

Non-Tidal Baltimore Harbor Sediment Total Maximum Daily Load Implementation Plan

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1 Introduction

The Federal Clean Water Act (CWA) of 1972 established requirements for each state to develop programs to address water pollution through:

- Establishment of water quality standards (WQSs)
- Implementation of water quality monitoring programs
- Identification and reporting of impaired waters
- Development of maximum allowable pollutant loads for impaired waters that when met, and not exceeded, will meet WQSs and attain the water’s designated use.

WQSs are based on the concept of designating and maintaining specifically defined uses for each waterbody. Under the CWA, the State of Maryland is required to assess and report on the quality of waters throughout the state. Section 303(d) of the CWA requires the State to list its water bodies as “impaired” if applicable WQSs are not met. In such cases, the State must develop a Total Maximum Daily Load (TMDL) for pollutants of concern.

The Maryland Department of the Environment (MDE) develops WQSs, lists qualifying water bodies as impaired, and establishes TMDLs to ensure designated uses are met. Once MDE develops a TMDL document and the U.S. Environmental Protection Agency (EPA) approves it, all jurisdictions with a designated stormwater wasteload allocation (SW-WLA) are required to develop an Implementation Plan (IP) to meet the goals of the TMDL.

EPA has delegated MDE authority to issue discharge permits within Maryland in accordance with the CWA and corresponding National Pollutant Discharge Elimination System (NPDES) regulations. MDE issued Maryland Department of Transportation State Highway Administration (MDOT SHA) an NPDES Municipal Separate Storm Sewer System (MS4) discharge permit on October 9, 2015 (Permit No. 11-DP-3313 MD0068276) that requires compliance with TMDLs, coordination with county MS4 jurisdictions concerning watershed assessments, and development of a TMDL IP for each watershed where MDOT SHA has a SW-WLA. The MDOT SHA NPDES MS4 permit is available for reference online at the following web address:

<https://roads.maryland.gov/mdotsha/pages/index.aspx?PageId=336>

In accordance with conditions in the NPDES MS4 discharge permit and recommendations described in the MDE document titled, “General Guidance for Local TMDL SW-WLA Watershed IPs” (MDE, 2022a), MDOT SHA has prepared this IP to address the sediment SW-WLA established for MDOT SHA in the MDE document titled, “Total Maximum Daily Load of Sediment in the Non-Tidal Baltimore Harbor Watershed, Baltimore City, Baltimore County, and Anne Arundel County, Maryland” that was approved by EPA on January 27, 2022 (MDE, 2021c).

2 Watershed Description

The Baltimore Harbor watershed (MD 8-digit code: 02130903; see **Figure 1**) encompasses 90 square miles within Anne Arundel County, Baltimore County, and Baltimore City. Located in

the Western Shore region of Maryland, south of the Back River watershed, it drains into the Chesapeake Bay. Tributaries of the Baltimore Harbor watershed include Gwynns Falls, Jones Falls, Bear Creek, and Curtis Bay/Creek. The areas of focus for the TMDLs in this watershed are within the subwatersheds of Baltimore Harbor Embayment, Bear Creek, Curtis Creek, Furnace Creek, and Marley Creek in Baltimore and Anne Arundel counties.

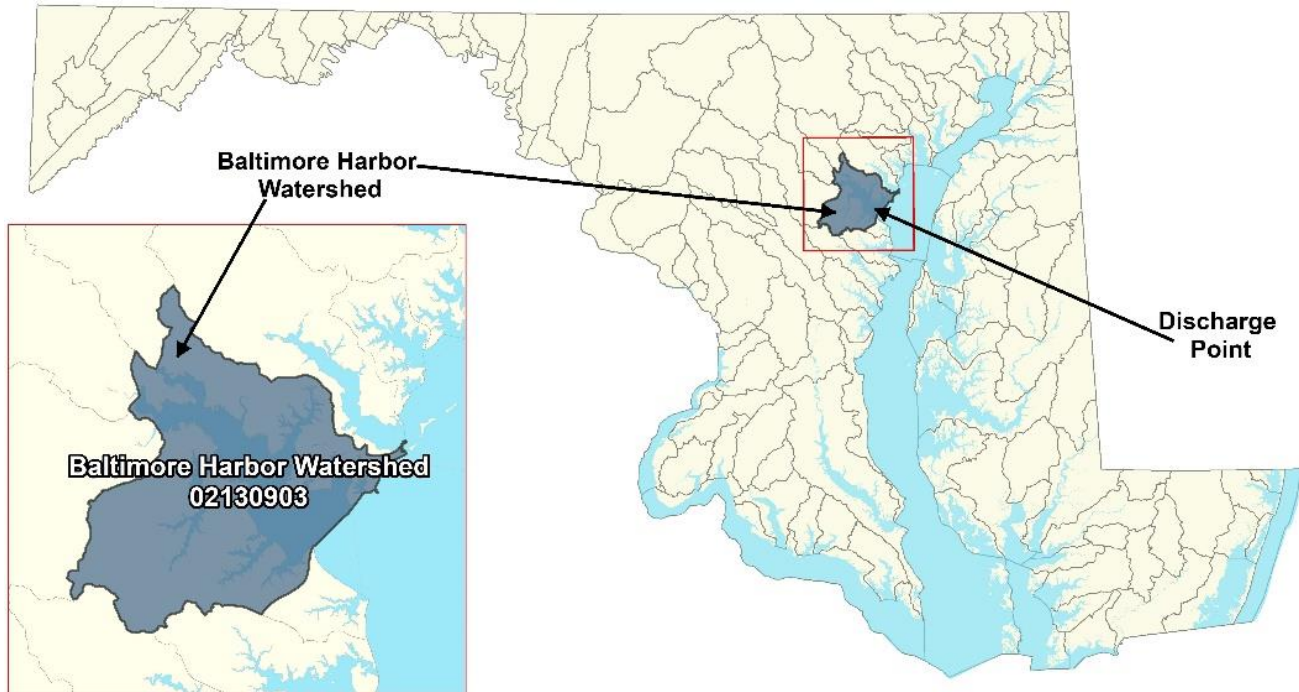


Figure 1: Baltimore Harbor 8-Digit Watershed

There are 1,258 miles of MDOT SHA roadway located within the Baltimore Harbor watershed. The associated 2,013 acres of MDOT SHA right-of-way (ROW) incorporates 952 acres of impervious surface. MDOT SHA does not have ROW within Baltimore City. MDOT SHA-owned land is a small portion of the Baltimore Harbor watershed, and it consists of relatively uniform land use including roadways and roadside vegetation.

Table 1 lists the designated uses for waterways in the Baltimore Harbor watershed (COMAR 26.08.02.02). Non-tidal tributaries in the watershed are designated as ‘Use Class I: water contact recreation and protection of non-tidal warmwater aquatic life’ and the tidal tributaries are designated ‘Use Class II: support of estuarine and marine aquatic life and shellfish harvesting’ (COMAR 26.08.02.08).

There are no Tier II stream segments within the Baltimore Harbor watershed. Tier II waters are those that have existing water quality that is significantly better than the water quality standards minimum requirement (MDE, 2021d).

Table 1: Designated Uses in the Baltimore Harbor Watershed

Designated Uses	Use Classes	
	I	II
Growth and Propagation of Fish (not trout), other aquatic life and wildlife	✓	✓
Water Contact Sports	✓	✓
Leisure activities involving direct contact with surface water	✓	✓
Fishing	✓	✓
Agricultural Water Supply	✓	✓
Industrial Water Supply	✓	✓
Propagation and Harvesting of Shellfish		✓
Seasonal Migratory Fish Spawning and Nursery Use		✓
Seasonal Shallow-water Submerged Aquatic Vegetation Use		✓
Open-Water Fish and Shellfish Use		✓
Seasonal Deep-Water Fish and Shellfish Use		✓
Seasonal Deep-Channel Refuge Use		✓
Growth and Propagation of Trout		
Capable of Supporting Adult Trout for a Put and Take Fishery		
Public Water Supply		

Source:

http://www.mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Pages/wqs_designated_uses.aspx

The Baltimore Harbor watershed is associated with three assessment units in Maryland’s *Final Combined 2020-2022 Integrated Report of Surface Water Quality (303(d) list and 305(b) Report* (Integrated Report; MDE, 2022c): the non-tidal 8-digit watershed (02130903) as noted above and two tidal portions: the Chesapeake Bay Segments Upper Chesapeake Bay Mesohaline (CB3MH) and the Patapsco Mesohaline (PATMH). Waters within the Baltimore Harbor watershed are subject to the following impairments as noted in the Integrated Report. Impairments in **bold text** are within the non-tidal tributaries of the watershed:

- Chlordane
- **Chlorides**
- Chromium
- Copper
- Cyanide
- Debris/Floatables/Trash
- Enterococcus
- Lead in Sediments
- Nitrogen (Total)
- **PCB in Fish Tissue**
- Phosphorus (Total)
- **Sulfates**
- **Total Suspended Solids (TSS)**
- Zinc in Sediments

Sediment TMDLs of non-tidal tributary streams address the narrative water quality criteria specific to designated uses for the support of aquatic health (COMAR 26.08.02.03-3a). According to its Sediment TMDL, the Baltimore Harbor watershed land use is approximately 85% urban lands and 14% forest and developed regulated urban land use is the largest sediment

source category, contributing an estimated 92.3% of baseline pollutant loads (MDE, 2021c). Specific sources of sediment pollution are not included in the TMDL. However, MDOT SHA researched potential sources during the development of this IP (see summary in **Table 2** below) and determined ‘urban’ and ‘natural’ sources are the mostly likely types to exist within MDOT SHA-owned lands.

Table 2: Sediment Sources from Various References

Land Use	Sources
Agriculture	Soil Erosion
Urban	<ul style="list-style-type: none"> • Construction Erosion • Parking Lot, Roof, and Street Runoff
Natural	<ul style="list-style-type: none"> • Stream Erosion • Shoreline Erosion

Sources: MDE, 2014; EPA, 2010; Hoos et al., 2000; and Schueler, 2011

3 Watershed Assessment Evaluations

Each NPDES MS4 permitted county is required to perform detailed assessments of local watersheds within its jurisdiction. These assessments determine current water quality conditions, identify and rank water quality problems, prioritize and rank structural and non-structural improvement projects, and set pollutant reduction benchmarks and deadlines to demonstrate progress toward meeting applicable WQSS. MDOT SHA is not required to duplicate this effort but is required to coordinate with the MS4 permitted jurisdictions to obtain and review their watershed assessments.

In 2012, the Baltimore County Department of Environmental Protection and Sustainability published the *Bear Creek/Old Road Bay Small Watershed Action Plan* (Parsons Brinckerhoff, 2012). The Bear Creek watershed is largely a mix of medium to high density residential (17% and 15%, respectively) and industrial (32%) land use with impervious cover representing 29% of the overall watershed. Although Baltimore County generally conducts biological monitoring of benthic health for its watershed assessments, this monitoring was excluded from the Bear Creek plan due to limited free flowing streams in the watershed (Parsons Brinckerhoff, 2012).

Within the Bear Creek subwatershed, Sparrows Point and the area immediately surrounding Colgate Creek and Peach Orchard Cove received a “very high” prioritization ranking for restoration. Out of these three areas, Sparrows Point ranked first in need of prioritization because it is almost entirely comprised of industrial land uses and EPA and MDE have documented contamination issues. Colgate Creek and Peach Orchard Cove areas were ranked second and third, respectively, in terms of priority for restoration because both areas include environmental justice areas of concern (Parsons Brinckerhoff, 2012). In its Small Watershed Action Plan, the County discusses and provides maps of restoration opportunities most likely to limit pollution sources and help implement pollution reduction in the Bear Creek subwatershed. The types of restoration opportunities identified include downspout redirect, tree planting, street sweeping, parking lot/alley retrofits, and bayscaping (Parsons Brinckerhoff, 2012).

Anne Arundel County’s Department of Public Works prepared the *Patapsco Tidal and Bodkin Creek Watershed Assessment* (AA-DPW, 2012). The assessment determined the condition of,

and prioritized watershed management activities for, areas within the Baltimore Harbor watershed. Bodkin Creek watershed is also included in the County’s assessment but is not part of the Baltimore Harbor 8-digit watershed area.

For their watershed assessment, the Anne Arundel County Aquatic Biological Monitoring Program, modeled after the State’s Maryland Biological Stream Survey (MBSS), assessed both random and targeted streams within the Patapsco Tidal subwatershed. Activities performed included benthic sample collection, physical habitat assessment, and Rapid Bioassessment Protocol habitat assessment. The overwhelming majority of sites sampled were rated either “Poor” or “Very Poor.” Approximately 16% of the streams evaluated in the Patapsco Tidal watershed were classified as “severely degraded” by the Maryland Physical Habitat Index. Three Cabin Branch 2, Marley Creek 1, and Cabin Branch subwatersheds were identified as having the highest percentage of stream reaches classified as either “degraded” or “severely degraded.”

One-third of the perennial streams in each of the Cabin Branch (PT3), Cabin Branch 2 (PT2), Marley Creek 1 (PT8), Marley Creek 3 (PTF), and Sawmill Creek 1 (PT7) subwatersheds of the Patapsco Tidal watershed were prioritized as “high” or “medium high” for restoration need. The Marley Creek 3 (PTF), Furnace Creek (PT5), Cabin Branch (PT3), Sawmill Creek 1 (PT7), Back Creek (PTC), and Marley Creek 2 (PTE) subwatersheds were also prioritized for implementation of restoration Best Management Practices (BMPs). The County suggested the following BMPs for the Patapsco Tidal watershed:

- *Outfall retrofits* – all major outfalls characterized as impaired
- *Stormwater pond retrofits* – all ponds constructed prior to 2002 with a drainage area greater than 10 acres
- *Stream restoration* – targeting degraded and severely degraded reaches (the County’s priority ranking is provided in **Table 3** below)
- *Street Sweeping* – all closed curbed County roads
- *Inlet cleaning* – vacuum cleaning stormwater curb inlets and catch basins
- *Public land reforestation*
- *ESD retrofit to the MEP* – including green roofs, permeable pavement, bioretention, etc.

Table 3: Anne Arundel County Identified Priority Areas for Treatment

Priority	Watershed	Subwatershed	Reach
1	Patapsco Tidal	Marley Creek 3	PTF016
3	Patapsco Tidal	Rock Creek	PTB048
4	Patapsco Tidal	Cabin Branch 2	PT2026
4	Patapsco Tidal	Cabin Branch	PT3039
10	Patapsco Tidal	Marley Creek 4	PTG086
10	Patapsco Tidal	Cabin Branch	PT3010

Source: AA-DPW (2012), Map 4.1

4 Desktop Reviews and Field Investigations

To supplement information from its evaluation of county watershed assessments, MDOT SHA utilized Geographic Information Systems (GIS) software and data to review MDOT SHA ROW for potential BMP implementation opportunities. MDOT SHA created a grid system (see **Figure 2**) to track the progress of desktop reviews across the Baltimore Harbor watershed. In sum, 42 grid cells were reviewed covering portions of 30 State route corridors. The following GIS datasets were referenced during associated BMP viability assessments:

- Aerial imagery
- Street view mapping
- Environmental features delineations such as streams, critical area boundary, wetlands buffers, floodplain limits
- County data such as utilities, storm drain systems, contour, and topographic mapping
- MDOT SHA ROW boundaries
- Current MDOT SHA stormwater control and restoration practice locations
- Drainage area boundaries

Table 4: Potentially Viable Sites for Future BMP Implementation

BMP Types	Number of Sites
Structural Stormwater Control Retrofits	1
Stream Restoration	3
Outfall Stabilization	14



Figure 2: Baltimore Harbor Desktop Review Grids

Sites identified through these desktop reviews were prioritized based on cost-effectiveness. Field investigations were then performed at prioritized sites to document existing site conditions, implementation constraints, and potential restoration credit. **Table 4** above and **Appendix A** summarize the number of sites and BMP types that were deemed potentially viable for future implementation to meet the Baltimore Harbor sediment SW-WLA.

5 Modeling Sediment Loads and Reductions

MDE is requiring that jurisdictions model all baseline, current progress, and planned implementation scenarios for nutrient and sediment implementation plans using the Chesapeake Bay Program (CBP) Watershed Model (WM) Phase 6. In 2021, MDE released its TMDL

Implementation Progress and Planning (TIPP) spreadsheet tool (MDE, 2021a) to help jurisdictions assess current progress and plan future BMP implementation. Land use-specific loading rates used in the TIPP are CBP WM Phase 6 CAST-2017d “No Action” (i.e., excluding BMPs implemented to date) scenario loading rates aggregated at the 8-digit watershed scale by county. These include Stream Bed and Bank loads determined by a variation of the method described in the MDE 2021 MS4 Accounting Guidance Document (MDE, 2021b).

The TIPP spreadsheet tool estimates load reductions for total nitrogen, total phosphorus, and TSS at the Edge-of-Stream (EOS) and Edge-of-Tide (EOT) scales. The EOS scale is used for MDOT SHA’s local TMDL modeling and implementation plans. EOS loads are calculated in the TIPP spreadsheet tool using the methods and BMP efficiencies recommended by the expert panels approved by CBP. The EOT scale incorporates in-stream uptake, processing, and transport of nutrient and sediment loads between the upstream source and the receiving water body. The EOT scale is used when modeling for the Chesapeake Bay TMDL and is not discussed further in this IP.

Given the TIPP spreadsheet tool applies loading rates that vary by county and MDOT SHA has ROW in multiple counties across the Baltimore Harbor watershed, MDOT SHA needed to first separate its land use acres and BMP implementation in Arundel County vs Baltimore County across two County-specific TIPP spreadsheets. The individual baseline, progress, and planned loads modeled in the separate, County-specific TIPP spreadsheets were then consolidated into a third, summary spreadsheet for the non-tidal Baltimore Harbor watershed. MDOT SHA sediment load reduction targets were calculated using these total baseline loads for the watershed and the following formula:

$$\mathbf{Reqd\ Reduction}_{MDOT\ SHA} = \mathbf{Baseline\ Load}_{MDOT\ SHA} * \mathbf{Reqd\ Reduction\ \%}$$

Where:

Reqd Reduction $_{MDOT\ SHA}$ = Reduction amount required for MDOT SHA
Baseline Load $_{MDOT\ SHA}$ = MDOT SHA translated Baseline Load
Reqd Reduction % = Published percent reduction assigned to MDOT SHA
 NPDES regulated stormwater point source in the TMDL document (i.e., 56%)

MDE used 2009 baseline conditions and an older version of the CBP WM to develop the non-tidal Baltimore Harbor sediment local TMDL. For this reason, MDOT SHA needed to ‘translate’ its SW-WLA into a TIPP-compatible target load while maintaining the original percent reduction required in the MDE TMDL document (56.0%). In order to reflect 2009 baseline conditions in the Baltimore Harbor watershed, the “MDOT SHA translated Baseline Load” for sediment accounts for load reductions provided by MDOT SHA-owned BMPs built prior to the 2009 TMDL baseline year that are currently functioning as designed. The 56% pollutant load reduction requirement from the TMDL document was applied to the MDOT SHA translated Baseline Load to calculate the total pounds per year of sediment load reduction required for MDOT SHA to meet its target. The required pollutant load reduction was then subtracted from the MDOT SHA translated Baseline Load to calculate the target SW-WLA in pounds per year.

The TIPP spreadsheet contains options to use either specific land use information (i.e., Impervious Road and Impervious Non-Road data) or aggregated impervious land use information. MDOT SHA used a conservative approach, modeling all its impervious ROW acres as “Impervious Road” in the TIPP spreadsheet tool. This is considered conservative because MDOT SHA impervious area includes areas that could otherwise qualify as “non-road impervious” such as sidewalks, portions of driveways, and parking areas. MDOT SHA does not have accurate data available for its land use from the 2009 TMDL baseline year so MDOT SHA used best available, 2011 land use data in its modeling. MDOT SHA impervious road and turf acres within the Baltimore Harbor watershed are summarized in **Table 5** below and were used as data input into the separate Anne Arundel County and Baltimore County TIPP spreadsheets.

Table 5: TIPP Model Baseline Land Use Data Inputs

Land Use Type	Anne Arundel County (acres)	Baltimore County (acres)
Impervious Road	830.0	122.3
Turf	977.1	83.6
Totals	1,807.1	205.9

The modelled sediment baseline load, reduction target, and milestones (a.k.a., benchmarks) for attainment of MDOT SHA’s SW-WLA is provided in **Table 6** below with supporting data provided in **Appendix B**. MDOT SHA has set 2038 as the “Target Year” for attainment of its SW-WLA. When setting the 2038 Target Year, MDOT SHA considered the standard 5-year MS4 permit term, the Maryland Watershed Implementation Plan (WIP) III schedule (e.g., 2% restoration/treatment per year of impervious surfaces not treated as of 2010) for restoration by MS4 permittees, and restoration projects already programmed for upcoming years to meet attainment milestones for MDOT SHA’s other TMDL SW-WLAs.

MDOT SHA will re-evaluate the Target Year and milestones presented in this IP after it completes remodeling target and progress load reductions for its 54 other nutrient and trash TMDL SW-WLAs to align with CBP WM Phase 6. Any adjustments proposed to the Target Year or milestones for this or other SW-WLAs assigned to MDOT SHA will be presented when MDOT SHA updates its “Coordinated TMDL Implementation Plan” (MDOT SHA, 2018). This update to the comprehensive, jurisdiction-wide TMDL IP is a standard condition of the next generation MS4 permits issued to other MS4 permitted jurisdictions so MDOT SHA expects to have similar permit conditions and submit its updated plan with the first MS4 permit annual report of the next generation MS4 permit term.

Table 6: Modelled Baseline Sediment Load, Reduction Target, and Attainment Milestones

Unit	Baseline Load	% Reduction Required	Reduction Target	Attainment Milestones				Target Attainment Year
				% Reduction Achieved 2028	Reduction Achieved 2028	% Reduction Achieved 2033	Reduction Achieved 2033	
EOS-lbs/yr	4,073,950	56.0	2,281,412	22.0	896,920	37.4	1,523,393	2038

6 Sediment Pollution Reduction Strategy

MDOT SHA will ultimately seek to program BMP implementation such that it provides 115% of the required pollutant load reduction. This should ensure SW-WLA attainment milestones are met despite anticipated, yet currently undefined, setbacks that sometimes arise during the design and implementation of projects.

During the current, administratively continued 2015-2020 MS4 permit term, MDOT SHA had success utilizing innovative contracting mechanisms to facilitate large scale, cost-effective BMP design and construction in relatively short time periods. For this reason, MDOT SHA intends to primarily use innovative contracting mechanisms to program BMP implementation. MDOT SHA will also explore the viability of new BMP types recently authorized as generating MS4 impervious area treatment credit and pollutant load reductions in the MDE 2021 MS4 Accounting Guidance (MDE, 2021b) and will leverage established and open-ended Memorandums of Understanding with Anne Arundel County and Baltimore County (executed March 2, 2016 and September 30, 2016 respectively) to identify opportunities for collaborative BMP implementation.

Table 7: BMPs Implemented to Date and Schedule for SW-WLA Attainment

BMP Type	Unit	Existing BMPs - Built before 2009	2022 Restoration Progress	Attainment Schedule			2038 Attainment Totals
				2023 to 2028	2029 to 2033	2034 to 2038	
Structural Stormwater Controls	drainage area acres	448	29				29
Structural Stormwater Control Retrofits	drainage area acres		138	14			152
Tree Planting	acres converted		62				62
Stream Restoration	linear feet			1,874	1,874	1,874	5,622
Outfall Stabilization	linear feet			652	652	652	1,956
Partnership Projects (BMP Types TBD)	No. of Projects					2	2
Sediment Load Reduction Totals	EOS lbs/yr	535,938	248,479	648,441	626,473	758,019	2,281,412

MDOT SHA will supplement these strategies with traditional contracting mechanisms to attain the SW-WLA. As described previously in Section 4 (see also Table 4 and Appendix A), MDOT SHA identified 3 stream restoration BMP sites (estimated 5,622.3 linear feet), 14 outfall stabilization BMP sites (estimated 1,956.0 linear feet), and 1 structural stormwater control retrofit BMP opportunity (estimated 13.7 drainage area acres) as potentially viable for implementation. All 3 stream restoration sites are located in Marley Creek which was identified as the highest priority for restoration activities in Anne Arundel County's Patapsco Tidal

watershed assessment (see Table 3 in Section 3). Additional, preliminary investigations will be needed to verify the viability of these sites.

Since the 2009 TMDL Baseline Year, MDOT SHA has implemented BMPs that currently function as designed and actively reduce 248,479 EOS lbs/yr of sediment from the baseline load. **Table 7** above summarizes this existing treatment provided by MDOT SHA-owned BMPs implemented before the 2009 TMDL Baseline Year with the MDOT SHA pollutant load reduction progress from BMPs implemented between 2009 and 2022 and a tentative schedule for future BMP implementation to attain the SW-WLA by 2038. Estimated costs to attain the SW-WLA are summarized below in **Table 8**. Cost estimates are based on the average cost per impervious acre credit yielded for MDOT SHA compliance from each BMP type during the current, administratively continued 2015-2020 MS4 permit term and do not include BMP inspection and maintenance costs.

Table 8: Estimated Cost of BMP Implementation

BMP Type	Attainment Schedule			Total
	2023 to 2028	2029 to 2033	2034 to 2038	
Structural Stormwater Control Retrofits	\$2,592,000			\$2,592,000
Stream Restoration	\$1,420,381	\$1,420,381	\$1,420,381	\$4,261,143
Outfall Stabilization	\$633,692	\$633,692	\$633,692	\$1,901,076
Partnership Projects*			\$402,011**	\$402,011
Totals	\$4,646,073	\$2,054,073	\$2,456,084	\$9,156,230

* Partnership project BMP types to be determined
 ** Partnership project cost based on 131,546 EOS lbs/yr sediment load reduction needed to meet the SW-WLA, the planning rate for stream restoration credit in the MDE 2021 MS4 Accounting Guidance, and MDOT SHA estimated implementation cost of \$757.90 per linear foot of stream restoration

7 Adaptive Management

The MS4 permit calls for MDOT SHA to develop an ongoing, iterative, and adaptive process that continuously evaluates and reassesses BMP implementation when SW-WLAs are not being met according to established benchmarks and deadlines. These activities are collectively referred to as “adaptive management.” MDOT SHA will utilize its annual pollutant load and reduction progress modeling to monitor the effectiveness of this IP over time. Pollutant load modeling methods are described in detail in Section 5. MDOT SHA will identify its water quality improvements and document progress toward attainment milestones and the SW-WLA in each NDPEs MS4 permit annual report to MDE following their approval of this IP. MS4 permit annual reports are posted for public reference on the MDOT SHA webpage shortly after their submittal to MDE.

MDOT SHA tracks the functionality of all BMPs on a year-to-year basis and immediately removes credit associated with BMPs when they are assigned a failed inspection rating. This ensures that MDOT SHA modelling is consistently the best available information for assessing current load reductions provided by BMPs and adaptively managing attainment milestones. Load reduction credit is added back into the modeling when failing BMPs are remediated.

MDOT SHA prioritizes its BMP remediation schedules to align with SW-WLA attainment milestones whenever practicable.

Using annual modeling results for attainment progress, MDOT SHA will evaluate the sufficiency of its BMP implementation levels and schedules programmed to meet attainment milestones established in this plan. If MDOT SHA determines that the goals of this IP cannot be met by programmed restoration activities, MDOT SHA will work to allocate funding for additional planning efforts necessary to identify new BMP opportunities and for expedited BMP implementation in subsequent fiscal years. State budgets are allocated on an annual basis so funding necessary to initiate/complete efforts to identify new BMP implementation opportunities or to update the IP may not be available during the same fiscal year that progress shortfalls are identified through MDOT SHA evaluation of progress modelling results.

MDOT SHA will continue to inspect and maintain BMPs implemented to achieve its SW-WLA until attainment can be documented. Although MDOT SHA modeling may project attainment, it is understood that monitoring data is required to document attainment of the sediment SW-WLA for the non-tidal Baltimore Harbor watershed. MDOT SHA will coordinate with its partners, the Chesapeake Bay Trust Pooled Monitoring Program, and MDE to determine appropriate actions and contributions necessary to complete said monitoring once all point sources identified in the TMDL have projected attainment of their WLA.

8 Public Engagement

In accordance with conditions in its NPDES MS4 permit, MDOT SHA will provide notice to the public, in a regional newspaper and on MDOT SHA's webpage, outlining how the public may obtain information on the development of this IP and opportunities for comment. MDOT SHA will accept and address comments from the public for a minimum of 30 days from date of its notice to the public and prior to finalizing this IP and submitting to MDE for approval.

Appendix C provides documentation of material comments received and MDOT SHA responses. Upon approval by MDE, this IP will be accessible online for public reference, along with all other MDOT SHA individual watershed IPs approved by MDE, at the following web address:

<https://roads.maryland.gov/mdotsha/pages/index.aspx?PageId=336>

MDOT SHA will continuously accept and address comments from the public and other stakeholders. Comments can be emailed directly to the MDOT SHA Office of Environmental Design, Water Programs Division at wpd@mdot.maryland.gov.

MDOT SHA will continue to communicate with MDE; particularly its Water and Science Administration, Watershed Protection, Restoration, and Planning Program (WPRPP); on an as-needed basis to address TMDL-related questions or MDE requests for program modifications. MDOT SHA will continue to address issues or concerns presented in MDE's review of the MDOT SHA Coordinated TMDL IP and associated SW-WLA attainment progress reported with MS4 permit annual reports and will make appropriate programmatic adjustments.

9 Abbreviations

AA-DPW	Anne Arundel County, Department of Public Works
BMP	Best Management Practice
CAST	Chesapeake Assessment Scenario
CBP	Chesapeake Bay Program
COMAR	Code of Maryland Regulations
CWA	Clean Water Act
EOS	Edge-of-Stream
EOT	Edge-of-Tide
EPA	United States Environmental Protection Agency
ESD	Environmental Site Design
GIS	Geographic Information System
IP	Implementation Plan
lbs	Pounds (weight)
MBSS	Maryland Biological Stream Survey
MD	Maryland
MDE	Maryland Department of the Environment
MDOT SHA	Maryland Department of Transportation State Highway Administration
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
PCB	Polychlorinated Biphenyl
ROW	Right-of-Way
STB	Stream Bed and Bank
SW-WLA	Stormwater Wasteload Allocation
TIPP	TMDL Implementation Progress and Planning
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
WIP	Watershed Implementation Plan
WM	Watershed Model
WQSs	Water Quality Standards
yr	Year

10 References

- Anne Arundel Department of Public Works (AA-DPW) in association with Limno Tech, and Versar. 2012. *Patapsco Tidal and Bodkin Creek Watershed Assessment Comprehensive Summary Report*. Retrieved from https://www.aacounty.org/departments/public-works/wprp/reports-publications/PTB_Summary_Report_Final_Main.pdf
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Appendix A

List of Potentially Viable BMPs

8 Digit Watershed Name	Site Name	Construction Purpose	MDE BMP Description	Unit	Treatment	Status	Projected Implementation Year
Non-Tidal Baltimore Harbor	020363	CONV	Retention Pond (Wet Pond)	Acres	11.38	Under Construction	2023
Non-Tidal Baltimore Harbor	AA_00085	REST	Stream Restoration	Linear Feet	2,201	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	AA_00086	REST	Stream Restoration	Linear Feet	1,751	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	AA_00087	REST	Stream Restoration	Linear Feet	1,671	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	291231.001	REST	Outfall Stabilization	Linear Feet	163	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201283.001	REST	Outfall Stabilization	Linear Feet	148	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201297.001	REST	Outfall Stabilization	Linear Feet	128	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201689.001	REST	Outfall Stabilization	Linear Feet	137	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201777.001	REST	Outfall Stabilization	Linear Feet	112	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201690.001	REST	Outfall Stabilization	Linear Feet	124	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201732.001	REST	Outfall Stabilization	Linear Feet	131	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201280.001	REST	Outfall Stabilization	Linear Feet	147	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201787.001	REST	Outfall Stabilization	Linear Feet	129	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201691.001	REST	Outfall Stabilization	Linear Feet	142	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201685.001	REST	Outfall Stabilization	Linear Feet	139	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201296.001	REST	Outfall Stabilization	Linear Feet	181	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201294.001	REST	Outfall Stabilization	Linear Feet	133	Recommended for Restoration	TBD
Non-Tidal Baltimore Harbor	201731.001	REST	Outfall Stabilization	Linear Feet	142	Recommended for Restoration	TBD

Appendix B

See Attached Non-Tidal Baltimore Harbor TIPP Excel Files:

1. MDE_TIPP_2022_BaltHarbor_TSS_AACo_2022.11.15.xlsx
2. MDE_TIPP_2022_BaltHarbor_TSS_BaCo_2022.11.15.xlsx
3. BaltHarbor_TSS_TIPP_Results_2022.11.15.xlsx

Appendix C

Public Comment Period Documentation

The public review and comment period for this IP was December 12, 2022 through January 12, 2023. MDOT SHA did not receive any public comments in writing or by phone or email during this period.

Notice of the public review and comment period was advertised in the December 12, 2022 publications of Baltimore Sun and Washington Post newspapers and was posted to the MDOT SHA webpage on the same date.

Copies of the Baltimore Sun and Washington Post newspaper advertisements and the MDOT SHA webpage have been attached to this Appendix C.

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LEGAL NOTICES

DISTRICT COURT OF MARYLAND FOR BALTIMORE CITY
501 E. FAYETTE STREET
BALTIMORE, MD 21202
CASE NO: 0101-0005443-2010

Pikeswood LLC
 1190 W. Northern Pkwy #124
 Baltimore, MD 21210

Leslie, Wandal
 2802 Grindon Avenue
 Baltimore, MD 21214

NOTICE OF PROPOSED RATIFICATION OF SALE OF REAL PROPERTY
 (Md. Rules 3-644 (d) and 14-305)

The property specifically described in the inventory has been sold at judicial sale. Inventory of property sold
 Property located at 3926 Kenyon Avenue, Baltimore, MD 21213-2122 and described as Ward 26, Section 34, Block 6128, Lot 014, 2 Story Center Brick Dwelling 16-1x121-10.

The sale will be ratified unless cause to the contrary is shown on or before December 23, 2022 (30 days after the date of this notice). A copy of this Notice will be published at least once a week in each of three successive weeks before December 23, 2022, in one or more newspapers of general circulation in Baltimore City. The report states the amount of sale to be \$15,000.

11/22/22
 Baltimore Sun Nov. 28, Dec. 5, 12 E. Roles, Clerk 7332757

DISTRICT COURT OF MARYLAND FOR BALTIMORE CITY
501 E. FAYETTE STREET
BALTIMORE, MD 21202
CASE NO: 0101-0005868-2022

Pikeswood LLC
 1190 W. Northern Pkwy #124
 Baltimore, MD 21210

DeVenny, Connie, et al
 8003 Wynbrook Road
 Baltimore, MD 21224

NOTICE OF PROPOSED RATIFICATION OF SALE OF REAL PROPERTY
 (Md. Rules 3-644 (d) and 14-305)

The property specifically described in the inventory has been sold at judicial sale. Inventory of property sold
 Property located at 3917 E. Pratt Street, Baltimore, MD 21224 and described as Ward 26, Section 16, Block 6305, Lot 009, 2 story Center Brick Dwelling 13x70.

The sale will be ratified unless cause to the contrary is shown on or before December 23, 2022 (30 days after the date of this notice). A copy of this Notice will be published at least once a week in each of three successive weeks before December 23, 2022, in one or more newspapers of general circulation in Baltimore City. The report states the amount of sale to be \$20,000.

11/22/22
 Baltimore Sun Nov. 28, Dec. 5, 12 E. Roles, Clerk 7332741

OPPORTUNITY FOR PUBLIC REVIEW AND COMMENT DRAFT IMPLEMENTATION PLAN FOR THE TOTAL MAXIMUM DAILY LOAD (TMDL) OF SEDIMENT IN THE NON-TIDAL BALTIMORE HARBOR WATERSHED, BALTIMORE CITY, BALTIMORE COUNTY, AND ANNE ARUNDEL COUNTY, MARYLAND

The Maryland Department of Transportation State Highway Administration (MDOT SHA) was issued a National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System (MS4) Permit, (Permit No. H11-DP-3313), by the Maryland Department of the Environment (MDE) on October 9, 2015. This permit covers stormwater discharges from the storm drain system owned or operated by MDOT SHA within Anne Arundel, Baltimore, Carroll, Cecil, Charles, Frederick, Harford, Howard, Montgomery, Prince George's, and Washington Counties. The permit requires MDOT SHA to submit an implementation plan to MDE that addresses Environmental Protection Agency (EPA)-approved stormwater waste load allocations (WLAs) within one year of EPA approval.

EPA approved the **Total Maximum Daily Load of Sediment in the Non-Tidal Baltimore Harbor Watershed, Baltimore City, Baltimore County, and Anne Arundel County Maryland** on January 27, 2022. The MDOT SHA Office of Environmental Design (OED) is soliciting comments on its draft Implementation Plan to meet this WLA as required under the MS4 Permit. A 30-day public comment period will take place from December 12, 2022 to January 12, 2023. The draft Implementation Plan is available on MDOT SHA's website at <https://www.roads.maryland.gov/mdotsha/pages/index.aspx?PageId=362>.

Comments should be submitted to MDOT SHA on or before **January 12, 2023** by emailing to wpd@mdot.maryland.gov or mailing to:

Maryland Department of Transportation
 State Highway Administration
 Office of Environmental Design, C-303
 707 N. Calvert Street
 Baltimore, MD 21202

Please note that comments should include the name and address of the person submitting the comments. Responses to comments will not be provided directly, but material comments received during the comment period will be considered and the draft Implementation Plan will be revised as appropriate prior to submission to MDE. A summary of comments received will be included in the MDOT SHA MS4 annual report submitted to MDE annually on October 9 and posted to this website: <https://www.roads.maryland.gov/mdotsha/pages/index.aspx?PageId=336>.

Baltimore Sun December 12, 2022 7320041

ANNE ARUNDEL COUNTY

Benjamin M. Decker, Esquire
 2806 Reynolda Rd., #208
 Winston-Salem, NC 27106
 443-729-0802

IN THE CIRCUIT COURT FOR ANNE ARUNDEL COUNTY, MARYLAND CIVIL DIVISION
Civil Action No. C-02-CV-22-001930

FNA VI, LLC Plaintiff

vs.
 THE TESTATE AND INTERSTATE SUCCESSORS OR BONNIE M. LOWE, DECEASED, AND ALL PERSONS CLAIMING BY, THROUGH, OR UNDER THE DECEDENT Anne Arundel County, Maryland, AND All persons having or claiming to have any interest in the property and premises situate, described as:

Anne Arundel County, described as follows: Tax Account No 774603548275, LTS 38 TO 42 BK C SNUG HARBOR, 1734 LAKE AVE SHADY SIDE MD 20764.

Defendants

ORDER OF PUBLICATION

The object of this proceeding is to secure the foreclosure of all rights of redemption in the following property situate, lying and being in Anne Arundel County, Maryland, sold by the Collector of Taxes for Anne Arundel County and the State of Maryland to the Plaintiff in this proceeding:

Anne Arundel County, described as follows: Tax Account No 774603548275, LTS 38 TO 42 BK C SNUG HARBOR, 1734 LAKE AVE SHADY SIDE MD 20764.

The Complaint states, among other things, that the amounts necessary for redemption have not been paid.

It is thereupon this 21st day of November, 2022, by the Circuit Court for Anne Arundel County, Maryland, ORDERED: That notice be given by the insertion of a copy of this Order in some newspaper having a general circulation in Anne Arundel County, Maryland, once a week for 3 successive weeks, warning all persons interested in the property to appear in this Court by the 2nd day of February, 2023, and redeem the property herein described and answer the complaint or thereafter a final judgment will be entered foreclosing all rights of redemption in the property, and vesting in the plaintiff a title, free and clear of all encumbrances.

Scott A. Poyer
 Clerk of the Circuit Court for Anne Arundel County, Maryland
 001930 (11/16/2022)

AUCTIONS

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BALTIMORE COUNTY CIRCUIT COURTHOUSE TOWSON, MD

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Tidewater Auctions, LLC
www.tidewaterauctions.com
 (410) 825-2900

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AT 11:00 A.M.
Bidder Pre-Qualification Is Required
 By December 16, 2022

Please see our website for complete details and terms.

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AUCTIONS

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 Baltimore, MD 21202

GUARDIAN'S AUCTION
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LANSDOWNE RANCHER
 2 Bedrooms & Bath
 Sole On Premises
317 CLYDE AVE.
 Baltimore County, MD 21227

MON., DEC. 19
AT 2:00 P.M.

J. Michael Holloway,
 Guardian of the Property of Janet Lowman

AJ BILLIG
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AUCTIONS

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Bridge Play Frank Stewart

"If I had a nickel for every time I had no idea what was going on, I'd be wondering why I was getting all those nickels." — graffiti.

Bridge can give rise to complex situations. I recall times when I failed to grasp a deal's subtleties until I was thinking about it in bed that night.

Today's North-South bid to four spades, and West led the queen of clubs: king, ace. East shifted to the queen of hearts. South won, cashed the K-Q of trumps and led a club. West took his jack and led another heart, and declarer won, drew the missing trump with dummy's ace and ran the clubs. Making four.

ENTRIES

The contract should have failed: East must let the king of clubs win. Then South lacks the entries to use the long clubs. He will lose only one club but also two diamonds and a heart.

It's a complex deal: South always succeeds by playing low from dummy on the first club. If West shifts to a heart, South wins, takes the K-Q of trumps and leads a club to dummy's ten effectively.

DAILY QUESTION

You hold: ♠ 9 6 5 ♥ 9 5 ♦ A 10 9 8 2 ♣ Q J 8. Your partner opens one heart, you respond 1NT, he bids two clubs and you return to two hearts. Partner then bids three clubs. What do you say?

ANSWER: Partner's three clubs shows five or more clubs and game interest. After your weak "false preference," he wouldn't bid again just to say he has extra club length. Your decision is close. Pass. But since you have a side ace, a raise to four clubs would be defensible.

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the new york times crossword no. 1107

ACROSS

1 Outstanding Clothes line?
 7 Toothed tool
 11 "Now it makes sense"
 14 Opposite of baja, in Spanish
 16 How many it takes to tango
 17 With 58-Across, "I'm so nervous! There are ..."
 19 Prominent feature of an elephant or dachshund
 20 "Now it makes sense!"
 21 Word with jerk or joint
 22 _____ and Caicos Islands
 24 "I can't stop thinking about it! There's a ..."
 28 Marched in an attention-seeking way
 30 German luxury auto
 31 Cards worth 1 or 11 in blackjack
 32 Opposite of exo-
 33 "I'll return soon," in a text
 36 "Why the troubled look?" ... or a hint to 17-, 24-, 48- and 58-Across
 41 Edgar's nickname, perhaps
 42 Prefix with sphere
 43 Flightless Australian birds
 44 Color of unbleached linen
 45 Skill
 48 "I can't sit still! There are ..."
 52 Cloth to dry off with

DOWN

53 Figs, that include interest
 54 Extra amount for a waiter
 57 What hips don't do, per a Shakira hit
 58 See 17-Across
 62 "_____ we there yet?"
 63 Where India is
 64 It has the same function as "Option" on a Mac
 65 6-3, 6-2 or 7-6 D.C. ball club, informally
 67 Attacks

DOWN

1 Japanese buckwheat noodle
 2 "No siree!"
 3 What baba ghanouj is often served with
 4 Approx.
 5 Stunk
 6 Senator Sanders
 7 Witch trials locale
 8 One of the Mannings
 9 Had breakfast, say
 10 Extinct megafauna species whose name derives from the Greek for "breast tooth"
 11 Rear of a ship
 12 No longer in slumberland
 13 -case scenario
 18 Ward (off)
 23 Prefix with cycle or code
 25 Sunrise direction
 26 Yin's counterpart
 27 _____ have promises to keep, and miles to go ..."
 Robert Frost

By Jill Singer

ANSWER TO SATURDAY'S PUZZLE

SCRIBES JAMUP
 THECATCH IRANI
 EASYCHAIR BIGON
 WIT HOLDA SEANCE
 ITIS SEEPED EAR
 NENEH SAGA ITRY
 GAGLAW NOTGOD
 FIELD DAYS
 MAILBAG CRAPPY
 RODE ADOS OPERA
 IBM CRISPS POSY
 PRIVATEEYES RAT
 OUTER SECRETIVE
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STATE HIGHWAY ADMINISTRATION



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MDOT SHA TMDL Implementation Plan Public Notice

The Maryland Department of Transportation State Highway Administration (MDOT SHA) places its draft Total Maximum Daily Load (TMDL) Implementation Plans on 30-day public notice and solicits comments, as required under the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit.

The United States Environmental Protection Agency (EPA) approved the "Total Maximum Daily Load of Sediment in the Non-Tidal Baltimore Harbor Watershed, Baltimore City, Baltimore County, and Anne Arundel County Maryland" on January 27, 2022. The MDOT SHA Office of Environmental Design (OED) is soliciting comments on its draft Implementation Plan to meet this WLA as required under the NPDES MS4 Permit. A 30-day public comment period will take place from December 12, 2022 to January 12, 2023. The draft Implementation Plan and its associated TMDL Implementation Progress and Planning (TIPP) worksheets can be downloaded by clicking the following links:

- [Draft Non-Tidal Baltimore Harbor Sediment TMDL Implementation Plan](#)
- [Non-Tidal Baltimore Harbor TIPP Worksheets](#)

Comments should be submitted to MDOT SHA on or before January 12, 2023 using one of the following methods:

- Mail to:
Maryland Department of Transportation
State Highway Administration
Office of Environmental Design, C-303
707 N. Calvert Street
Baltimore, MD 21202
- Email to: wpd@mdot.maryland.gov

Note

Include your name and address. MDOT SHA will not respond individually. Material comments received during the comment period will be considered and the draft plan will be revised prior to submittal to the Maryland Department of the Environment (MDE). On October 9 we will include a summary of comments received in the MDOT SHA MS4 annual report to MDE, which can be found on October 9 on [this website](#).

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