + 15.4 lb TN from annual BMPs + 3544.4 lb TN from replacement perennil BMPs = 3783.8 lb TN to be maintained from prior permit annual BMPs. 2020: 0 lb TSS from annual BMPs + 3980339 lb TSS from replacement perennil BMPs > 691565 lb TSS to be maintained from prior permit annual BMPs. Curbs swept at least 2 times per year
TBD000335	MSS	A	0		0	0.0	\$822,610	Planning	2021	Flooding, Trash TMDL, Trash Reduction Strategy	2021: 0 lb TN from annual BMPs + 4104.1 lb TN from replacement perennil BMPs > 3783.8 lb TN to be maintained from prior permit annual BMPs. 2021: 0 lb TSS from annual BMPs + 4985853 lb TSS from replacement perennil BMPs > 691565 lb TSS to be maintained from prior permit annual BMPs. Curbs swept at least 2 times per year
TBD000336	MSS	A	0		0	0.0	\$830,424	Planning	2022	Flooding, Trash TMDL, Trash Reduction Strategy	2022: all annual BMP obligations met via replacement perennil BMPs as of 2021. Curbs swept at least 2 times per year
TBD000337	MSS	A	0		0	0.0	\$838,629	Planning	2023	Flooding, Trash TMDL, Trash Reduction Strategy	2023: all annual BMP obligations met via replacement perennil BMPs as of 2021. Curbs swept at least 2 times per year
TBD000338	MSS	A	0		0	0.0	\$847,244	Planning	2024	Flooding, Trash TMDL, Trash Reduction Strategy	2024: all annual BMP obligations met via replacement perennil BMPs as of 2021. Curbs swept at least 2 times per year
TBD000671	SDV	A	0		0	138.4	\$160,408	Planning	2019	TN, TP, and TSS TMDLs, Flooding, Trash TMDL, Trash Reduction Strategy	2019: 2250.3 + 138.4+ 164.5 lb TN from annual BMPs + 1230.6 lb TN from replacement perennil BMPs = 3783.8 lb TN to be maintained from prior permit annual BMPs. 2019: 0 lb TSS from annual BMPs + 857399 lb TSS from replacement perennil BMPs > 691565 lb TSS to be maintained from prior permit annual BMPs.
TBD000339	SDV	A	0		0	13.0	\$160,408	Planning	2020	TN, TP, and TSS TMDLs, Flooding, Trash TMDL, Trash Reduction Strategy	2020: 211.0 + 13.0 + 15.4 lb TN from annual BMPs + 3544.4 lb TN from replacement perennil BMPs = 3783.8 lb TN to be maintained from prior permit annual BMPs. 2020: 0 lb TSS from annual BMPs + 3980339 lb TSS from replacement perennil BMPs > 691565 lb TSS to be maintained from prior permit annual BMPs.
TBD000340	SDV	A	0		0	0.0	\$160,408	Planning	2021	TN, TP, and TSS TMDLs, Flooding, Trash TMDL, Trash Reduction Strategy	2021: 0 lb TN from annual BMPs + 4104.1 lb TN from replacement perennil BMPs > 3783.8 lb TN to be maintained from prior permit annual BMPs. 2021: 0 lb TSS from annual BMPs + 4985853 lb TSS from replacement perennil BMPs > 691565 lb TSS to be maintained from prior permit annual BMPs.
TBD000341	SDV	A	0		0	0.0	\$160,408	Planning	2022	TN, TP, and TSS TMDLs, Flooding, Trash TMDL, Trash Reduction Strategy	2022: all annual BMP obligations met via replacement perennil BMPs as of 2021.
TBD000342	SDV	A	0		0	0.0	\$160,408	Planning	2023	TN, TP, and TSS TMDLs, Flooding, Trash TMDL, Trash Reduction Strategy	2023: all annual BMP obligations met via replacement perennil BMPs as of 2021.
TBD000343	SDV	A	0		0	0.0	\$160,408	Planning	2024	TN, TP, and TSS TMDLs, Flooding, Trash TMDL, Trash Reduction Strategy	2024: all annual BMP obligations met via replacement perennil BMPs as of 2021.
TBD000672	SEPP	A	0		0	164.5	\$0	Planning	2019	Local TN TMDL and Bay TMDL, Bacteria TMDLs	2019: 2250.3 + 138.4+ 164.5 lb TN from annual BMPs + 1230.6 lb TN from replacement perennil BMPs = 3783.8 lb TN to be maintained from prior permit annual BMPs. 2019: 0 lb TSS from annual BMPs + 857399 lb TSS from replacement perennil BMPs > 691565 lb TSS to be maintained from prior permit annual BMPs.
TBD000344	SEPP	A	0		0	15.4	\$0	Planning	2020	Local TN TMDL and Bay TMDL, Bacteria TMDLs	2020: 211.0 + 13.0 + 15.4 lb TN from annual BMPs + 3544.4 lb TN from replacement perennil BMPs = 3783.8 lb TN to be maintained from prior permit annual BMPs. 2020: 0 lb TSS from annual BMPs + 3980339 lb TSS from replacement perennil BMPs > 691565 lb TSS to be maintained from prior permit annual BMPs.
TBD000345	SEPP	A	0		0	0.0	\$0	Planning	2021	Local TN TMDL and Bay TMDL, Bacteria TMDLs	2021: 0 lb TN from annual BMPs + 4104.1 lb TN from replacement perennil BMPs > 3783.8 lb TN to be maintained from prior permit annual BMPs. 2021: 0 lb TSS from annual BMPs + 4985853 lb TSS from replacement perennil BMPs > 691565 lb TSS to be maintained from prior permit annual BMPs.
TBD000346	SEPP	A	0		0	0.0	\$0	Planning	2022	Local TN TMDL and Bay TMDL, Bacteria TMDLs	2022: all annual BMP obligations met via replacement perennil BMPs as of 2021.
TBD000347	SEPP	A	0		0	0.0	\$0	Planning	2023	Local TN TMDL and Bay TMDL, Bacteria TMDLs	2023: all annual BMP obligations met via replacement perennil BMPs as of 2021.
TBD000348	SEPP	A	0		0	0.0	\$0	Planning	2024	Local TN TMDL and Bay TMDL, Bacteria TMDLs	2024: all annual BMP obligations met via replacement perennil BMPs as of 2021.
Subtotal Operations⁵			0		0	465.4	\$6,037,798				Annual BMPs during the prior permit term reduced 691,565 lbs of TSS to local waters and 3,783.8 lbs of TN to the Bay annually. These quantities must be removed annually by some combination of annual and perennial BMPs.
Capital Projects (Proposed to Replace Annual Obligations)											
ALN000113	STRE							Design			
ALN000113	STRE						\$703,000	Under Construction	2019		
ALN000113	STRE	A	1		508,000	711.0		Complete	2019	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000070	STRE							Design			
ALN000070	STRE						\$395,000	Under Construction	2019		
ALN000070	STRE	A	1		341,000	476.6		Complete	2019	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000062	STRE							Design	2018		
ALN000062	STRE						\$1,800,000	Under Construction	2019		
ALN000062	STRE	A	1		112,125	445.4		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000046	STRE							Design	2017		
ALN000046	STRE							Under Construction	2019		
ALN000046	STRE	A	1		203,085	62.9		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000068	STRE							Design	2018		
ALN000068	STRE						\$270,000	Under Construction	2019		
ALN000068	STRE	A	1		444,000	614.6		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000060	STRE							Design	2018		
ALN000060	STRE						\$110,418	Under Construction	2019		
ALN000060	STRE	A	1		67,500	299.7		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000114	STRE							Design	2018		
ALN000114	STRE						\$1,486,000	Under Construction	2019		
ALN000114	STRE	A	1		1,386,125	413.5		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000135	STRE							Design	2018		
ALN000135	STRE							Under Construction	2019		
ALN000135	STRE	A	1		192,333	20.4		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000110	STRE							Design	2019		
ALN000110	STRE							Under Construction	2020		
ALN000110	STRE	A	1		8,000	33.4		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000147	STRE							Design	2019		
ALN000147	STRE						\$2,800,000	Under Construction	2019		
ALN000147	STRE	A	1		439,664	198.2		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000118	STRE	A	1		7,575	28.3	\$730,000	Complete	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	DPW Project
ALN000119	STRE	A	1		5,850	2.6	\$600,000	Complete	2021	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	DPW Project
ALN000111	STRE							Design			
ALN000111	STRE						\$4,400,000	Under Construction	2019		
ALN000111	STRE	A	1		604,000	266.6		Complete	2021	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000054	STRE							Design			
ALN000054	STRE						\$531,000	Under Construction	2019		
ALN000054	STRE	A	1		360,000	111.5		Complete	2021	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000129	OUT	A	1		0	0.0	\$0	Complete	2019	TN, TP, TSS TMDLs pending approval, protection of property from erosion	
ALN000130	OUT	A	1		0	0.0	\$0	Complete	2019	TN, TP, TSS TMDLs pending approval, protection of property from erosion	
ALN000131	OUT	A	1		0	0.0	\$0	Complete	2019	TN, TP, TSS TMDLs pending approval, protection of property from erosion	
ALN000132	OUT	A	1		0	0.0	\$0	Complete	2019	TN, TP, TSS TMDLs pending approval, protection of property from erosion	
ALN000133	OUT	A	1		0	0.0	\$0	Complete	2019	TN, TP, TSS TMDLs pending approval, protection of property from erosion	
TBD000259	FPU	A			1,098	9.3	\$31,761	Under Construction	2019	TN, TP, TSS TMDLs, wildlife habitat	
TBD000260	FPU	A			4,397	22.4	\$364,350	Planning	2020	TN, TP, TSS TMDLs, wildlife habitat	
TBD000261	FPU	A			9,862	22.1		Complete	2021	TN, TP, TSS TMDLs, wildlife habitat	
TBD000268	FPU	A			1,567	9.0	\$47,368	Complete	2019	TN, TP, TSS TMDLs, wildlife habitat	
TBD000273	FPU	A			499	4.1	\$72,801	Design	2019	TN, TP, TSS TMDLs, wildlife habitat	
TBD000274	FPU	A			2,642	10.1		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat	
TBD000295	FPU	A					\$290,000	Planning	2020	TN, TP, TSS TMDLs, wildlife habitat	
TBD000296	FPU	A			5,870	37.4		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat	
TBD000297	FPU	A			5,870	37.4		Complete	2021	TN, TP, TSS TMDLs, wildlife habitat	
TBD000298	FPU	A					\$20,000	Planning	2020	TN, TP, TSS TMDLs, wildlife habitat	
TBD000299	FPU	A			7	0.9		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat	
TBD000300	FPU	A			7	0.9		Complete	2021	TN, TP, TSS TMDLs, wildlife habitat	
TBD000301	FPU	A					\$652,500	Planning	2021	TN, TP, TSS TMDLs, wildlife habitat	
TBD000302	FPU	A			13,208	84.2		Complete	2021	TN, TP, TSS TMDLs, wildlife habitat	
TBD000303	FPU	A			13,208	84.2		Complete	2022	TN, TP, TSS TMDLs, wildlife habitat	
TBD000304	FPU	A					\$11,250	Planning	2021	TN, TP, TSS TMDLs, wildlife habitat	
TBD000305	FPU	A			1	0.0		Complete	2021	TN, TP, TSS TMDLs, wildlife habitat	
TBD000306	FPU	A			1	0.0		Complete	2022	TN, TP, TSS TMDLs, wildlife habitat	
TBD000262	FPU Riparian Buffer	A			1,074	4.1	\$165,450	Planning	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000263	FPU Riparian Buffer	A			5,988	25.2		Complete	2021	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000279	FPU Riparian Buffer	A					\$15,000	Design	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000287	FPU Riparian Buffer	A			605	2.9	\$23,477	Under Construction	2019	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000308	WSHW	S	3	17.84	4,630	17.6	\$79,680	Complete	2019	TN, TP, TSS TMDLs, wildlife habitat, temperature	

TBD000309	WSHW	S	4	22.22	2,133	46.1	\$125,372	Complete	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000310	WSHW	S	1	2.5623	373	8.4	\$24,014	Complete	2021	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000278	Urban Tree Canopy Over Impervious	A			294	0.8		Complete	2021	TN, TP, TSS TMDLs, temperature, aesthetic benefit	
TBD000277	Urban Tree Canopy Over Impervious	A					\$7,500	Planning	2020	TN, TP, TSS TMDLs, temperature, aesthetic benefit	
TBD000283	Urban Tree Canopy Over Turf	A			470	5.1	\$12,000	Design	2020	TN, TP, TSS TMDLs, aesthetic benefit	
ALN000008	SHST							Design	2019		
ALN000008	SHST						\$344,310	Under Construction	2019		
ALN000008	SHST	A	1		246,000	71.3		Complete	2020	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
Subtotal Capital											
			28	42.622	4,999,063	4,188.4	\$16,112,251				Annual BMPs during the prior permit term reduced 691,565 lbs of TSS to local waters and 3,783.8 lbs of TN to the Bay annually. The replacement perennial BMPs listed here provide TSS and TN reductions that meet or exceed the prior permit annual BMPs.
Other (Proposed to Replace Annual Obligations)											
Subtotal Other											
			0	0	0	0	\$0				
Total of Obligations from Previous Permit That Must Be Continued											
			28	42.6	4,999,063	4,653.8	\$22,150,049				
Proposed Restoration for the Next Permit											
Operational Programs ⁴											
Subtotal Operations ⁵											
			0		0	0	\$0				
Capital Projects											
ALN000052	STRE						\$450,000	Design	2019		
ALN000052	STRE						\$1,624,407	Under Construction	2020		
ALN000052	STRE	A	1		1,645,578	608.1		Complete	2024	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000136	STRE							Design			
ALN000136	STRE						\$6,000,000	Under Construction	2020		
ALN000136	STRE	A	1		1,664,800	1,594.2		Complete	2023	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000128	STRE							Design			
ALN000128	STRE						\$3,000,000	Under Construction	2021		
ALN000128	STRE	A	1		75,000	333.0		Complete	2023	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000141	STRE							Design	2019		
ALN000141	STRE						\$3,500,000	Under Construction	2022		
ALN000141	STRE	A	1		225,000	126.4		Complete	2025	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000144	STRE							Design	2019		
ALN000144	STRE						\$602,000	Under Construction	2021		
ALN000144	STRE	A	1		211,500	68.5		Complete	2025	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000125	STRE							Design	2019		
ALN000125	STRE						\$5,167,361	Under Construction	2020		
ALN000125	STRE	A	1		346,500	217.1		Complete	2023	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000134	STRE							Design	2020		
ALN000134	STRE							Under Construction	2021		
ALN000134	STRE	A	1		72,000	40.5		Complete	2026	TN, TP, TSS TMDLs, wildlife habitat, temperature, protection of sanitary sewer and property from erosion	
ALN000010	SHST							Design	2019		
ALN000010	SHST							Under Construction	2024		
ALN000010	SHST	A	1		173,600	152.2		Complete	2026	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000465	FPU	A						Planning	2021	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000466	FPU	A			5,870	37.4		Complete	2021	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000467	FPU	A			5,870	37.4		Complete	2022	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000474	FPU	A						Planning	2022	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000475	FPU	A			13,208	84.2		Complete	2022	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000476	FPU	A			13,208	84.2		Complete	2023	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000480	FPU	A						Planning	2022	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000481	FPU	A			5,870	37.4		Complete	2022	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000482	FPU	A			5,870	37.4		Complete	2023	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000489	FPU	A						Planning	2023	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000490	FPU	A			13,208	84.2		Complete	2023	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000491	FPU	A			13,208	84.2		Complete	2024	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000498	FPU	A						Planning	2023	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000499	FPU	A			5,870	37.4		Complete	2023	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000500	FPU	A			5,870	37.4		Complete	2024	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000507	FPU	A						Planning	2024	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000508	FPU	A			14,676	93.6		Complete	2024	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000509	FPU	A			14,676	93.6		Complete	2025	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000513	FPU	A						Planning	2024	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000514	FPU	A			5,870	37.4		Complete	2024	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000515	FPU	A			5,870	37.4		Complete	2025	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000317	WSHW	S	8	13.5	5,184	53.8		Complete	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000318	WSHW	S	40	67.0	25,920	303.2		Complete	2021	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000531	WSHW	S	40	67.0	25,920	595.6		Complete	2022	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000543	WSHW	S	40	67.0	25,920	306.8		Complete	2023	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000555	WSHW	S	40	67.0	25,920	486.4		Complete	2024	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000567	WSHW	S	8	13.5	5,184	188.8		Complete	2025	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000316	WSHW	S						Planning	2020	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000523	WSHW	S						Planning	2021	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000535	WSHW	S						Planning	2022	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000547	WSHW	S						Planning	2023	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000559	WSHW	S						Planning	2024	TN, TP, TSS TMDLs, wildlife habitat, temperature	
TBD000435	SHST	A	3		410,000	118.9		Complete	2022	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000453	SHST	A	3		344,400	99.9		Complete	2023	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000444	SHST	A	4		565,800	164.1		Complete	2025	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000432	SHST	A	1		262,400	76.1		Complete	2026	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000435	SHST	A						Design	2019	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000453	SHST	A						Design	2020	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000444	SHST	A						Design	2022	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000432	SHST	A						Design	2023	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000435	SHST	A						Under Construction	2020	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000453	SHST	A						Under Construction	2021	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000444	SHST	A						Under Construction	2023	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000432	SHST	A						Under Construction	2024	TN, TP, TSS TMDLs, protection of property from erosion, wildlife habitat, climate change resiliency	
TBD000390	STRE	A	1		135,000	199.8		Complete	2025	TN, TP, TSS TMDLs, wildlife habitat, temperature,	

TBD000612	Capital Project Enhance ment (Remediation)							\$500,000	Planning	2021	Restoration project permit requirement, CBP verification requirement	
TBD000613	Capital Project Enhance ment (Remediation)							\$500,000	Planning	2022	Restoration project permit requirement, CBP verification requirement	
TBD000614	Capital Project Enhance ment (Remediation)							\$500,000	Planning	2023	Restoration project permit requirement, CBP verification requirement	
TBD000615	Capital Project Enhance ment (Remediation)							\$500,000	Planning	2024	Restoration project permit requirement, CBP verification requirement	
TBD000626	Gwynns Falls Trash Wheel							\$75,000	Planning	2020	Trash TMDL, Trash Reduction Strategy	
TBD000662	Gwynns Falls Trash Wheel							\$75,000	Planning	2021	Trash TMDL, Trash Reduction Strategy	
TBD000663	Gwynns Falls Trash Wheel							\$75,000	Planning	2022	Trash TMDL, Trash Reduction Strategy	
TBD000664	Gwynns Falls Trash Wheel							\$75,000	Planning	2023	Trash TMDL, Trash Reduction Strategy	
TBD000665	Gwynns Falls Trash Wheel							\$75,000	Planning	2024	Trash TMDL, Trash Reduction Strategy	
TBD000606	Shoreline Project Enhancement/Monitoring							\$100,000	Planning	2020	Restoration project permit requirement, CBP verification requirement	
TBD000607	Shoreline Project Enhancement/Monitoring							\$100,000	Planning	2021	Restoration project permit requirement, CBP verification requirement	
TBD000608	Shoreline Project Enhancement/Monitoring							\$100,000	Planning	2022	Restoration project permit requirement, CBP verification requirement	
TBD000609	Shoreline Project Enhancement/Monitoring							\$100,000	Planning	2023	Restoration project permit requirement, CBP verification requirement	
TBD000610	Shoreline Project Enhancement/Monitoring							\$100,000	Planning	2024	Restoration project permit requirement, CBP verification requirement	
TBD000616	Stream Monitoring (stream restoration permits)							\$250,000	Planning	2020	Restoration project permit requirement, CBP verification requirement	
TBD000617	Stream Monitoring (stream restoration permits)							\$250,000	Planning	2021	Restoration project permit requirement, CBP verification requirement	
TBD000618	Stream Monitoring (stream restoration permits)							\$250,000	Planning	2022	Restoration project permit requirement, CBP verification requirement	
TBD000619	Stream Monitoring (stream restoration permits)							\$250,000	Planning	2023	Restoration project permit requirement, CBP verification requirement	
TBD000620	Stream Monitoring (stream restoration permits)							\$250,000	Planning	2024	Restoration project permit requirement, CBP verification requirement	
TBD000627	Stormwater BMP Repairs, Inspections							\$3,464,889	Planning	2020	Repair of BMPs, CBP verification requirement	
TBD000628	Stormwater BMP Repairs, Inspections							\$2,910,665	Planning	2021	Repair of BMPs, CBP verification requirement	
TBD000629	Stormwater BMP Repairs, Inspections							\$2,828,147	Planning	2022	Repair of BMPs, CBP verification requirement	
TBD000630	Stormwater BMP Repairs, Inspections							\$2,710,962	Planning	2023	Repair of BMPs, CBP verification requirement	
TBD000631	Stormwater BMP Repairs, Inspections							\$2,582,058	Planning	2024	Repair of BMPs, CBP verification requirement	
TBD000632	WMM Watershed Association Grants							\$240,000	Planning	2020	Education and outreach, local TMDLs, Bay TMDL	Capacity building grants support staffing and restoration reporting among watershed associations.
TBD000633	WMM Watershed Association Grants							\$240,000	Planning	2021	Education and outreach, local TMDLs, Bay TMDL	Capacity building grants support staffing and restoration reporting among watershed associations.
TBD000634	WMM Watershed Association Grants							\$240,000	Planning	2022	Education and outreach, local TMDLs, Bay TMDL	Capacity building grants support staffing and restoration reporting among watershed associations.
TBD000635	WMM Watershed Association Grants							\$240,000	Planning	2023	Education and outreach, local TMDLs, Bay TMDL	Capacity building grants support staffing and restoration reporting among watershed associations.
TBD000636	WMM Watershed Association Grants							\$240,000	Planning	2024	Education and outreach, local TMDLs, Bay TMDL	Capacity building grants support staffing and restoration reporting among watershed associations.
TBD000647	WMM Watershed Education and Outreach							\$250,000	Planning	2020	Education and outreach, trash TMDL, bacteria TMDLs	
TBD000648	WMM Watershed Education and Outreach							\$250,000	Planning	2021	Education and outreach, trash TMDL, bacteria TMDLs	
TBD000649	WMM Watershed Education and Outreach							\$250,000	Planning	2022	Education and outreach, trash TMDL, bacteria TMDLs	
TBD000650	WMM Watershed Education and Outreach							\$250,000	Planning	2023	Education and outreach, trash TMDL, bacteria TMDLs	
TBD000651	WMM Watershed Education and Outreach							\$250,000	Planning	2024	Education and outreach, trash TMDL, bacteria TMDLs	
TBD000652	Stormwater BMP Operation and Maintenance							\$1,353,760	Planning	2020	Inspection and repair of BMPs, CBP verification requirement	Operating budget expenses, 2.75% inflation rate.
TBD000653	Stormwater BMP Operation and Maintenance							\$1,390,988	Planning	2021	Inspection and repair of BMPs, CBP verification requirement	Operating budget expenses, 2.75% inflation rate.
TBD000654	Stormwater BMP Operation and Maintenance							\$1,429,241	Planning	2022	Inspection and repair of BMPs, CBP verification requirement	Operating budget expenses, 2.75% inflation rate.
TBD000655	Stormwater BMP Operation and Maintenance							\$1,468,545	Planning	2023	Inspection and repair of BMPs, CBP verification requirement	Operating budget expenses, 2.75% inflation rate.
TBD000656	Stormwater BMP Operation and Maintenance							\$1,508,930	Planning	2024	Inspection and repair of BMPs, CBP verification requirement	Operating budget expenses, 2.75% inflation rate.
TBD000657	Stormwater and Flood Control Repairs and Enhancements							\$3,810,000	Planning	2020	Flooding and climate resiliency	Climate resiliency
TBD000658	Stormwater and Flood Control Repairs and Enhancements							\$3,810,000	Planning	2021	Flooding and climate resiliency	Climate resiliency
TBD000659	Stormwater and Flood Control Repairs and Enhancements							\$3,810,000	Planning	2022	Flooding and climate resiliency	Climate resiliency
TBD000660	Stormwater and Flood Control Repairs and Enhancements							\$3,810,000	Planning	2023	Flooding and climate resiliency	Climate resiliency
TBD000661	Stormwater and Flood Control Repairs and Enhancements							\$3,810,000	Planning	2024	Flooding and climate resiliency	Climate resiliency
Subtotal Other			0	0		0		\$48,273,186				
Total for Next Permit		214	295.0	8,047,389.2		8,179.9		\$150,308,483				
Total for Next Permit Completed 2019 through 2024		178	281.5	4,703,842.9		5,420.1		\$150,308,483				
Total for Next Permit Completed 2020 through 2024		178	281.5	4,703,842.9		5,420.1		\$139,068,122				
Total for Remaining Obligations from The Previous Permit and Proposed Activities for the Next Permit		242	295.0	13,046,451.9		12,833.7		\$172,458,533				
Total for Remaining Obligations from The Previous Permit and Proposed Activities for the Next Permit Completed through 2024		206	324.1	9,702,905.6		10,074.0		\$172,458,533				
Total for Remaining Obligations from The Previous Permit and Proposed Activities for the Next Permit Completed 2020 - 2024 (excluding 2019)		196	306.3	8,845,506.8		8,617.3		\$147,041,675				

Check with MDE Geodatabase:

Rest BMP ID, type, class, number of BMPs, impervious acres, built date, implementation cost should match the various geodatabase tables for BMPs (AltBMPLine, AltBMPPoint, AltBMPPoly, and RestBMP)-- aggregated by type and status.

Notes:

1 Use BMP types and classes from the MDE Geodatabase.

2 Implementation status should be Planning, Design, or Under Construction.

3 Includes annual BMPs and Water Quality Trades required to be maintained each year until replaced with permanent BMP.

4 For street sweeping, indicate the annual frequency that the streets are swept and for inlet cleaning indicate the number of inlets cleaned.

5 For Operational BMPs, TSS, TP, and TN reductions should use averages for each type of BMP.

6 Use pollutant load reduction efficiencies in accordance with the CBP's expert panel reports and a delivery factors based on the BMP's proximity to the Bay.

7 Add detailed description of co-benefits provide by the BMP in this column. Also note if a permanent BMP is replacing annual BMPs.

BMP Class	
Code	Code Description
A	Alternative BMP
E	ESD
S	Structural BMP

BMP Classification	BMP Type Code	BMP Type
Alternative Surfaces (A)		
E	AGRE	Green Roof – Extensive
E	AGRI	Green Roof – Intensive
E	APRP	Permeable Pavements
E	ARTF	Reinforced Turf
Nonstructural Techniques (N)		
E	NDRR	Disconnection of Rooftop Runoff
E	NDNR	Disconnection of Non-Rooftop Runoff
E	NSCA	Sheetflow to Conservation Areas
Micro-Scale Practices (M)		
E	MRWH	Rainwater Harvesting
E	MSGW	Submerged Gravel Wetlands
E	MILS	Landscape Infiltration
E	MIBR	Infiltration Berms
E	MIDW	Dry Wells
E	MMBR	Micro-Bioretenion
E	MRNG	Rain Gardens
E	MSWG	Grass Swale
E	MSWW	Wet Swale
E	MSWB	Bio-Swale
E	MENF	Enhanced Filters
Ponds (P)		
S	PWED	Extended Detention Structure, Wet
S	PWET	Retention Pond (Wet Pond)
S	PMPS	Multiple Pond System
S	PPKT	Pocket Pond
S	PMED	Micropool Extended Detention Pond
Wetlands (W)		
S	WSHW	Shallow Marsh
S	WEDW	ED – Wetland
S	WPWS	Wet Pond – Wetland
S	WPKT	Pocket Wetland
Infiltration (I)		
S	IBAS	Infiltration Basin
S	ITRN	Infiltration Trench
Filtering Systems (F)		
S	FBIO	Bioretention
S	FSND	Sand Filter
S	FUND	Underground Filter
S	FPER	Perimeter (Sand) Filter
S	FORG	Organic Filter (Peat Filter)
S	FBIO	Bioretention
Open Channels (O)		
S	ODSW	Dry Swale
S	OWSW	Wet Swale
Other Practices (X)		
S	XDPD	Detention Structure (Dry Pond)
S	XDED	Extended Detention Structure, Dry
S	XFLD	Flood Management Area
S	XOGS	Oil Grit Separator

S	XOTH	Other
Alternative BMPs		
A	MSS	Mechanical Street Sweeping
A	VSS	Regenerative/Vacuum Street Sweeping
A	IMPP	Impervious Surface Elimination (to pervious)
A	IMPF	Impervious Surface Elimination (to forest)
A	FPU	Planting Trees or Forestation on Pervious Urban
A	CBC	Catch Basin Cleaning
A	SDV	Storm Drain Vacuuming
A	STRE	Stream Restoration
A	OUT	Outfall Stabilization
A	SPSC	Regenerative Step Pool Storm Conveyance
A	SHST	Shoreline Management
A	SEPP	Septic Pumping
A	SEPD	Septic Denitrification
A	SEPC	Septic Connections to WWTP

Financial Capacity Spreadsheet			
1	County/City Name	Baltimore County, Maryland	
2	Cost As A Percent Of Household Income		
2a	Median Household Income (MHI)	\$	71,810
2b	Total Number Of Households In Jurisdiction		312,859
2c	Average Annual Cost For Public Stormwater Related Management Programs	\$	33,103,788
2d	Annual Cost For Public Stormwater Related Management Programs Per Household	\$	105.81
2e	% Of MHI Spent On Public Stormwater Related Management Programs		0.15%
2f	Total Annual Stormwater Remediation Fee Per Household	\$	-
2g	% Of MHI Spent Annually On Stormwater Remediation Fee		0.00%
3	Cost Of Impervious Surface Restoration As A Percent Of Household Income		
3a	Total In Previous Permit Term Spent On The Impervious Surface Restoration Plan (ISRP)	\$	126,476,911
3b	Average Annual Cost Of The ISRP During The Previous Permit Term	\$	15,809,614
3c	Annual Cost Of The ISRP Per Household During The Previous Permit Term	\$	50.53
3d	% Of MHI Spent On The ISRP During The Previous Permit Term		0.07%
3e	Total Projected Cost For Restoration Portfolio	\$	146,766,675
3f	Projected Annual Cost For Restoration Portfolio	\$	29,353,335
3g	Projected Annual Cost For Restoration Portfolio Per Household	\$	93.82
3h	% Of MHI Spent On Projected Cost Of Restoration Portfolio		0.13%
4	Cost For Low-Income Residential Customers As A Percent Of Household Income		
4a	Percentage Of Households With Annual Income <\$25,000		14.20%
4b	% Of Income For Low Income Households Spent On Public Stormwater Related Management Programs		0.42%
4c	% Of Income For Low Income Households Spent On Stormwater Remediation Fees		0.00%
4d	% Of Income For Low Income Household Spent On The ISRP		0.20%
4e	% Of MHI For Low Income House Spent On Projected Cost Of Restoration Portfolio		0.38%
5	Key Socioeconomic Indicators		
5a	Percentage Unemployed		4.20%
5b	Median Household Income	\$	71,810
5c	Percent Of Individuals (All People) Below Poverty Level		9.10%
6	Financial Capacity Indicators		
6a	Debt Indicators	Bond Rating – GO ¹ Bonds	Aaa
6b		Bond Rating – Revenue Bonds	Aaa
6c		Net Debt As A % Of FMPV ²	4.35%
6d	Financial Management Indicators	Property Tax Revenues As % Of FMPV	1.12%
6e		Property Tax Revenue Collection Rate	99.70%

2.1	Additional Cost As A Percent Of Household Income		
2.1c	Average Annual Cost For Public Sanitary Sewer Related Management Programs	\$	262,799,153
2.1d	Annual Cost For Public Sanitary Sewer Related Management Programs Per Household	\$	839.99
2.1e	% Of MHI Spent On Public Sanitary Sewer Related Management Programs		1.17%

2.1f	Total Annual Bay Restoration Fee Per Household		\$	60
2.1g	% Of MHI Spent Annually On Bay Restoration Fee			0.08%
2.1h	Annual Cost For Public Stormwater and Sanitary Sewer Programs Per Household		\$	1,005.80
2.1i	% Of MHI Spent Annually on Public Stormwater and Sanitary Sewer Programs			1.40%
4.1	Additional Cost For Low-Income Residential Customers As A Percent Of Household Income			
4.1b	% Of Income For Low Income Households Spent On Public Stormwater and Sanitary Sewer Programs			4.02%
4.1f	Total Annual Income of Low Income Households, using upper end of Census Household Income Ranges		\$	801,310,270
4.1g	Average Annual Income of Low Income Households, using 4.1f		\$	18,037
4.1h	% Of Income For Low Income Households (4.1g) Spent On Public Stormwater and Sanitary Sewer Programs			5.58%
4.1i	Total Annual Income of Low Income Households, using mid-point of Census Household Income Ranges		\$	601,467,500
4.1j	Average Annual Income of Low Income Households, using 4.1j		\$	13,539
4.1k	% Of Income For Low Income Households (4.1g) Spent On Public Stormwater and Sanitary Sewer Programs			7.43%
6.1	Additional Financial Capacity Indicators: Income Tax			
6.1c	Debt Indicators	Net Debt As A % of FMPV + Personal Income ³		2.72%
6.1d	Financial Management Indicators	Income Tax Revenues As % of Personal Income ³		1.34%

Notes:

1. GO = General Obligation

2. FMPV = Full Market Property Value

Moody's	Aaa
	Aa
	A
	Baa
	Ba
	B
	Caa
	Ca
	C
S&P	AAA
	AA
	A
	BBB
	BB
	B
	CCC
	CC
	R
	SD
	D

Parameter from 2017 ACS	2017 Value
National Average MHI	\$ 57,652.00
National Percent Unemployed	4.1%
National Percent of Individuals Below Poverty Level	14.6%