

Maryland State Highway Administration Maximum Extent Practicable Analysis

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to:

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Table of Contents

Introduction.....	2
Differences Between SHA and County/Local Government Agencies	3
Previously Accomplished Restoration	4
Adaptive Management	4
Pace of Restoration - Limiting Factors	5
Pace of Restoration - TMDLs	9

Tables

Table 1: CTP Trends for TMDL Compliance Fund Allocations (\$000).....	7
Table 2: Time Frames by Planning Stage and BMP Type.....	24
Table 3: TMDL Compliance Budget Summary from FY 2025 - FY 2029	27

Appendices

- Appendix A: Restoration Project Portfolio
- Appendix B: Physical Capacity Analysis Questionnaire
- Appendix C: Year 1 BMP Portfolio

Introduction

The Maryland State Highway Administration (SHA) is committed to continuing its National Pollution Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Program efforts and is pleased to partner with the Maryland Department of the Environment (MDE) Water and Science Administration, the Environmental Protection Agency (EPA), and other NPDES jurisdictions to achieve the program goals.

The SHA's first NPDES Phase I MS4 permit, MS-SH-99-011, was issued on January 8, 1999 and expired in 2004. This permit guided SHA through establishment of its NPDES MS4 program. The Phase II State and Federal Small MS4 General Permit; 05-SF-5501, MDR 055501; was issued November 12, 2004 and expired November 12, 2009. The SHA submitted a Notice of Intent for coverage under the Phase II MS4 GP and received authorization for coverage May 25, 2005. Under the authority of this Phase II permit, SHA extended the same MS4 program elements established under the Phase I permit to the SHA storm drain systems in Phase II areas.

The next Phase I permit (99-DP-3313, MD0068276; issued October 21, 2005 and expired on October 21, 2010) focused on improving water quality benefits, developing an impervious accounting database, and developing a watershed-based outlook for stormwater management and MS4 program elements. The SHA submitted a reapplication prior to its expiration for the Phase I MS4 permit on October 21, 2009 and a new permit was issued to SHA on October 9, 2015. This current permit covers SHA storm sewer systems in both the originally designated Phase I jurisdictions as well as those designated for Phase II.

The SHA submitted its reapplication for MS4 permit coverage as Attachment B to its fourth, fiscal year (FY) 2019 MS4 permit annual report, received by MDE on October 8, 2019. In correspondence from MDE to SHA dated November 30, 2020, MDE conveyed that SHA coverage under the MS4 Permit has been administratively continued in accordance with the Code of Federal Regulations, until a new MS4 permit can be issued, and that all permit requirements remain in force.

As part of the NPDES MS4 permit development process for future permits, MDE requested that SHA provide a comprehensive Maximum Extent Practicable (MEP) Analysis. The comprehensive MEP Analysis includes this report (referenced hereafter as the "MEP Report") as well as a Restoration Project Portfolio spreadsheet (see **Appendix A**) and a Physical Capacity Analysis questionnaire (see **Appendix B**).

The Restoration Project Portfolio tentatively summarizes SHA restoration projects to be planned, designed, and/or constructed during the next 5-year MS4 permit term and anticipated equivalent impervious acre restoration credit and total nitrogen, total phosphorus, and total suspended sediment load reduction yields for each. Impervious acre restoration credits and pollutant load reductions in the Restoration Project Portfolio are based on the MDE 2021 guidance document for MS4 permittees, *Accounting of Stormwater Wasteload Allocations and Impervious Acres Treated* (MDE, 2021) and the Chesapeake Bay Program Phase 6 Watershed Model (CBP, 2017). The SHA has also provided a simplified presentation of the restoration best management practices (BMPs) it plans to implement during the first year of its next MS4 permit term (see **Appendix C**). The SHA restoration projects, and associated schedules presented in this comprehensive MEP Analysis are subject to change with the pending MDE tentative and final determinations for issuance of the next MS4 permit for SHA.

The Physical Capacity Analysis questionnaire details limitations, constraints, and impacts that can influence the pace of SHA implementation for restoration projects. This report references and elaborates on information provided in the Restoration Project Portfolio and Physical Capacity Analysis questionnaire to summarize and justify SHA's maximum extent practicable pace for impervious surface restoration during the next MS4 permit term.

Differences Between SHA and County/Local Government Agencies

The SHA is implicitly different than the other Large and Medium Phase I NPDES MS4 permittees in Maryland in the following ways that directly impact the SHA strategies and capacity for MS4 compliance, including Chesapeake Bay restoration:

- The MS4 permitted area for SHA is wider reaching than any other MS4 permitted jurisdiction and currently intersects 11 Maryland counties. To align with the Phase II NPDES MS4 General Permit issued by MDE on April 27, 2018, SHA MS4 permit coverage will expand to intersect 15 Maryland counties when MDE issues the next MS4 permit to SHA. This expansion will require significant efforts agencywide over short time periods to transition and increase SHA workloads and funding allocations sufficiently to satisfy all new requirements anticipated for the next MS4 permit.
- SHA properties, collectively referred to hereafter as the SHA right-of-way (ROW), were established for the purpose of delivering essential roadway transportation services to Maryland citizens and interstate commuters. In accordance with Title 8 of the Transportation Article, Annotated Code of Maryland, the SHA ROW can only be acquired and perpetually owned by SHA if/when doing so is necessary for SHA to carry out its legally designated duty, which is to plan, select, construct, improve, and maintain the State highway system. These property acquisitions and use regulations limit available ROW for SHA restoration BMP implementation. Additional details are provided with the SHA response to question 1 in Appendix B.
- Most SHA property is relatively narrower and more linear than property owned by other MS4 permitted agencies which limits the variety of restoration BMP types that SHA can potentially or effectively implement within its ROW.
- Expanding SHA ROW boundaries is inherently challenging for SHA due to restrictions imposed by State law. SHA will need to dedicate State resources to securing new rights to access and use private and public property outside its ROW to complete restoration that may be required by future MS4 permits.
- SHA does not own or operate commercial, institutional, or recreational facilities that can sometimes be a source of undeveloped lands available to other MS4 permittees for implementing restoration projects.
- County/local government agencies have the capacity and flexibility to enact new ordinances/regulations in response to MS4 permit conditions that can facilitate the implementation of new restoration BMPs whereas SHA's implementation of new restoration BMPs is limited by the authority granted in Maryland State Law that SHA cannot independently alter.

Previously Accomplished Restoration

Part III of the current MS4 permit states that compliance with all the conditions contained in Parts IV through VII of the SHA MS4 permit shall constitute compliance with § 402(p)(3)(B)(iii) of the Clean Water Act and adequate progress for the permit term toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater wasteload allocation (WLA). On September 16, 2019, MDE provided SHA its review of the 3rd SHA MS4 permit annual report for State FY 2018 and the current MS4 permit term wherein MDE established that SHA was required to accomplish restoration for 4,621 impervious acres before the expiration date of the current MS4 permit term (i.e., October 8, 2020).

To date, SHA has achieved 2,166 impervious acres beyond its current MS4 permit restoration requirement of 4,621 impervious acres. The SHA expenditures from FY 2017 through FY 2021 to plan, design, and construct BMPs that would be credited against SHA MS4 permit restoration goals in future SHA MS4 permits were incorporated into summaries provided for “Fund 82 - TMDL Compliance” in the Program Funding section of the applicable SHA MS4 annual reports (TMDL refers to the “Total Maximum Daily Load” that can be established for impaired waterbodies by EPA). These were in addition to all expenditures by SHA that were necessary during those FYs to meet the minimum 4,621 impervious acre restoration requirement before the 2015 SHA MS4 permit term expired.

The SHA has continued the inspection and maintenance of BMPs it implemented for compliance with the restoration requirements of the current MS4 permit. The implementation and maintenance of these BMPs represents adequate progress by SHA during the current MS4 permit term (i.e., from October 9, 2015 through the date SHA submitted this MEP Analysis to MDE) toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs. The SHA and MDE coordinated throughout the MS4 permit term to ensure all restoration BMPs SHA built since 2010 and their associated restoration credit yields are appropriately accounted in MS4 permit annual reports to demonstrate SHA compliance with current and future MS4 permit restoration requirements, as applicable.

In March of 2020, SHA contacted MDE inquiring as to how SHA should manage its qualifying restoration BMPs that represent accomplishments by SHA in addition to the required 4,621 impervious acre restoration requirement. The MDE responded and confirmed that SHA should include with its MS4 permit annual reports all its completed projects, including those that provide restoration credit in addition to the 4,621 acres required by the current MS4 permit. In its review of SHA's MS4 permit annual report for State FY 2020, MDE confirmed that SHA must claim restoration accomplished after the MS4 permit expiration date, during the administratively continued period of MS4 permit coverage, as supporting compliance with the next MS4 permit MDE issues SHA.

Adaptive Management

To prevent backsliding SHA restoration progress accomplished since 2010, SHA must perpetually ensure the total amount of qualifying/verified impervious surface restoration credits it reports is never less than the 4,621 acres required under the current MS4 permit. The hundreds of new restoration BMPs completed during the current MS4 permit term that generate the required 4,621 impervious acre treatment credits must be inspected every 3 years in perpetuity to verify they continue to provide water quality treatment function. BMPs must be remediated or replaced if they fail during verification inspections or associated credit must be removed from the SHA MS4 permit restoration compliance portfolio until water quality treatment function can be verified.

The SHA constructed new restoration BMP compliance assets at an unprecedented rate during the current MS4 permit term that must now be managed perpetually under SHA asset management programs. Many of the restoration practices SHA implemented for MS4 permit compliance during the 5-year MS4 permit term were stream restoration and urban forest planting alternative BMPs. The associated SHA programs for alternative BMP verification and adaptive management are relatively novel. The SHA dedicated resources during the current MS4 permit term to improve adaptive management programs to promote BMP function and to preserve restoration credit.

During its next MS4 permit term, SHA will need to fund and continue piloting the adaptive management programs necessary to perpetuate BMP function and credit but the relative costs for those programs were not well understood when funding for future MS4 permit compliance was requested and allocated in the current Maryland Consolidated Transportation Program (CTP). The full extents of adaptive management and its associated funding needs remain under evaluation. Until sufficient data is available through time and evaluations are complete, SHA will not be able to reliably inform cost estimates for funding requests. Consequently, SHA implementation of the adaptive management programs will draw from the SHA TMDL Compliance fund in the CTP and allocations therein that otherwise would be available for implementing new restoration BMPs. This drawdown will need to continue until SHA can update its cost estimates, request additional funding needed for the new adaptive management programs, and the CTP can be adjusted to reflect greater capital funding needs. In the following section of this MEP Report, SHA has provided additional details about the influence the CTP has on SHA restoration capacity.

Pace of Restoration - Limiting Factors

The Maryland Watershed Implementation Plan Phase III for the Chesapeake Bay TMDL (referred to hereafter as the “Maryland WIP III”) published in 2019 (MDE, 2019) acknowledges several factors limiting the pace of implementation by the urban stormwater sector as follows:

- Management practices that address stormwater pollution generated by impervious surfaces (e.g., stormwater management facilities, land conversion BMPs, etc.) must be dispersed through the watershed instead of building a single facility at one centralized location (e.g., a wastewater treatment plant).
- Most stormwater restoration practices must be designed and permitted, which requires a significant planning effort.
- Land for stormwater restoration practices must be identified and potentially acquired which can impose significant costs or require private landowner permission, in addition to any construction expenses.

The SHA concurs with the Maryland WIP III and experienced each limiting factor listed above while implementing restoration BMPs during the current MS4 permit term. There are several additional, interrelated factors that limited SHA’s ability to identify, plan, and implement restoration projects. These are detailed in the following subsections of this MEP Report and are elaborated further throughout the Physical Capacity Analysis questionnaire located in Appendix B. The primary limiting factors that impart the most control on the pace of restoration BMP implementation are described hereafter and include budget allocations and general inflexibility of the CTP over the short term, typical project implementation timelines surpassing the 5-year permit term, and limitations on SHA owned and operated ROW available for cost effective project implementation.

Maryland Consolidated Transportation Program (CTP)

The CTP is Maryland's 6-year capital budget for transportation projects and contains projects and programs spread across the Maryland Department of Transportation. The SHA's allocated budget for MS4 permit and TMDL compliance is referred to as the "TMDL Compliance" fund. A primary constraint to SHA's restoration program is the lack of flexibility to rapidly increase funding needs within the CTP. There is also a risk that budget allocations towards the TMDL Compliance fund may be reduced in the future because of budget deficits or shifts in State funding priorities.

Table 1 below provides the current and projected allocations for SHA's TMDL Compliance fund in CTP reports beginning with the CTP report released in FY 2013 through the most recent CTP report that provided anticipated funding allocations through FY 2029. The TMDL Compliance fund includes all allocations in the capital budget for SHA implementation of impervious restoration BMPs but also other activities necessary for SHA administration of its NPDES MS4 permit that do not directly result in restoration credit (e.g., MS4 permit annual reporting, monitoring for assessment of controls, etc.). For each CTP report listed in Table 1, the funding allocation noted for the first year of the given CTP report reflects the actual funding allocated to the TMDL Compliance fund for that fiscal year while allocations noted for all following fiscal years reflect anticipated allocations.

The highest and lowest funding allocations for a given fiscal year, as published in applicable CTP reports to date, have been highlighted in Table 1 to demonstrate how allocations noted in any given CTP report are subject to significant changes over a 5-year timescale but changes to a given FY actual/anticipated allocations in any given CTP report, relative to allocations for that same FY in the next year's CTP report, are typically much less. For example, the current CTP (i.e., FY 2024 to FY 2029) includes an actual FY 2024 capital budget allocation of \$16,303,000 that is slightly higher than the \$14,417,000 that was anticipated for FY 2024 in the previous year's CTP report (i.e., FY 2023 to FY 2028) but significantly less than the \$49,600,000 noted for FY 2024 the first time it was component to a CTP report (i.e., FY 2019 to FY 2024). The significant reduction in anticipated allocations between the FY 2019 and FY 2020 CTP reports, observable in Table 1, was strongly influenced by the rapid escalation of the COVID pandemic and associated public policies during FY 2020 that significantly reduced highway user travel rates and volumes and dependent revenue sources for the CTP such as motor fuel taxes, vehicle excise (a.k.a., titling) taxes, and motor vehicle fees (e.g., registrations, licenses, etc.).

There is typically a minimum 1-year lag time after SHA clearly identifies any needs and requests additional funding before any such request can be reflected in the CTP report as a revised allocation. This lag time is demonstrated in Table 1 where it can be observed that it took several years for SHA to increase FY 2018 funding allocations to the SHA TMDL Compliance fund from the \$14,900,000 initial allocation in the FY 2013 CTP report to the \$100,000,000 actual allocation reflected in the FY 2018 CTP report.

The anticipated allocations for the TMDL Compliance fund in the current CTP for FY 2025 through FY 2029 are all lower than the amounts indicated for those years in any of the preceding CTP reports (i.e., FY 2023 to FY 2028). Anticipated allocations began their current downward trend with the FY 2017 CTP report due, in part, to uncertainty surrounding possible adjustments to existing MS4 permit requirements or additions of new ones. Most notably, potential changes to the amount of restoration credits that the next SHA MS4 permit will require SHA to accomplish before the end of the next MS4 permit term remained unclear on the date SHA submitted this MEP Analysis to MDE.

Table 1: CTP Trends for TMDL Compliance Fund Allocations (\$000)

CTP Report	Fiscal Year																	Total 6 Year Cost
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
FY 2013 to 2018	\$24,200	\$33,800	\$28,800	\$21,600	\$14,900	\$14,900												\$138,200
FY 2014 to 2019		\$35,800	\$80,200	\$91,800	\$106,800	\$123,300	\$108,300											\$546,200
FY 2015 to 2020			\$52,500	\$92,500	\$107,300	\$124,700	\$111,000	\$110,900										\$598,900
FY 2016 to 2021				\$64,600	\$74,000	\$123,200	\$109,700	\$108,100	\$108,000									\$587,600
FY 2017 to 2022					\$85,000	\$113,900	\$111,500	\$103,500	\$83,100	\$74,500								\$571,500
FY 2018 to 2023						\$100,000	\$100,000	\$105,700	\$64,600	\$58,600	\$54,500							\$483,400
FY 2019 to 2024							\$96,000	\$112,000	\$57,800	\$46,600	\$53,600	\$49,600						\$415,600
FY 2020 to 2025								\$90,000	\$69,100	\$15,000	\$15,000	\$24,100	\$23,100					\$236,300
FY 2021 to 2026									\$37,472	\$4,414	\$14,326	\$14,296	\$21,740	\$35,593				\$127,841
FY 2022 to 2027										\$15,193	\$11,761	\$14,052	\$21,177	\$36,157	\$36,111			\$134,451
FY 2023 to 2028											\$12,159	\$14,417	\$20,642	\$34,936	\$35,143	\$38,532		\$155,829
FY 2024 to 2029												\$16,303	\$19,949	\$30,712	\$27,514	\$33,157	\$29,044	\$156,679

Highest funding in that FY

Lowest funding in that FY

Uncertainty as to whether, how much, and how fast additional SHA restoration BMP implementation might be needed to comply with the next SHA MS4 permit has made it difficult to determine and justify budgetary needs for the TMDL Compliance fund. Compliance program funding requests are more straightforward to fund when their requirements are known. SHA must justify its requests to allocate funding to the TMDL Compliance fund within the upcoming CTP report for any associated FYs. Given the uncertainty for future requirements and given Part III of the current MS4 permit states explicitly that SHA's continued compliance with conditions in its current MS4 permit represents adequate progress by SHA toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs, SHA has limited evidence to support any claim that SHA needs sustained or increased funding allocations to the TMDL Compliance fund over the next 5-years in order to maintain SHA compliance with known NPDES MS4 permit and TMDL Compliance requirements.

Restoration BMP Developmental Timelines

Based on the precedent MDE set with its issuance of MS4 permits to county jurisdictions since 2020, SHA anticipates that the next SHA MS4 permit will similarly include conditions for a minimum amount of impervious surface restoration that must be accomplished by completing restoration BMPs before the end of the permit term (i.e., 5 years). Upon MDE issuance of its final determination for the next SHA MS4 permit, the minimum amount of restoration will become a legally binding requirement set to a timeline that cannot be altered by SHA.

The current MS4 permit restoration conditions required SHA to complete restoration BMP implementation, from initial site investigations through construction certifications, for any new BMPs necessary for compliance before the expiration date for the associated 5-year MS4 permit term. This short timeframe created significant limitations on the BMP types and locations SHA was able to utilize to confidently ensure the agency completed the necessary work in time to remain in compliance with its MS4 permit. Based on previously completed SHA projects and SHA's understanding of current project implementation time frames, the shortest project timelines are about 3 years and the longest are about 7 years (see **Table 2** in Appendix B). Longer implementation timelines that extend past the 5-year term require planning stages to start before the permit is in effect so that credit may be secured prior to the permit expiration date.

If a project is going to take 7 years for full implementation, the project must start before the next MS4 permit is issued by MDE or the project will not be completed until after the permit expiration date. This obligates SHA to estimate costs and request allocations to the TMDL Compliance fund in the current CTP necessary to complete planning and initiate design work for unknown, future restoration BMP implementation requirements while simultaneously completing any planning through construction phase work necessary to complete enough restoration BMPs before the permit term expiration date to comply with the current MS4 permit restoration requirements.

The Maryland WIP III notes:

The long lead time for putting practices in the ground means that a stormwater management program cannot be quickly ramped up, and in order to provide regulatory certainty beyond a five-year planning horizon, it is important for [the Maryland WIP III] to establish a long-term pace of implementation. (MDE, 2019, p. B-32)

Without at least two years prior knowledge of forthcoming MS4 permit requirements, including the amount of restoration that must be accomplished during the permit term, it is difficult for SHA to plan effectively and ensure the MS4 permit compliance program is allocated sufficient and sustained funding. The challenge is intensified if compliance requirements, such as the pace and scale of restoration required, change significantly from one MS4 permit term to the next and SHA average annual workloads must increase accordingly to persist compliance.

Restoration BMP Implementation Opportunity

Maryland's population and its highway users continues to increase and the need to expand transportation services is anticipated to increase concurrently, placing demands on the use of the finite area of undeveloped SHA ROW to complete new projects for both improvements and alternatives while satisfying associated federal and State permitting requirements. The SHA must prioritize use of undeveloped SHA ROW for mission-essential new development and redevelopment projects; so, the SHA ROW currently available to implement new restoration BMPs to meet MS4 permit driven impervious restoration goals and for TMDL compliance is expected to continuously diminish with time. Given SHA obligations to efficiently use State resources and act in the best interest of the State, it is increasingly challenging to implement new restoration BMPs for MS4 permit and/or TMDL compliance within SHA ROW that may conflict with future needs for development projects within SHA ROW that are mandated by its priority mission/duty.

An apparent alternative is to implement most new restoration BMPs outside the SHA ROW in the future through acquisition of property or easements or by executing interagency partnership agreements with private/public property owners. Those additional costs are less than the costs associated with identifying, tracking, and replacing BMPs constructed in the ROW that are affected by new development and redevelopment projects. There are significant administrative workloads associated with identifying and replacing BMP credit lost when a SHA or external agent/agency's project impacts restoration BMPs.

Diminishing amounts of available SHA ROW, the increasing risk of impacts, and the increased challenges tied to credit replacement combine to make implementing restoration BMPs within SHA ROW increasingly cost prohibitive when compared to implementing BMPs outside of the ROW. It's notable that implementing BMPs outside SHA ROW requires additional time to secure perpetual access to private/public property necessary for continuous inspection and maintenance of the BMPs in their post-construction phase. During its next MS4 permit term, SHA will need sufficient time during the early phases of BMP implementation to plan restoration BMPs outside of SHA's ROW.

Pace of Restoration - TMDLs

The SHA accomplished restoration for 903 impervious acres before the current MS4 permit was issued in 2015 that MDE accounted toward the current MS4 permit restoration requirement. When MDE set the restoration requirement of 4,621 acres, it meant SHA needed to implement new BMPs to restore an additional 3,718 impervious acres within the 5-year permit term, a 2.7% average annual pace of restoration. The Maryland WIP III states that the stormwater sector, which includes Large Phase I NPDES MS4 permitted agencies (like SHA), is capable of restoring 2% of its untreated impervious areas each fiscal year (MDE, 2019, p. B-33). When an agency's MS4 permit requires that agency to implement BMPs at a rate that equals or exceeds its annual capacity, the need to achieve the required minimum amount of restoration within the finite, 5-year MS4 permit term must be prioritized above the need to implement BMPs that produce pollutant load reductions in support of attainment of TMDL WLAs.

Though SHA was able to achieve and exceed the minimum restoration required by the MS4 permit expiration date, the annual pace of restoration mandated by that permit requirement was greater than the maximum capacity pace established in the Maryland WIP III. As a consequence, SHA planning for restoration BMP implementation since 2015 needed to optimize cost-benefit by pursuing the least expensive, fastest BMP implementation approaches in order to achieve the challenging, minimum amount of impervious surface restoration credits before the permit term expiration date. That need to prioritize BMPs with the fastest implementation schedules and highest impervious acre treatment credit yields implicitly limited SHA capacity to strategically plan restoration for the purpose of achieving any specific water quality improvement goals established for local and Chesapeake Bay watershed TMDLs. A summary of SHA TMDL WLA responsibilities and relative progress toward associated water quality improvement goals is provided in Appendix E to the 8th SHA MS4 permit annual report (SHA, 2023).

The Maryland WIP III states that “recognizing the multiple water quality impacts from stormwater means that care should be taken to select specific restoration practices that provide both a nutrient reduction benefit for the Bay as well as address other important local stressors” and “when assessing the cost-benefit of a stormwater strategy, selecting and placing practices that maximize the number of pollutants treated becomes more important” (MDE, 2019, p. B-32). The challenging pace of restoration BMP implementation required by MS4 permit conditions since 2015 has made it more difficult for SHA to carefully select any given BMP location or type to ensure that it:

- Maximizes measurable pollutant load reductions at the applicable 8-digit local watershed scale in support of TMDL water quality improvement goals
- Supplements or establishes a “BMP Treatment Chain” whereby BMP placement upstream maximizes cohesiveness with and efficacy of BMPs located downstream within a given stormwater drainage pathway
- Supports the needs of applicable stakeholders
- Maximizes co-benefits for other SHA mission objectives

A slower annual pace of restoration relative to the 2.7% annual pace MDE required SHA to implement during the current MS4 permit term would allow SHA the time necessary to better select BMP types and locations for the purpose of achieving local and Bay TMDL water quality improvement goals sooner and in greater alignment with the needs of applicable stakeholders. If the BMP implementation rate for the next SHA MS4 permit term is higher than 2% per year, SHA will not have sufficient time to effectively coordinate with stakeholders or select types and locations for BMP implementation during the 5-year MS4 permit term that optimize progress towards attainment of WLAs established under local and Bay TMDLs. Instead, SHA BMP implementation planning during the next MS4 permit term will mirror that of the first 5 years of the current MS4 permit term and focus on the rapid implementation of impervious surface restoration.

The SHA planning for future restoration BMP implementation, beginning in FY 2017 and continued through the date of submittal of this MEP Analysis to MDE, was accomplished when SHA’s current MS4 permit term restoration progress was projected to exceed the minimum amount required and no additional requirements were in effect that mandated any further BMP implementation until SHA is issued its next MS4 permit by MDE. In the absence of a persistent or new MS4 permit-required pace of restoration, SHA BMP implementation planning and design efforts did not stop or slow down and instead, continued and was able to redirect focus to accelerating progress toward SHA’s achievement of longer term, local 8-digit watershed water quality improvement goals for TMDL compliance. The SHA BMP type and location selections targeted strategies that would best support SHA achievement of 2025 restoration progress

milestones established for its TMDL WLAs in the SHA Impervious Restoration and Coordinated TMDL Implementation Plan (SHA, 2018).

The SHA has nearly finished development two Full Delivery contracts (see the SHA response to Question 6 in the Appendix B questionnaire for more details about the ‘Full Delivery’ contracting method) that would seek to achieve pollutant load reduction progress toward attainment of SHA WLAs in specific, local 8-digit watersheds. These new contracts task contractors to locate and implement BMPs that remove the maximum amount of a specific pollutant from a specific watershed where SHA has an established TMDL WLA. Previous Full Delivery contracts tasked contractors to implement BMPs anywhere in the SHA MS4 permitted areas that would yield the most MS4 impervious acre treatment credits for SHA.

Working at near but less than maximum capacity during the administratively continued period of MS4 permit coverage, SHA utilized available time and resources to strengthen and expand its interjurisdictional partnerships and continued pursuit of collaborative BMP implementation projects in watersheds where SHA has established WLAs. Through those increased partnering efforts, SHA identified new restoration project opportunities in impaired watersheds that align with the water quality improvement strategies/goals of applicable, local municipalities that also support the State’s goals for environmental justice.

Lastly, the available capacity during this time meant SHA was able to increase its focus on investigating and piloting novel and innovative BMP types. The SHA began investigating ways to diversify its restoration BMP portfolio by implementing new BMP types recently made creditable for MS4/TMDL compliance with MDE issuance of its 2021 MS4 Accounting Guidance (MDE, 2021) such as the Forest Conservation, Riparian Forest, and Conservation Landscaping land conversion BMP types that have not previously been implemented by SHA for MS4 permit or TMDL compliance.

Needing to implement restoration BMPs at a rate equivalent to or exceeding its annual capacity limits SHA time and fiscal resources available to carefully select restoration BMP types and locations so they best expedite delisting of specific, impaired waterbodies in the State. The SHA’s currently developed Full Delivery contracts intended to meet specific watershed improvement goals by implementing targeted stream restoration and riparian forest planting land conversion BMPs will need to be revised to instead target BMP types and locations (anywhere in the SHA MS4 permitted areas) that can be developed fastest, with the least funding needs, and with the highest equivalent impervious acre treatment credit yields. The SHA interjurisdictional and community partnership expansion will slow until SHA has met its new minimum impervious acre treatment credit restoration requirement because collaborative projects for coordinated watershed-specific water quality improvement outcomes take significantly more time and effort than SHA implementing restoration projects that warrant no, or minimal, interjurisdictional or community engagement and that prioritize impervious acre treatment credit yields over TMDL pollutant load reduction yields. Last but certainly not least, SHA efforts to develop/grow novel programs not required by the MS4 permit for BMP implementation, watershed monitoring, or related research will need to be reduced, postponed indefinitely, or abandoned altogether because their novelty introduces risk to SHA capacity to optimize BMP implementation rates and impervious acre treatment credit yields within the next 5-year MS4 permit term.

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Appendix A: Restoration Project Portfolio

Maryland State Highway Administration
 Restoration Project Portfolio
 Restoration Projects To Be Planned, Designed, and/or Constructed From the End of SHA's 2015 Permit Through FY 2029
 March 22, 2024

Remaining Unmet Restoration Obligation from Previous Permit (Impervious Acres): 0

REST BMP ID	REST BMP TYPE ¹	BMP CLASS ¹	PERMA-NENT OR ANNUAL BMP	NUM BMP	DRAIN-AGE AREA (acres)	PE (inches)	LENGTH RESTORED (feet)/LANE MILES (miles)/MASS LOADING (lbs)	TP REDUCTION (lbs/year)	TSS REDUCTION (lbs/year)	TN ⁶ REDUCTION (lbs/year)	IMP ACRES (IA)	GREEN STORMWATER INFRASTRUCTURE (GSI) CREDIT (IA X 0.35)	WATERSHED MANAGE-MENT (WM) CREDIT	TOTAL IMP ACRES (W/ GSI AND WM CREDITS)	IMPLEMEN-TATION COST ³	IMPLEMEN-TATION STATUS ²	PROJECTED IMPLEMEN-TATION YEAR	TMDL PARAMETER OR WQ OBJECTIVE ADDRESSED	GENERAL COMMENTS ⁷
Remaining Unmet Restoration Obligations from Previous Permit																			
Annual Operational Programs (Unmet Obligations from Previous Permit)^{3,4}																			
N/A																			
Subtotal Operations ³				0				0	0	0	0			0	\$0				
Capital Projects (Unmet Obligations from Previous Permit Term)																			
N/A														0					
Subtotal Capital				0				0	0	0	0	0	0	0	\$0				
Other (Unmet Obligations from Previous Permit Term)																			
N/A														0					
Subtotal Other				0				0	0	0	0	0	0	0	\$0				
Total of Remaining Obligations from The Previous Permit				0				0	0	0	0	0	0	0	\$0				

Obligations from Previous Permit That Must Be Continued																
Annual Operational Programs Required to be Maintained from Previous Permit ^{3,4}																
	Mechanical Street Sweeping	A	ANNUAL													0
		A	ANNUAL													0
		A	ANNUAL													0
		A	ANNUAL													0
		A	ANNUAL													0
	Regenerative/ Vacuum Street Sweeping	A	ANNUAL													0
		A	ANNUAL													0
		A	ANNUAL													0
		A	ANNUAL													0
	Catch Basin Cleaning	A	ANNUAL													0
		A	ANNUAL													0
		A	ANNUAL													0
		A	ANNUAL													0
	Storm Drain Vacuuming (i.e., Storm Drain Cleaning)	A	ANNUAL													0
		A	ANNUAL													0
		A	ANNUAL													0
		A	ANNUAL													0
Subtotal Operations ³				0			0	0	0	0	0	0	0			\$0
Capital Projects (Proposed to Replace Annual Obligations)																
																0
																0
																0
																0
Subtotal Capital				0			0	0	0	0	0	0	0			\$0
Other (Proposed to Replace Annual Obligations)																
																0
																0
Subtotal Other				0			0	0	0	0	0	0	0			\$0
Total of Obligations from Previous Permit That Must Be Continued				0			0.0	0.0	0	0	0.0	0.0	0.0			\$0

Proposed Restoration for the Next Permit

Operational Programs ⁴																		
	Street Sweeping	A	ANNUAL															
		A	ANNUAL															
		A	ANNUAL															
		A	ANNUAL															
	Catch Basin Cleaning	A	ANNUAL															
		A	ANNUAL															
		A	ANNUAL															
		A	ANNUAL															
Subtotal Operations (up to FY2029) ⁵				0				0	0	0	0		0	\$0				
Capital Projects																		
N/A	Restoration beyond the 20% Requirement from the 2015 permit and being used for restoration under the next permit			N/A							1,505.5			1,505.5		Complete	2021	Restoration beyond the 20% Requirement from the 2015 permit, implemented up to 10/8/2020, and being used for restoration under the next permit
132444	MSWG	E	PERMANENT	1	0.6	1.32		1.3	3,028.2	6.9	0.4	0.13		0.5		Complete	2021	IA, Little Patuxent River TSS local TMDL, Bay TMDL GSI credits not incorporated in the SHA FY 2023 MS4 permit annual report credit summaries.
132445	MSWG	E	PERMANENT	1	0.5	1.18		1.2	2,797.0	6.2	0.4	0.12		0.5		Complete	2021	IA, Little Patuxent River TSS local TMDL, Bay TMDL GSI credits not incorporated in the SHA FY 2023 MS4 permit annual report IA credit summaries.
132446	MSWG	E	PERMANENT	1	0.2	1.02		0.5	1,200.0	2.7	0.2	0.05		0.2		Complete	2021	IA, Little Patuxent River TSS local TMDL, Bay TMDL GSI credits not incorporated in the SHA FY 2023 MS4 permit annual report IA credit summaries.
130120	PWET	S	PERMANENT	1	4.4	2.6		5.8	13,104.9	23.8	1.5			1.5		Complete	2021	IA, Little Patuxent River TSS local TMDL, Bay TMDL
130073	PWET	S	PERMANENT	1	5.7	2.31		8.1	21,267.2	31.3	3.4			3.4		Complete	2021	IA, Little Patuxent River TSS local TMDL, Bay TMDL
130027	PWET	S	PERMANENT	1	40.9	1.96		38.8	129,909.4	240.5	16.2			16.2		Complete	2021	IA, Bay TMDL
130220	PWET	S	PERMANENT	1	2.9	2.09		3.2	14,738.4	18.2	1.9			1.9		Complete	2021	IA, Patapsco River LN Branch TSS local TMDL, Bay TMDL
020268	IBAS	S	PERMANENT	1	38.0	0.49		15.8	17,789.1	168.2	8.7			8.7		Complete	2021	IA, South River TSS local TMDL, Bay TMDL
15	OUT	A	PERMANENT	1			592.0	258.8	796,258.1	567.7	82.1			82.1		Complete	2021	IA, Loch Raven Reservoir TP local TMDL, Bay TMDL
160018UO	OUT	A	PERMANENT	1			374.0	211.3	125,645.9	58.4	37.9			37.9		Complete	2021	IA, Piscataway Creek TSS local TMDL, Bay TMDL
030010UO	OUT	A	PERMANENT	1			129.0	22.6	69,446.0	49.5	7.2			7.2		Complete	2021	IA, Loch Raven Reservoir TP local TMDL, Bay TMDL
030012UO	OUT	A	PERMANENT	1			166.0	6.3	19,512.1	13.9	2.0			2.0		Complete	2021	IA, Loch Raven Reservoir TP local TMDL, Bay TMDL
030011UO	OUT	A	PERMANENT	1			47.0	0.5	1,521.8	1.1	0.2			0.2		Complete	2021	IA, Loch Raven Reservoir TP local TMDL, Bay TMDL
030013UO	OUT	A	PERMANENT	1			24.0	0.4	1,152.9	0.8	0.1			0.1		Complete	2021	IA, Loch Raven Reservoir TP local TMDL, Bay TMDL
160020UO	OUT	A	PERMANENT	1			353.0	59.2	148,951.8	79.4	16.5			16.5		Complete	2021	IA, Piscataway Creek TSS local TMDL, Bay TMDL
160011UO	OUT	A	PERMANENT	1			103.0	65.1	42,683.6	15.4	11.8			11.8		Complete	2021	IA, Piscataway Creek TSS local TMDL, Bay TMDL
160025UR	OUT	A	PERMANENT	1			584.0	115.4	13,483.9	143.7	29.1			29.1		Complete	2021	IA, Anacostia River TN/TP/TSS local TMDLs, Bay TMDL
030026UO	OUT	A	PERMANENT	1			86.0	29.5	90,903.7	64.8	9.4			9.4		Complete	2021	IA, Loch Raven Reservoir TP local TMDL, Bay TMDL
030027UR	OUT	A	PERMANENT	1			1,503.0	145.7	451,116.4	321.7	46.4			46.4		Complete	2021	IA, Loch Raven Reservoir TP local TMDL, Bay TMDL
030025UO	OUT	A	PERMANENT	1			391.0	175.5	540,092.9	385.1	55.7			55.7		Complete	2021	IA, Loch Raven Reservoir TP local TMDL, Bay TMDL
160008UO	OUT	A	PERMANENT	1			21.0	0.3	768.1	1.0	0.1			0.1		Complete	2021	IA, Bay TMDL
160009UO	OUT	A	PERMANENT	1			42.0	2.5	7,169.2	9.7	0.9			0.9		Complete	2021	IA, Bay TMDL
160010UO	OUT	A	PERMANENT	1			50.0	1.6	4,523.5	6.1	0.5			0.5		Complete	2021	IA, Bay TMDL
100019UR	STRE	A	PERMANENT	1			3,121.0	177.1	427,503.6	560.0	54.5			54.5		Complete	2021	IA, Lower Monocacy River TP/TSS local TMDLs, Bay TMDL
030011UR	STRE	A	PERMANENT	1			2,427.0	171.2	462,575.0	448.7	53.0			53.0		Complete	2021	IA, Bay TMDL
030016UR	STRE	A	PERMANENT	1			1,836.0	71.6	197,787.2	194.9	22.5			22.5		Complete	2021	IA, Bay TMDL
100016UR	STRE	A	PERMANENT	1			3,739.0	431.4	739,029.5	1,159.7	116.5			116.5		Complete	2021	IA, Lower Monocacy River TP/TSS local TMDLs, Bay TMDL

100015UR	STRE	A	PERMANENT	1			3,185.0	200.8	353,456.1	592.3	55.6			55.6		Complete	2021	IA, Lower Monocacy River TP/TSS local TMDLs, Bay TMDL	
100590UT	FPU	A	PERMANENT	1				1.2	1,490.0	13.6	1.2			1.2		Complete	2021	IA, Lower Monocacy River TP/TSS local TMDLs, Bay TMDL	
100613UT	FPU	A	PERMANENT	1				0.9	1,102.6	10.1	0.9			0.9		Complete	2021	IA, Lower Monocacy River TP/TSS local TMDLs, Bay TMDL	
100614UT	FPU	A	PERMANENT	1				21.6	26,557.4	242.2	20.6			20.6		Complete	2021	IA, Lower Monocacy River TP/TSS local TMDLs, Bay TMDL	
100615UT	FPU	A	PERMANENT	1				4.4	5,349.2	48.8	4.2			4.2		Complete	2021	IA, Lower Monocacy River TP/TSS local TMDLs, Bay TMDL	
130048	PWET	S	PERMANENT	1	16.0	2.28		16.9	39,087.2	68.4	4.1			4.1	\$130,000	Under Construction	2025	IA, Little Patuxent River TSS local TMDL, Bay TMDL	Implementation cost represents the projected remaining costs in 2025
020363	PWET	S	PERMANENT	1	11.4	2.38		11.5	20,630.2	80.7	7.8			7.8	\$70,000	Under Construction	2025	IA, Baltimore Harbor TSS local TMDL, Bay TMDL	Implementation cost represents the projected remaining costs in 2025
160030UO	OUT	A	PERMANENT	1			700.0	36.2	181,100.7	108.7	14.9			14.9	\$1,119,000	Design	2026	IA, Patuxent River Upper TSS local TMDL, Bay TMDL	Partnership project
160031UR	STRE	A	PERMANENT	1			536.0	8.5	58,099.4	12.5	3.9			3.9	\$235,000	Design	2026	IA, Patuxent River Upper TSS local TMDL, Bay TMDL	Partnership project
160029UR	STRE	A	PERMANENT	1			797.0	21.7	98,288.6	49.1	8.2			8.2	\$494,000	Design	2026	IA, Patuxent River Upper TSS local TMDL, Bay TMDL	Partnership project
150021UR	STRE	A	PERMANENT	1			950.0	64.6	235,600.0	71.3	19.0			19.0	\$1,140,000	Design	2026	IA, Potomac River MO County TSS local TMDL, Bay TMDL	Partnership project
BIOSWALE	MSWB	E	PERMANENT	3	5.4	1		7.3	17,842.0	43.9	1.9	0.6		2.5	\$684,000	Design	2026	IA, Little Patuxent River TSS local TMDL, Bay TMDL	Partnership project
GRASS SWALE	MSWG	E	PERMANENT	3	3.1	1		4.3	10,423.7	25.5	1.1	0.4		1.5	\$400,000	Design	2026	IA, Little Patuxent River TSS local TMDL, Bay TMDL	Partnership project
BIORETENTION	FBIO	S	PERMANENT	1	5.2	1		7.5	19,773.1	44.9	2.3			2.3	\$640,000	Design	2026	IA, Little Patuxent River TSS local TMDL, Bay TMDL	Partnership project
GRASS SWALE	MSWG	E	PERMANENT	38	56.8	0.91		88.7	245,237.8	546.3	23.7	8.3		32.0	\$5,000,000	Planning	2026	IA, Patuxent River Middle TSS Local TMDL, Bay TMDL	1 Grass Swale project
GRASS SWALE	MSWG	E	PERMANENT	24	39.3	0.68		54.7	150,040.8	337.0	11.9	4.2		16.1	\$3,000,000	Planning	2026	IA, TP/TSS local TMDL reductions, Bay TMDL	1 Grass Swale project
GRASS SWALE	MSWG	E	PERMANENT	19	23.4	0.82		36.0	105,856.9	226.5	10.6	3.7		14.3	\$2,900,000	Planning	2026	IA, TP/TSS local TMDL reductions, Bay TMDL	1 Grass Swale project
FOREST PLANTING	FPU	A	PERMANENT	1				47.3	74,472.8	295.2	26.6			26.6	\$2,921,000	Design	2027	IA, Catoctin Creek TSS local TMDL, Bay TMDL	1 Forest Planting project
STREAM RESTORATION	STRE	A	PERMANENT	1			2,500.0	170.0	620,000.0	187.5	50.0			50.0	\$3,000,000	Planning	2029	IA, TN/TP/TSS local TMDL reductions, Bay TMDL	Project in early planning stages
STREAM RESTORATION	STRE	A	PERMANENT	1			2,500.0	170.0	620,000.0	187.5	50.0			50.0	\$3,000,000	Planning	2029	IA, TN/TP/TSS local TMDL reductions, Bay TMDL	Project in early planning stages
ADAPTIVE MANAGEMENT	OUT	A	PERMANENT	2				0.0	0.0	0.0	0.0			0.0	\$409,000	Planning	2029	Adaptive Management to Prevent Backsliding Restoration Progress	2 outfall stabilization BMP Adaptive Management projects to prevent failure of 2 currently functional BMPs generating 2.68 IA credits established during the 2015 MS4 permit term; no new IA restoration credit will be yielded by these projects.
ADAPTIVE MANAGEMENT	STRE	A	PERMANENT	3				0.0	0.0	0.0	0.0			0.0	\$3,014,000	Planning	2029	Adaptive Management to Prevent Backsliding Restoration Progress	3 stream restoration BMP Adaptive Management projects to prevent failure of 3 currently functional BMPs generating 239.21 IA credits established during the 2015 MS4 permit term; no new IA restoration credit will be yielded by these projects.
ADAPTIVE MANAGEMENT	FPU	A	PERMANENT	0				0.0	0.0	0.0	0.0			0.0	\$15,903,000	Planning	2027	Adaptive Management to Prevent Backsliding Restoration Progress	20 to 40 forest planting BMP Adaptive Management projects to remediate 276 tree planting (FPU) sites and 144.58 associated IA credits established during the 2015 MS4 permit term; no new IA restoration credit will be yielded
FOREST PLANTING (PLACEHOLDER)	FPU	A	PERMANENT	14				226.5	357,000.0	1,415.3	140.0			140.0	\$15,490,000	Planning	2027	IA, TN/TP/TSS reductions	3 to 6 Forest Planting projects; placeholder because SHA has not yet completed site selection for these BMPs
OUTFALL STABILIZATION (PLACEHOLDER)	OUT	A	PERMANENT	36			17,850.0	1,213.8	4,426,800.0	1,338.8	311.0			311.0	\$23,352,000	Planning	2028	IA, TN/TP/TSS reductions	3 to 4 Outfall Stabilization projects; placeholder because SHA has not yet completed site selection for these BMPs
Subtotal Capital (up to FY2029)				184				4,435.0	12,012,167.5	10,525.3	2,853.4	17.5	0.0	2,870.9	\$82,901,000				
Other																			

Permit Administration / Compliance										0				0	\$8,023,000		2025	Facilitate agencywide compliance with the CWA and demonstrate adequate progress toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs for the term of the MS4 permit in effect	Inspections, IDDE, monitoring, BMP remediation, TMDL planning, impervious credit accounting, reporting (i.e., TMDL implementation plans and Annual Reports), interoffice coordination, and coordinating with County MS4 partners, other agencies, and stakeholders.
Permit Administration / Compliance										0				0	\$8,214,000		2026	Facilitate agencywide compliance with the CWA and demonstrate adequate progress toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs for the term of the MS4 permit in effect	Inspections, IDDE, monitoring, BMP remediation, TMDL planning, impervious credit accounting, reporting (i.e., TMDL implementation plans and Annual Reports), interoffice coordination, and coordinating with County MS4 partners, other agencies, and stakeholders.
Permit Administration / Compliance										0				0	\$9,844,000		2027	Facilitate agencywide compliance with the CWA and demonstrate adequate progress toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs for the term of the MS4 permit in effect	Inspections, IDDE, monitoring, BMP remediation, TMDL planning, impervious credit accounting, reporting (i.e., TMDL implementation plans and Annual Reports), interoffice coordination, and coordinating with County MS4 partners, other agencies, and stakeholders.
Permit Administration / Compliance										0				0	\$13,165,000		2028	Facilitate agencywide compliance with the CWA and to demonstrate adequate progress toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs for the term of the MS4 permit in effect	Inspections, IDDE, monitoring, BMP remediation, TMDL planning, impervious credit accounting, reporting (i.e., TMDL implementation plans and Annual Reports), interoffice coordination, and coordinating with County MS4 partners, other agencies, and stakeholders.
Permit Administration / Compliance										0				0	\$13,229,000		2029	Facilitate agencywide compliance with the CWA and demonstrate adequate progress toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs for the term of the MS4 permit in effect	Inspections, IDDE, monitoring, BMP remediation, TMDL planning, impervious credit accounting, reporting (i.e., TMDL implementation plans and Annual Reports), interoffice coordination, and coordinating with County MS4 partners, other agencies, and stakeholders.
BMP design for restoration credited in the future permit				0						0				0	\$2,500,000		2028	IA, TN/TP/TSS reductions	Planning stages of BMP implementation that will be credited towards the subsequent, future permit (i.e., constructed after 2029). No new BMPs will be constructed/completed with this funding during the next MS4 permit term
BMP design for restoration credited in the future permit				0						0				0	\$2,500,000		2029	IA, TN/TP/TSS reductions	Planning stages of BMP implementation that will be credited towards the subsequent, future permit (i.e., constructed after 2030). No new BMPs will be constructed/completed with this funding during the next MS4 permit term.
Subtotal Other (up to FY2029)				0				0	0	0	0	0	0	0	\$57,475,000				
Total New Restoration for Next Permit (up to FY2029)				184				4,435.0	12,012,167.5	10,525.3	2,853.4	17.5	0.0	2,870.9	\$140,376,000				
Projected Years				184				4,435.0	12,012,167.5	10,525.3	2,853.4	17.5	0.0	2,870.9	\$140,376,000				
Total for Remaining Obligations from The				184				4,435.0	12,012,167.5	10,525.3	2,853.4	17.5	0.0	2,870.9	\$140,376,000				
Total for Remaining Obligations from The				184				4,435.0	12,012,167.5	10,525.3	2,853.4	17.5	0.0	2,870.9	\$140,376,000				

Appendix B: Physical Capacity Analysis Questionnaire

1. Provide information on MDOT SHA’s rights-of-way (ROW) and what is available for restoration. How does the demand for available ROW from other MDOT SHA programs, initiatives, or goals impact restoration opportunities (e.g., ROW being used for solar panels, MDOT SHA’s Pollinator Habitat Plan, adding bike lanes)?

The SHA seeks to use available SHA properties (referred to collectively hereafter as the SHA ROW), when practicable, to maximize efficiency when implementing new impervious surface restoration BMPs for SHA compliance with NPDES MS4 permit conditions. The following sections elaborate the limitations of and demands for SHA ROW that influence the proportion of SHA ROW that is available for the purpose of implementing new restoration BMPs during the next MS4 permit term.

Right-Of-Way Use and Expansion

In accordance with Title 8 of the Transportation Article, Annotated Code of Maryland, the SHA ROW can only be acquired and perpetually owned by SHA if/when doing so is necessary for SHA to carry out its legally designated duty, which is to plan, select, construct, improve, and maintain the State highway system. Most of the ROW that SHA maintains ownership of today was acquired before the federal Clean Water Act or State Stormwater Management Act was in affect that currently require that SHA, as part of its duty mandated by law, condemn sufficient public or private property necessary to adequately manage stormwater runoff from any impervious surfaces SHA constructs. This means that the current extent of SHA ROW is generally insufficient to implement stormwater management or restoration BMPs necessary to provide water quality treatment for any currently untreated impervious surfaces that were constructed before Maryland passed the Stormwater Management Act of 2007.

SHA generally needs to purchase new private/public property access and use rights or establish and then perpetually maintain new agreements to satisfy any future NPDES MS4 permit conditions that require water quality treatment of untreated impervious surfaces built before 2007. Any restoration BMPs located within SHA ROW implicitly compete with other often conflicting transportation needs. If installing restoration BMPs within the ROW, SHA must accept the risk of impacts to those BMPs from projects pursued in the future necessary to accomplish the core mission and duty established for SHA by law.

Competing Use

The SHA can only acquire and then retain new SHA ROW as necessary to accomplish its legally mandated duty, which has included activities necessary for SHA NPDES MS4 permit and TMDL compliance since 2011 but otherwise includes activities necessary for:

- Expanding transportation alternatives – projects creating bike lanes, hiker-biker trails, sidewalks, bus rapid transit, and other infrastructure that facilitates transportation by means other than individually owned automobiles. These often require more significant space within the ROW to implement safely compared to traditional practices.
- Future transportation expansion – projects creating additional lanes, intersections, access ramps, or other infrastructure necessary for transportation via automobile.
- Drainage – projects establishing, maintaining, or improving drainage infrastructure for roadways.
- Pollinator habitat – projects to create, enhance, and manage pollinator habitats implemented by SHA in accordance with the SHA Pollinator Habitat Plan mandated by Title 18 of the Agriculture Article, Annotated Code Maryland.

- Adjacent property owner interests – SHA addressing concerns, needs, or other interests related to use of SHA ROW expressed by private and public property owners can result in ROW lease agreements and other restrictions to SHA use of the ROW.
- Solar Panel Deployment – The SHA ROW is frequently proposed for solar panel deployment to support efforts to combat the effects of climate change. The scale and effect of future deployment is currently unclear but would likely impact available ROW for restoration projects. As new societal and political objectives arise, the open space along State highways is commonly perceived as an area of opportunity for progress and the State’s most urgent objectives will ultimately get priority use of SHA ROW.

The SHA consistently monitors its operations for opportunities to create co-benefits from the competing uses listed above by claiming activities implemented for those purposes as also generating MS4/TMDL restoration compliance credits. To date, SHA has not identified significant opportunities for this. For instance, the opportunity for SHA to claim pollinator habitats developed for the Title 18 regulatory requirement as Conservation Landscaping land conversion BMPs that generate MS4/TMDL compliance credits is being investigated but it is anticipated that the scale of such opportunities would be relatively limited.

If SHA were to implement Conservation Landscaping BMPs in its ROW, along highway medians and/or shoulders, such BMPs would still carry a higher risk of impacts from future SHA new development and redevelopment project needs than the same BMPs built outside SHA ROW. For this reason, the apparent opportunity to claim MS4/TMDL credit as a co-benefit of SHA regulated activities to comply with Title 18 may not be in the best interest of the State since highly anticipated, future impacts from new development or redevelopment projects in SHA ROW would require SHA to replace the Conservation Landscaping BMPs to maintain its compliance with multiple regulations instead of needing to mitigate compliance for just one regulation.

2. 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)?

The types of projects that SHA considers to be “low-hanging fruit” include those where BMP implementation (i.e., location and concept selection, design, permitting, and construction) is straightforward, cost-effective, and minimizes long-term risks. When working to locate and implement restoration BMPs necessary for compliance with the current MS4 permit, SHA initially believed that such “low-hanging fruit” projects would be readily available for current and future restoration needs, particularly within the existing SHA ROW.

The SHA’s actual experience implementing and maintaining BMPs across a variety of types and locations was that none of the projects SHA implemented would qualify as “low-hanging fruit.” No BMP type/location option SHA pursued was a perceivably ‘lower-hanging fruit’ than the other pursued or potential types/locations. In most cases, one or two of the low-hanging fruit criteria could be met but rarely could all three be met. All restoration projects had significant challenges that were often unique to their BMP type and/or location. The overall level of challenge was not significantly different, particularly when considering the full life cycle of any given BMP which includes its post-construction, perpetual workloads necessary to maintain MS4 permit compliance credit yields indefinitely.

Due to the relative novelty of most restoration BMPs in SHA's inventory, implementation data is currently insufficient for SHA to effectively estimate long term resource needs associated with perpetual inspection, maintenance, and/or replacement of BMPs. The SHA anticipates that addressing the long-term challenges tied to perpetual post-construction activities necessary for any given restoration BMP will be comparable to or exceed the level of effort and resources that was necessary for the initial planning and construction of that BMP, regardless of its type or location.

The SHA must focus its planning and design for future restoration BMP implementation in watersheds where SHA has established WLAs for local watershed TMDLs when practicable. The need to align compliance efforts this way will increasingly limit SHA's options for BMP location (i.e., project must be within a local TMDL watershed) and type (i.e., BMP type is selected for the greatest reduction of the listed TMDL pollutant) as the most effective and efficient BMP opportunities get implemented by SHA and the other MS4 permittees in coming years. The SHA targeting future restoration BMP implementation in TMDL watersheds is discussed further in SHA's response to Question 4 herein.

Planned projects presented in the Restoration Project Portfolio (Appendix A) were initiated after the restoration necessary to comply with the current MS4 permit was completed and includes mainly grass swale, forest planting, outfall stabilization, and stream restoration projects. The SHA is exploring the potential to implement the newly approved BMP types presented in MDE's 2021 MS4 Accounting Guidance to support future MS4 permit restoration requirements.

3. How does MDOT SHA collaborate with surrounding jurisdictions and agencies to increase restoration opportunities? How does MDOT SHA ensure the credit is there in perpetuity?

The SHA actively engages with surrounding jurisdictions, local governments, State and federal agencies, and non-profit organizations to partner on TMDL and impervious restoration projects and programs. Where SHA was able to establish active partnership agreements with stakeholders, SHA has collaborated intensively with those partners to provide project implementation support, participation in scientific studies, coordination support for BMP placement and impacts, and general support in pursuit of water quality improvements.

The SHA has found that its MS4-permitted partner agencies can add significant efficiency to agency planning and post-construction BMP adaptive management efforts, but it is increasingly challenging to find mutual benefit sufficient to balance or exceed the added administrative cost necessary to perpetually persist interagency agreements for crediting collaborative restoration BMP implementation. Many of the current SHA partners, or presumed potential partners, have their own Phase I or Phase II NPDES MS4 permit to comply with and their own challenging TMDL and impervious restoration requirements to address as a result. The current version of the MDE MS4 Accounting Guidance does not allow more than one MS4 permitted agency to claim full treatment provided by any given BMP toward MS4 compliance requirements which inherently creates interests for the other MS4 permitted agencies that compete with SHAs. Most notable among said interests is the competing interest to implement enough restoration BMPs within a 5-year permit term to demonstrate MS4 permit compliance for their respective agency. The SHA has seen more consistent success identifying mutual benefits when pursuing new restoration BMP implementation collaboratively under interagency agreements with entities that do not require coverage under an MS4 permit.

As described in the SHA response to Question 1 herein, limitations in ROW use will require SHA to look outside of the ROW for future restoration opportunities but implementing BMPs on property where SHA cannot secure a perpetual easement and instead must execute an interagency agreement (and then perpetually manage and amend said agreement to persist access/use rights for any applicable BMPs) can present unique challenges to BMP design (e.g., added time to negotiate the division of short term versus long term responsibilities between the stakeholder agencies for the collaborative BMP implementation) and construction (e.g., construction requirements can be different for County and local government agency partners relative to SHA standard requirements) timelines and increase associated administrative costs long term. In order to manage and persist the property access and use rights secured for restoration BMPs built outside SHA ROW, it is necessary for SHA to project and allocate considerable resources now and in the future for the establishment of new, and amendments to existing, interagency agreements. In more cases than not, these resource allocations will not yield new MS4 permit restoration compliance credits and are needed to simply prevent agreement coverage from lapsing and to prevent SHA from backsliding its restoration progress because SHA can no longer access or use the applicable BMP areas to satisfy required triennial inspection and maintenance.

4. How does MDOT SHA's work to address local TMDL WLAs impact available ROW and funding for impervious surface restoration?

A summary of SHA TMDL WLA responsibilities and relative progress toward associated water quality improvement goals is provided in Appendix E to the 8th SHA MS4 permit annual report (SHA, 2023). The SHA is a unique NPDES MS4 permittee in the sense that SHA ROW and infrastructure are located throughout multiple county MS4 jurisdictions. Many local TMDL watershed boundaries, where SHA has an established WLA and pollutant load reduction responsibility, span the jurisdictional boundaries of multiple Counties who have similar responsibilities for MS4 permit restoration and attainment of WLAs.

The SHA is challenged to work within a narrow ROW, as discussed within SHA's response to Question 1 in this Appendix B questionnaire, that is only limited further when BMP implementation must be focused within local TMDL watersheds. Impervious restoration practices can be sited in any location within SHA's MS4 permit coverage areas. With that flexibility SHA can select the most cost-effective locations for BMP implementation. Restoration for local TMDL watersheds must be implemented within the TMDL watershed where the most cost-effective siting may no longer be available for restoration, forcing SHA to construct more expensive projects per impervious acre restored.

The BMPs implemented towards nutrient and sediment TMDL reduction targets also provide impervious restoration credit. SHA's Restoration Project Portfolio (Appendix A) notes the local TMDL watershed and impairment in the Comments field when a proposed BMP serves both needs. Although BMPs implemented towards nutrient and sediment TMDL reduction targets are also providing impervious restoration credit, there are challenges balancing TMDL goals and impervious restoration goals. Cost effective BMPs (i.e., BMPs with the most pollutant reduction for the least cost) are selected based on the listed TMDL pollutant and targeted in watersheds of the highest priority related to all SHA's TMDL requirements. The BMP planning is generally either driven by TMDL needs or impervious restoration needs.

An MS4 permitted agency's achievement of the minimum impervious acre restoration required by conditions in any given MS4 permit within the given 5-year MS4 permit term is enforceable by MDE and EPA and failure to comply with the MS4 permit can result in sanctions being levied against the MS4 permitted agency. Unlike impervious restoration, local TMDL WLA requirements are not set to a predetermined timeline for completion. Per the MDE 2022 guidance document, *General Guidance for Local TMDL Stormwater Wasteload Allocation Watershed Implementation Plans*, timeframes must be established for attainment of each TMDL WLA and the responsible jurisdictions must determine and document their timelines for achieving milestone progress and full attainment goals for each of their respective WLA responsibilities. The SHA resource allocations must target BMP implementation strategies that will satisfy the time constrained legal requirements of the MS4 permit and also demonstrate progress toward local TMDL milestone and attainment goals presented in SHA TMDL Implementation Plans submitted for public comment and approved by MDE to date.

The SHA must allocate funding annually to implement compliance programs that do not yield any impervious acre restoration credits in order to continue demonstrating adequate progress by SHA toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs. The MDE released new guidance documents in February and August 2022 respectively for watersheds impaired by bacteria and Polychlorinated Biphenyl (PCB) pollutants that require SHA update all its TMDL implementation plans for those pollutant types by the end of calendar year 2025. Plan updates must incorporate SHA commitments to implement, annually thereafter, a pollutant source monitoring plan unique to each applicable watershed. Programmatic improvements must be implemented by SHA in short order to achieve MS4 permit compliance, but the program requirements were unknown prior to MDE releasing its guidance updates in 2022 so associated annual cost estimates for the necessary programmatic improvements could not be prepared by SHA until State FY 2023. Therefore, SHA has no funding allocated to the TMDL Compliance fund in the current CTP report to satisfy these new compliance requirements. The SHA needs to meet new and upcoming deadlines and to comply otherwise with the recent 2022 MDE guidance updates for PCB and bacteria TMDL implementation plans will reduce resources available for implementation of new restoration BMPs until the CTP has had sufficient time to adjust to pending SHA requests for increased funding allocations to the SHA TMDL Compliance fund.

5. Provide information on new impacts to funding. For example, describe if there have been changes to what grants are available to fund projects.

There is a declining trend for revenues to the Maryland State Transportation Fund including reduced funding from the gas tax with the transition to electric vehicles and the reduction in the number of drivers, in general, that is further reducing funding from tags/titles, etc. The number of vehicle registrations in the State of Maryland was continually increasing until FY 2020 (5.2 million) where the number of registrations decreased in FY 2021 (5 million) and has remained generally at the same amount (MVA Vehicle Registration by County from 2010 to 2023 available on Maryland's Open Data Portal - <https://opendata.maryland.gov/>).

On January 16, 2023, Maryland Department of Transportation Public Affairs released a PSA that discusses Governor Wes Moore's restoring \$150 million in funding of the \$3.3 billion deficit in the FY 2024 – FY 2029 CTP. The PSA states that Governor Moore is "determined to commit \$150 million in general funds on a one-time basis to help relieve pressure in Fiscal Year 2025 on the state's Transportation Trust Fund." However, NPDES/TMDL restoration is not included in the list of programs MDOT commits

to funding. The programs included in the restored funding align with what is discussed in another PSA published on December 5, 2023, where MDOT announced that the CTP will include “reductions across the department while maintaining an essential focus on safety, maintenance, and strategic investment.” The impacts to SHA funding allocations resultant from the CTP deficit are currently undetermined but anticipated to present significant constraints to resources available to SHA for implementation of new restoration BMPs. Historically, the SHA MS4 permit restoration program has not received significant funding from grants, relative to the program’s overall implementation cost, and the capacity of SHA to obtain and administer increased grant funding for the purpose of satisfying MS4 permit regulatory compliance requirements is currently unclear but programs are under development to explore grant opportunities that could support the program in the future.

6. What is the typical implementation time frame (from planning through construction) for: large upland stormwater projects (e.g., new and retrofits for ponds, bioretention, infiltration basins, etc.); instream restoration projects; and alternative projects (not annual) (e.g., tree planting).

Typical implementation time frames by developmental stage are presented by BMP type in Table 2. Developmental stages (typical) are described below and a list of standard activities accomplished is provided for each:

- Planning: Activities include:
 - Identification and assessment of viable project sites.
 - Initial evaluations for the National Environmental Policy Act (NEPA).
 - Preliminary project cost estimates and budget allocations.
 - Negotiations with property owners for potential ROW acquisition or access.
 - Design engineers tasked/contracted.
- Preliminary Investigations/Concept Design (30%): Activities include:
 - Engineering design plans initiated and advanced to approximately 30% complete.
 - Preliminary project constructability review.
 - Initial stages of ROW acquisition.
 - NEPA reevaluation.
 - Coordination with reviewer agencies in advance of preparation/submittal of permit applications
 - Natural resource permit preapplication meetings held.
- Semi-Final Design/Review (60%): Activities include:
 - Engineering design plans advanced to approximately 60% complete.
 - Initiate development of specifications.
 - Project cost estimate updated.
 - Hydrologic & hydraulics analysis completed.
 - Develop erosion and sediment control (E&SC) & stormwater management (SWM) plan.
 - NEPA reevaluation.
 - Permit applications submitted.
 - Constructability review.
 - ROW acquisition advanced.

- Final Design/Review (90%): Activities include:
 - Engineering design plans advanced to approximately 90% complete.
 - Specifications advanced.
 - Project cost estimate updated.
 - Hydrologic & hydraulics analysis completed.
 - E&SC/SWM plans revised.
 - NEPA reevaluation.
 - Constructability review.
 - ROW acquisition advanced.
- PS&E (Plans, Specification, & Estimate) package preparation (100%): Activities include:
 - Engineering design plans advance to 100% complete.
 - Permit authorizations secured.
 - Specifications finalized.
 - Project cost estimate updated.
 - Final constructability review.
 - ROW acquisition and/or access is finalized.
- Procurement: Activities include:
 - Invitation for Bids advertisement.
 - Bid submittal by contractors.
 - Bids determined by SHA.
 - Contract executed with contractor.
 - Construction Notice to Proceed (NTP) issued by SHA
- Construction: Activities include:
 - Mobilization/E&SC practice installation.
 - Grading/structure installation.
 - Stabilization/planting.
 - Construction verification/as-built inspections.
 - As-built plan documents developed and approved.

Table 2: Time Frames by Planning Stage and BMP Type

Planning Stage	Forest Planting in ROW	Forest Planting off ROW	Grass Swales in ROW	Outfall Stabilization off ROW	Large Upland SWM	Stream Restoration off ROW
Planning	0.50	2.00	0.50	2.00	2.00	2.00
Preliminary Investigations/Concept Design (30%)	0.25	0.50	0.25	0.50	0.50	0.50
Semi-final Design/Review (60%)	0.25	0.50	0.25	1.00	1.00	1.00
Final Design/Review (90%)	0.25	0.50	0.25	0.50	0.50	0.50
PS&E Package Prep (100%)	0.25	0.25	0.25	0.25	0.25	0.25
Procurement	0.50	0.50	0.50	0.50	0.50	0.50
Construction	1.00	1.00	1.50	1.50	2.00	2.00
Total	3 years	5.25 years	3.5 years	6.25 years	6.75 years	6.75 years

Overall, the shortest project timelines are about 3 years and the longest are about 7 years. For some projects, when utilizing traditional SHA contracting methods, SHA will attempt to accelerate BMP implementation by moving specific developmental stages forward concurrently. However, this approach carries risk. For example, securing easements outside of SHA ROW can take several years. If SHA is unable to secure easements, any planning or design efforts would be potentially wasted, since the project cannot be built.

For some BMP types, SHA may have multiple options for how planning, design, and construction activities can be contracted and the capability of SHA to choose from multiple options can impact the timeframes for project implementation. Project developmental stages can potentially be expedited if SHA is able to utilize innovative contracting methods that can create added efficiency for one or more of the typical developmental stages when compared to the efficiency of the given stage when implemented using traditional SHA contracting methods.

During the current MS4 permit term SHA piloted one such innovation, the “Full Delivery” contracting method, whereby the contractors that receive NTP for the contract will assume risk for successful implementation of the project by pursuing one or more of the typical project developmental stages concurrently until the project is verified complete and functioning as designed and is ready for transfer to SHA perpetual ownership and maintenance. That said, the Full Delivery contracting method was only appropriate for some types of BMPs, like stream restoration and forest planting on private property. Other BMP types, particularly those more likely to be located within SHA ROW like outfall stabilization or traditional SWM facilities, are not conducive to the Full Delivery contracting method because the desired BMP types cannot be implemented without direct SHA oversight.

The BMPs that incorporate elements of SHA-owned infrastructure typically require more SHA oversight and are better suited to more traditional project development processes and contracting methods. In contrast, land conversion and stream restoration BMP types can often be implemented without intersecting/impacting any SHA-owned infrastructure and thus require less direct oversight by SHA. It is also notable that restoration projects that target specific, small scale areas geographically for BMP implementation or seek to utilize novel or variable BMP types can be difficult to successfully implement with innovative contracting methods. Restoration projects like the ones necessary to address localized, 8-digit watershed TMDL water quality improvement goals can require careful selection of BMP types and locations that may warrant added oversight by SHA for early project developmental stages in order to establish sufficient confidence that the project will produce the desired restoration progress/outcomes for MS4 permit and TMDL compliance.

New legislation proposed to the Maryland General Assembly, pertaining to stream restoration, may increase permitting timelines for those BMP types if enacted. The actual effect this new legislation will have on the SHA MS4 program is currently unclear but could increase the timeline for new restoration BMP implementation by several years depending on the relative impacts to current policy and conditions that must be met for stream restoration projects to achieve necessary permit authorizations to proceed to construction. The proposed legislation could also reduce the potential locations where stream restoration projects are allowable which could increase the cost and time needed for SHA to identify and select alternate, permissible restoration BMP types and locations that can similarly support SHA restoration goals during the next MS4 permit term

7. Provide a copy of MDOT SHA's 5-year Consolidated Transportation Program (CTP) for restoration projects. If possible, include MDOT SHA's operating budget for annual restoration projects, as well as its operating and maintenance budget for all BMPs implemented under the MS4 permit.

The CTP is Maryland's 6-year capital budget for transportation projects and contains projects and programs throughout the Maryland Department of Transportation. A summary of funding requested for FY 2024 through FY 2029 is provided in the Final FY 2024 – FY 2029 CTP report available for download at this website: www.ctp.maryland.gov

The SHA's TMDL Compliance Budget Summary from FY 2025 through FY 2029 is provided in **Table 3**. The following describes the program/work elements included in each portion of the TMDL Compliance fund capital budget allocation:

- Permit administration/compliance:
 - Illicit Discharge Detection and Elimination program management and minimum mandated annual outfall screenings.
 - Monitoring activities mandated by the MS4 permit conditions for Assessment of Controls and for TMDL Compliance.
 - Triennial MS4 permit and TMDL restoration credit verification inspections for all BMP types except for traditional, structural SWM facilities.
 - Adaptive management programs to prevent SHA backsliding previously accomplished MS4/TMDL restoration credits.
 - Restoration planning, including TMDL implementation plan development and associated restoration BMP type and site selections and advertisement for public comment.
 - Continuous MS4 permit impervious acre credit and TMDL pollutant load reduction credit accounting.
 - Annual MS4 permit reporting and any supplementary MS4 permit-related report development necessitated by requests from EPA, MDE, or other stakeholders
 - Interoffice coordination activities necessary to administer MS4 permit and TMDL compliance across a multitude of SHA Offices statewide that independently manage compliance activities
 - Continuous coordination with County MS4 partners, other agencies, and stakeholders necessary to maintain efficient MS4 permit and TMDL compliance planning and implementation.
- Impervious acre restoration requirement: All planning, design engineering, ROW acquisition, permitting, utility management, and construction activities necessary to implement sufficient impervious restoration BMPs necessary to achieve impervious acre restoration credits required by the end of the MS4 permit.
- BMP planning and design for subsequent MS4 permit term restoration credit: As discussed in the response to Question 6 in the preceding section of this Appendix B, SHA typically needs as much as 7 years to implement BMPs. The work necessary to complete implementation required by the end of a given MS4 permit term must be funded and initiated before a new restoration requirement is issued. This investment by SHA is essential to ensure continuous restoration progress through the subsequent MS4 permit term.

Table 3: TMDL Compliance Budget Summary from FY 2025 – FY 2029

NPDES/TMDL Program	Annual Budget (\$000) Needs					5-Year Total
	2025	2026	2027	2028	2029	
Permit administration / compliance	8,023	8,214	9,844	13,165	13,229	52,475
Impervious acre restoration requirement	11,926	22,498	17,670	17,492	13,316	82,901
BMP planning & design for subsequent MS4 permit term restoration credit				2,500	2,500	5,000
Totals	19,949	30,712	27,514	33,157	29,044	140,376

The CTP capital budget allocations to the TMDL Compliance fund must be dedicated first to the permit administration/compliance program elements before any amount of funding can be dedicated to impervious acre restoration BMP implementation for compliance with restoration conditions in the current or future MS4 permits. As more restoration BMP implementation is required by MDE and completed by SHA, and as SHA’s built BMP assets age, the scale of SHA perpetual needs to inspect and adaptively manage functionality for built BMPs expands. This expansion requires that more and more funding allocated to the TMDL Compliance fund in the CTP be dedicated to the SHA permit administration/compliance program elements in order to perform all activities necessary to perpetuate previously achieved impervious acre restoration BMP credits short of largescale or complete BMP remediation.

Funding for operational practices like street sweeping and inlet cleaning is housed in SHA’s operational/maintenance budget that is not included in the CTP, which is only representative of capital fund allocations. The SHA anticipates continuing its operational practices as required under the Property Management conditions of its current and next MS4 permit but is not claiming impervious restoration credit for those practices implemented during the 2015 MS4 permit term.

8. Provide the average time to procure professional planning, design, and construction services. Please provide information on any innovative contracting mechanism you use to reduce procurement timeframes and what those reduced time frames are. – *OPTIONAL QUESTION*

The SHA procures Architectural/Engineering services as open-ended contracts with multiple firms for 5-year periods. This allows SHA to assign tasks under the contracts to the firms that will provide some portion the Professional Engineering services without having to procure services on a project-by-project basis. The services that may be included range from full planning and design through advertisement of the project plans and specifications to development of Request for Proposals to contract planning, design, and construction services under alternative contracting mechanisms.

The SHA procures construction services on a project-by-project basis. This process follows State and federal procurement regulations and provides a competitive, inclusionary procurement process. As outlined within the SHA response to Question 6 of this Appendix B questionnaire, the procurement process takes approximately 6 months from the advertisement of plans and specifications to issuing NTP to the contractor.

The SHA has implemented alternative contracting mechanisms, including Design-Build and Full Delivery contracting. Design-Build can streamline large projects where work is phased so that construction is concurrent with design. For example, a watershed wide contract may include several independent BMP projects that can be constructed in staggered phasing. Design-Build projects have the potential to streamline the construction process when permits and ROW are acquired prior to the contract execution. Permits and ROW acquisition processes must be adapted to fit the Design-Build approach since designs are not finalized prior to contract execution. This limits the effectiveness of the Design-Build approach for projects that have wetland and waterway permitting requirements and/or ROW acquisition needs.

Similarly, Full Delivery contracts allow the contractor to control the design, permitting, ROW, and construction processes. In a manner similar to wetland banking, the integration of developmental activities can shorten timelines. The SHA is currently analyzing the Full Delivery approach for alignment with available funding sources since traditional funding sources are currently stressed. Additional time and testing are needed to determine the full range of benefits and challenges associated with the contracting methods SHA has innovated in recent years, including their relative capacity to expedite the pace of restoration BMP implementation.

9. Provide a typical time frame required to obtain permits from local, State, and federal agencies prior to construction. Describe how these time frames affect the overall project implementation time frames described in Question #6. How can these time frames be reduced to help get these projects out the door faster? – *OPTIONAL QUESTION*

Timeframes to obtain permits from local, State, and federal agencies prior to construction vary depending on the project type and complexity. Permitting is built into SHA's project design processes noted in Question 6. The ROW acquisition and permitting are essential processes that require long lead times and generally must occur concurrently with design when authorizations are likely.

Uncertainty in the permitting process is introduced during the public notice and comment periods for wetland/waterways permitting. Typically, a significant amount of time has elapsed after project design efforts have been initiated before public notice happens. Addressing public and regulator comments can require project redesign and extend the permitting process.

10. 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? – *OPTIONAL QUESTION*

The bidding process is not an obstacle for SHA to complete projects or implement the SHA MS4 compliance program components. The SHA routinely receives adequate numbers of contractor proposals for open-end contracts and bids for restoration BMP design and construction contracts. Re-advertisement is not a routine occurrence and does not generally impact contract procurement and implementation of SHA's programs.

11. 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. – *OPTIONAL QUESTION*

The contracting limitations that resulted in longer project implementation times are generally due to the overall limited availability of experienced specialty contractors to install restoration BMPs. SHA's inclusionary, traditional design-bid-build procurement approach for typical projects relies on a low bid process. While it is a relatively rapid procurement process compared to alternative contracting mechanisms, it does not evaluate contractor quality. At times, this has resulted in significantly longer construction durations due to contractors that are unfamiliar or inexperienced with restoration BMPs. The amount of time added to implementation timelines can range anywhere from 6 months to several years.

Appendix C: Year 1 BMP Portfolio

BMP NAME	BMP TYPE	NUMBER of BMPs	IMPERVIOUS ACRES TREATED	LENGTH RESTORED (feet)/ LANE MILES (miles)/ MASS LOADING (lbs)
Property Management				
Annual BMPs				
Street Sweeping	MSS/VSS	N/A ¹	0.0 ²	155.7
Inlet Cleaning/ Pipe Cleaning	CBC/SDV	N/A ¹	0.0 ²	598,500.0
Proposed Restoration for Year 1 of the Reissued Permit				
Capital Projects				
N/A ³	Restoration beyond the 20% Requirement from the 2015 permit, implemented up to 10/8/2020, and being used for restoration under the next permit	N/A ³	1,505.5	N/A ³
N/A ³	Restoration completed during the administrative continuation and being used for restoration under the next permit	N/A ³	661.4	N/A ³
130048	PWET	1	4.1	N/A ⁴
020363	PWET	1	7.8	N/A ⁴

N/A = not applicable.

Notes:

1. Street sweeping and inlet cleaning/pipe cleaning do not have number of BMPs as a metric.
2. The SHA street sweeping and inlet cleaning operations since the end of the previous MS4 Permit term have not met the minimum qualifications for restoration credit established in the MDE 2021 MS4 Accounting Guidance. The SHA implementation of these BMP types beyond October 8, 2020, is not claimed for impervious restoration credit but it is anticipated that these practices will continue.
3. The restoration beyond the 20% requirement of the 2015 MS4 Permit constructed prior to October 8, 2020, and restoration completed during the administrative continuation includes multiple BMPs which are summarized as two records of total impervious acre credit for the purpose of this table. As a result, BMP NAME, NUMBER OF BMPs, and LENGTH RESTORED (feet)/ LANE MILES (miles)/ MASS LOADING (lbs) are not presented.

4. The BMPs with no associated length, lane miles, or mass loading metric.

Column Descriptions:

- BMP NAME: Unique ID or name of the project.
- BMP TYPE: Type of restoration BMP. BMP types from the MS4 Geodatabase.
- NUMBER OF BMPs: The number of restoration BMPs present in the project.
- IMPERVIOUS ACRES TREATED: Impervious acres treated is calculated using the MDE 2021 Accounting Guidance.
- LENGTH RESTORED (feet)/ LANE MILES (miles)/ MASS LOADING (lbs): Length of stream restoration or outfall stabilization, lane miles swept, and pounds of material removed as part of inlet cleaning/pipe cleaning.