From: "Karl Berger" <kberger@mwcog.org>
Sent: Fri, 3 Mar 2017 17:04:04 +0000
To: "Lynn Buhl -MDE- (lynn.buhl@maryland.gov)" <lynn.buhl@maryland.gov>; "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>
Cc: "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>; "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Adam Ortiz" <aortiz@co.pg.md.us>; "Lisa Feldt" <Lisa.Feldt@montgomerycountymd.gov>; "vgardina@baltimorecountymd.gov" <vgardina@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Tdevilbiss@ccg.carr.org" <Tdevilbiss@ccg.carr.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "buckley, christine (cmbuckley@harfordcountymd.gov)" <cmbuckley@harfordcountymd.gov>; "Karen Wiggen" <wiggenk@charlescounty.org>; "kwilen@ccgov.org" <kwilen@ccgov.org>; "jpippel@washco-md.net" <jpippel@washco-md.net>
Subject: Materials for March 14 MS4 Phase I meeting
Attachments: MS4 Permit Extension - Discussion Item.docx, Draft Next Gen Permit - Version 3.docx

Lynn and Lee,

I have attached two documents in preparation for our meeting on **Tuesday, March 14, from 1 – 3 p.m**. at the offices of the Prince George's County Department of the Environment, at which we would like to focus on discussing our ideas about the next set of Phase I permits.

- A concept proposal for how to address the major restoration requirement in a very general discussion item format
- A more detailed mark-up of the current Phase I permit template showing specific suggested changes in ~~strikeout~~/redline format.

Note that these documents represent an informal consensus among the jurisdictional technical staff of the Phase I MS4s, but they are preliminary in nature and should not be regarded as the policy position of any individual MS4.

As at previous meetings, we would like to have brief status updates on some ongoing discussion items, such as permit streamlining, geodatabase status, and local TMDL accounting. But we anticipate most of the meeting will focus on the next permit discussion.

Meeting location:

(1801 McCormick Drive, Suite 500
Potomac Conference Room, 5th floor
Largo, Maryland 20774)

Karl Berger

Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MS4 Permit Extension – Discussion Item
March 3, 2017

Background

The submission of Financial Assurance Plans (FAPs) by the state's Phase 1 MS4 jurisdictions to MDE in the middle of 2016 made it clear that most if not all jurisdictions will not be able to attain the restoration requirements of the current generation permit within the current 5-year time frame of the permit. Some of the MS4s indicated this through a need to "trade in time" to achieve the goal. Ongoing discussions among the jurisdictions have confirmed the impossibility of meeting that goal for most if not all the regulated jurisdictions.

Given Montgomery County's leadership in restoration efforts, including the fact that it has had dedicated revenues for stormwater management well before almost all the other Maryland Phase I jurisdictions that established stormwater utility fees, that county's inability to achieve a 20-percent impervious surface restoration requirement in its 5-year permit time frame illustrates the difficulty of achieving this requirement in the current permit.

The county's ongoing consent decree negotiations with MDE seem to acknowledge the ambitious nature of the original goal, and would allow an additional 5 years to achieve the 20-percent restoration requirement. Additionally, the recently released draft Phase 2 general permit has a 2025 deadline to achieve the 20-percent restoration goal.

Discussion Item

In view of the foregoing, Maryland's Phase 1 MS4 jurisdiction restoration, compliance and technical staff wish to engage MDE in a discussion of the following concept:

> **MDE implements a major permit modification to extend the compliance deadline for impervious surface restoration for an additional 5 years.**
>
> Following the language of the draft consent decree between MDE and Montgomery County, the language in the current Phase 1 MS4 permit could be modified as follows:
>
> *Part IV. Standard Permit Conditions; E. Restoration Plans and Total Maximum Daily Loads; 2. Restoration Plans*
>
> > By ~~the end of this permit term~~ February 11, 2024 (or whenever 5 years after the existing permit deadline falls in a particular jurisdiction), (XX County/City/SHA) shall commence and complete the implementation of restoration efforts for twenty percent of the County's impervious surface area consistent with the methodology described in the MDE document cited in PART IV.E.2.a. that has not already been restored to the MEP. Equivalent acres restored of impervious surfaces, through new retrofits or the retrofit of pre-2002 structural BMPs, shall be based upon the treatment of the WQ_v criteria and associated list of practices defined in the *2000 Maryland Stormwater Design Manual*. For alternate BMPs, the basis for calculation of equivalent impervious acres restored is based upon the pollutant loads from forested cover.

What are MDE's views of this concept?

MARYLAND DEPARTMENT OF THE ENVIRONMENT

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

PART I. IDENTIFICATION

A. Permit Number: XX-XX-XXXX XXXXXXXXX

B. Permit Area

This permit covers all stormwater discharges from the municipal separate storm sewer system (MS4) owned or operated by XXXXXXXX, Maryland.

C. Effective Date:

D. Expiration Date:

PART II. DEFINITIONS

Terms used in this permit are defined in relevant chapters of Title 40 of the Code of Federal Regulations (CFR) Parts 122 - 124 or the Code of Maryland Regulations (COMAR) 26.08.01, 26.17.01, and 26.17.02. Terms not defined in CFR or COMAR shall have the meanings attributed by common use.

PART III. WATER QUALITY

The permittee must manage, implement, and enforce a stormwater management program (SWMP) to the maximum extent practicable (MEP) in accordance with the Clean Water Act (CWA) and corresponding stormwater National Pollutant Discharge Elimination System (NPDES) regulations, 40 CFR Part 122, to meet the following requirements:

1. Effectively ~~prohibit~~ minimize pollutants in stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with Maryland's receiving water quality standards;

2. Make progress toward a~~A~~ttaining applicable wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with Title 33 of the U.S. Code (USC) §1342(p)(3)(B)(iii); 40 CFR §122.44(k)(2) and (3); and

3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with all the conditions contained in PARTs IV through VII of this permit shall constitute compliance with §402(p)(3)(B)(iii) of the CWA and adequate progress toward compliance with Maryland's receiving water quality standards (PART III.1 above) and any EPA approved stormwater WLAs (PART III.2 above) for this permit term.

Commented [KB1]: ~~Strikeout~~ and red highlighted text show MS4s' draft consensus changes from original MDE language. Comments supply additional context.

PART IV. STANDARD PERMIT CONDITIONS

A. Permit Administration

XXXXX County/City shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County shall submit in its annual reports to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

B. Legal Authority

XXXXXXX County/City shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County's (City's) annual report.

C. Source Identification

- Sources of pollutants in stormwater runoff ~~countywide~~ in the permit area shall be identified and linked to specific water quality impacts on a watershed basis. ~~The source identification process shall be used to develop watershed restoration plans.~~ The ~~following information shall be submitted annually for all County watersheds within the permit area in geographic information system (GIS) format with associated tables as required in PART V of this permit:~~ georeferenced database should be submitted annually, (reference the MDE document) and potentially include information on the following.

1. Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;

2. Industrial and commercial sources: industrial and commercial land uses and sites that the County has determined have the potential to contribute significant pollutants;

3. Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;

4. Impervious surfaces: public and private land use delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;

5. Monitoring locations: locations established for chemical, biological, and physical monitoring of watershed restoration efforts and the *2000 Maryland Stormwater Design Manual*; and

6. Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.

Commented [KB2]: From Anne Arundel County: If monitoring protocols change, this could read "If applicable."

D. Management Programs

The following management programs shall be implemented in areas served by XXXXXX County's (City's) MS4. These management programs are designed to control stormwater discharges and reduce associated pollutant loadings to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. The County shall modify these programs according to needed program improvements identified as a result of periodic evaluations by MDE.

1. Stormwater Management

An acceptable stormwater management program shall continue to be maintained in accordance and generally consistent with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the *2000 Maryland Stormwater Design Manual*. This includes:

i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;
ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and
iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.

Commented [KB3]: From Anne Arundel County: This section may need to be modified depending on what is done with the monitoring section.

b. Maintaining programmatic and implementation information including, but not limited to:

i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;
ii. Number of redevelopment projects received;
iii. Number of stormwater exemptions issued; and
iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.

Stormwater program data shall be recorded on MDE's annual report database and submitted as required in PART V of this permit.

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by Anne Arundel County.

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall continue to be maintained and implemented in accordance and generally consistent with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the County's erosion and sediment control enforcement authority;

b. ~~At least three times per year, conducting responsible personnel certification classes to educate construction site operators regarding erosion and sediment control compliance~~ Ensure that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE ;

c. Program activity shall be recorded on MDE's annual report database and submitted as required in PART V of this permit; and

d. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

3. Illicit Discharge Detection and Elimination

XXXXXX County (City) shall continue to implement an inspection ~~and enforcement~~ program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:

a. Field screening at least ~~150~~ xxx outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit. ~~Within one year of permit issuance,~~If an alternative program ~~may be submitted for~~is approved by~~-~~ MDE ~~approval~~ that methodically identifies, investigates, and eliminates illegal connections to the County's storm drain system, the program shall be implemented ;

Commented [KB4]: From Prince George's County:
In this section of the NPDES permit, the State requires the County to ensure all discharges that are not composed entirely of Stormwater are eliminated or permitted. MS4 jurisdictions do not have regulatory enforcement for industrial activities nor their discharges (either permitted or not); the State does.

Further discussion is needed to resolve how to address this issue in the permit.

b. Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and ~~eliminating~~ assessing pollutant sources. Areas surveyed shall be reported annually;

c. Maintaining a program to address, and if necessary, respond to illegal discharges, dumping, and spills;

d. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting; and

e. Reporting illicit discharge detection and elimination activities as specified in PART V of this permit.

~~4. Litter and Floatables~~

~~This section of the permit requires XXXXXX County to address problems associated with litter and floatables in waterways that adversely affect water quality. Increases in litter discharges to receiving waters have become a growing concern both nationally and within Maryland and cannot be ignored. XXXXX County needs to evaluate current litter control problems associated with discharges from its storm drain system and develop and implement a public outreach and education program as needed on a watershed by watershed basis.~~

~~a. As part of XXXXXX County's watershed assessments under PART IV.E.1 of this permit, XXXXXXX County shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.~~

~~b. Within one year of permit issuance, as part of the public education program described in PART IV.D.6., XXXXX County shall develop and implement a public education and outreach program to reduce littering and increase recycling. This shall include:~~

~~i. Educating the public on the importance of reducing, reusing, and recycling;~~
~~ii. Disseminating information by using signs, articles, and other media outlets; and~~
~~iii. Promoting educational programs in schools, businesses, community associations, etc.~~

~~c. Evaluating annually the effectiveness of the education program.~~

~~d. Submit annually, a report which details progress toward implementing the public education and outreach program. The report shall describe the status of public outreach efforts including resources (e.g., personnel and financial) expended and the effectiveness of all program components.~~

~~5.~~4. Property Management and Maintenance

Commented [KB5]: From Prince George's County:
It is the County's opinion that since these municipal facilities require NPDES stormwater general permit coverage that is issued by the State directly under the State's NPDES Phase I permit, it is not reasonable to require the county, through its NPDES permit, to review and document these plans. We believe this this is an enforcement/reporting issue between the Permittee and the State.

Further discussion is needed to resolve how to address this issue in the permit.

Commented [KB6]: From Anne Arundel County:
This should be the responsibility of the 12-SW permit holding entities and should only be incorporated by reference in the MS4 permit.

a. XXXXXXX County shall ensure that a Notice of Intent (NOI) has been submitted to MDE and a pollution prevention plan developed for each County- owned ~~municipal~~ facility requiring NPDES stormwater general permit coverage. ~~The status of pollution prevention plan development and implementation for each County-owned municipal facility shall be reviewed, documented, and submitted to MDE annually.~~

b. The County shall continue to implement a program to reduce pollutants associated with maintenance activities at County-owned facilities including parks, roadways, and parking lots. The maintenance program shall include these or MDE-approved alternative activities, where applicable:

i. Street sweeping;
ii. Inlet inspection and cleaning;
iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management through increased use of integrated pest management;
iv. Reducing the use of winter weather deicing materials through research, continual testing and improvement of materials, equipment calibration, employee training, and effective decision-making; and
~~v. Ensuring that all County staff receive adequate training in pollution prevention and good housekeeping practices.~~

The County shall report annually on the changes in any maintenance practices and the overall pollutant reductions resulting from the maintenance program. ~~Within one year of permit issuance, an~~Where applicable, maintain an MDE-approved alternative maintenance program ~~may be submitted for MDE approval~~ indicating the activities to be undertaken and associated pollutant reductions.

~~6.~~5. Public Education

XXXXXXX County shall continue to implement a public education and outreach program to reduce stormwater pollutants. Outreach efforts may be integrated with other aspects of the County's activities. These efforts are to be documented and summarized in each annual report. The County shall continue to implement a public outreach and education campaign with specific performance goals and deadlines to:

a. Maintain a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

b. Provide information to inform the general public about the benefits of:

i. Increasing water conservation;
ii. Residential and community stormwater management implementation and facility maintenance;
iii. Proper erosion and sediment control practices;
iv. Increasing proper disposal of household hazardous waste;
v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow

removal, cash for clippers, etc.);

vi. Residential car care and washing; and

vii. Proper pet waste management.

~~c. Provide information regarding the following water quality issues to the regulated community when requested~~

~~i. Provide information regarding the following water quality issues to the regulated community when requested:NPDES permitting requirements;~~

~~ii. Pollution prevention plan development;~~

~~iii. Proper housekeeping; and~~

~~iv. Spill prevention and response.~~

E. Restoration Plans and Total Maximum Daily Loads

Commented [KB7]: Language in this section could be modified in accordance with the recommendations noted in the MS4 Permit Extension discussion item.

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Attachment B).

XXXXX County shall annually provide watershed assessments, restoration plans, opportunities for public participation, and TMDL compliance status to MDE. A systematic assessment shall be conducted and a detailed restoration plan developed for all watersheds within XXXXX County. As required below, watershed assessments and restoration plans shall include a thorough water quality analysis, identification of water quality improvement opportunities, and a schedule for BMP and programmatic implementation to meet stormwater WLAs included in EPA approved TMDLs.

~~Watershed Assessments~~

Commented [KB8]: This requirement can be removed, since the watershed assessments should be completed by the end of the current permit term.

~~By the end of the permit term, XXXXX County shall complete detailed watershed assessments for the entire County. Watershed assessments conducted during previous permit cycles may be used to comply with this requirement provided the assessments include all of the items listed in PART IV.E.1.b below. Assessments shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County water quality analysis;~~

~~Watershed assessments by the County shall:~~

~~Determine current water quality conditions;~~
~~Include the results of a visual watershed inspection;~~
~~Identify and rank water quality problems;~~
~~Prioritize all structural and nonstructural water quality improvement projects; and~~
~~Specify pollutant load reduction benchmarks and deadlines that demonstrate progress toward meeting all applicable stormwater WLAs.~~

1. Restoration Plans

Within one year of permit issuance, XXXXXXX County shall submit an impervious surface area assessment consistent with the methods described in the MDE document *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits* (MDE, June 2011 or subsequent versions). Upon approval by MDE, this impervious surface area assessment shall serve as the baseline for the restoration efforts required in this permit. By the end of this permit term, XXXXX County shall commence and complete the implementation of restoration efforts for twenty percent of the County's impervious surface area consistent with the methodology described in the MDE document cited in PART IV.E.2.a. that has not already been restored to the MEP. Equivalent acres restored of impervious surfaces, through new retrofits or the retrofit of pre-2002 structural BMPs, shall be based upon the treatment of the WQ_v criteria and associated list of practices defined in the *2000 Maryland Stormwater Design Manual*. For alternate BMPs, the basis for calculation of equivalent impervious acres restored is based upon the pollutant loads from forested cover.

a. Within one year of permit issuance, County shall submit to MDE– for approval a restoration plan for each stormwater WLA approved by EPA prior to the effective date of the permit. The County shall submit restoration plans for subsequent TMDL WLAs within one year of EPA approval. Upon approval by MDE, these restoration plans will be enforceable under this permit. As part of the restoration plans, Anne Arundel County shall:

   i. Include the final date for meeting applicable WLAs and a detailed schedule for implementing all structural and nonstructural water quality projects, enhanced stormwater management programs, and alternative stormwater control initiatives necessary for meeting applicable WLAs;
   ii. Provide detailed cost estimates for individual projects, programs, controls, and plan implementation;
   iii. Evaluate and track the implementation of restoration plans through monitoring or modeling to document progress toward meeting established benchmarks, deadlines, and stormwater WLAs; and
   iv. Develop an ongoing, iterative process that continuously implements structural and nonstructural restoration projects, program enhancements, new and additional programs, and alternative BMPs where EPA approved TMDL stormwater WLAs are not being met according to the benchmarks and deadlines established as part of the County's watershed assessments.

2. Public Participation

XXXXXXX County shall provide continual outreach to the public regarding the development of its watershed assessments and restoration plans. Additionally, the County shall allow for public participation in the TMDL process, solicit input, and incorporate any relevant ideas and program improvements that can aid in achieving TMDLs and water quality standards. XXXXXX County shall provide:

a. Notice in a local newspaper and the County's web site outlining how the public may obtain information on the development of watershed

assessments and stormwater watershed restoration plans and opportunities for comment;

b. Procedures for providing copies of watershed assessments and stormwater watershed restoration plans to interested parties upon request;

c. A minimum 30 day comment period before finalizing watershed assessments and stormwater watershed restoration plans; and

d. A summary in each annual report of how the County addressed or will address any material comment received from the public.

3. TMDL Compliance

XXXXX County shall evaluate and document its progress toward meeting all applicable stormwater WLAs included in EPA approved TMDLs. An annual TMDL assessment report with tables shall be submitted to MDE. This assessment shall include complete descriptions of the analytical methodology used to evaluate the effectiveness of the County's restoration plans and how these plans are working toward achieving compliance with EPA approved TMDLs. XXXXX County shall further provide:

a. Estimated net change in pollutant load reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives;

b. A comparison of the net change in pollutant load reductions detailed above with the established benchmarks, deadlines, and applicable stormwater WLAs;

c. Itemized costs for completed projects, programs, and initiatives to meet established pollutant reduction benchmarks and deadlines;

d. Cost estimates for completing all projects, programs, and alternatives necessary for meeting applicable stormwater WLAs; and

e. A description of a plan for implementing additional watershed restoration actions that can be enforced when benchmarks, deadlines, and applicable stormwater WLAs are not being met or when projected funding is inadequate.

F. Assessment of Controls

~~All Permittees shall provide, in each annual report, a description of any stormwater monitoring or stormwater-related studies conducted by the Permittee during the reporting period. If other stormwater monitoring or stormwater-related studies were conducted on behalf of the Permittee during the reporting period, or if stormwater-related investigations conducted by other entities were reported to the Permittee during the reporting period, a brief description of the type of information gathered or received shall be included in the annual report.~~

Commented [KB9]: The MS4s would like to have an in-depth discussion with the state about what has been learned from the required monitoring programs to date and use that information to guide the monitoring requirements in the next permit.

Options include allowing permittees to pay into a collective fund to implement monitoring projects (such as the Maryland Pooled Monitoring Program currently administered by the Chesapeake Bay Trust) in lieu of conducting their own individual monitoring studies and allowing permittees to substitute their own monitoring studies for the ones required by the state.

~~Permittees are not required to provide descriptions of any monitoring, studies, or analyses conducted as part of the Maryland Pooled Monitoring Program (MPMP) in annual reports. If a Permittee conducts independent monitoring in accordance with requirements in F.1 or F.2 below, annual reporting of such monitoring must follow the requirements specified in those sections.~~

XXXXXX County and ten other municipalities in Maryland have been conducting discharge characterization monitoring since the early 1990s. From this expansive monitoring, a statewide database has been developed that includes hundreds of storms across numerous land uses. Analyses of this dataset and other research performed nationally effectively characterize stormwater runoff in Maryland for NPDES municipal stormwater purposes. To build on existing information and to better track progress toward meeting TMDLs, better data are needed on ESD performance and BMP efficiencies and effectiveness.

Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. The County shall use chemical, biological, and physical monitoring to assess watershed restoration efforts, document BMP effectiveness, or calibrate water quality models for showing progress toward meeting any applicable WLAs developed under EPA approved TMDLs identified above. Additionally, the County shall conduct physical stream monitoring to assess the implementation of the latest version of the *2000 Maryland Stormwater Design Manual.* Specific monitoring requirements are described below.

1. Watershed Restoration ~~Assessment~~Status and Trends Monitoring

a. No later than June 1, 2019, XXXXXX County/City shall notify the Maryland Department of the Environment in writing which of the following two options for status and trends monitoring the Permittee chooses to carry out during this permit cycle. Either option will fully satisfy the Permittee's obligations under this section (F.1). Each Permittee shall select a single option for the duration of this permit term.

i. Status and Trends Monitoring Option #1: Each Permittee that chooses this option shall pay into a collective fund to implement MPMP small streams and marine nearshore status and trends monitoring in the Chesapeake Bay region. The first payment into the collective fund is due to the Chesapeake Bay Trust by June 1, 2019, and subsequent payments into the collective fund are due to the Chesapeake Bay Trust annually beginning August 15, 2020. The payment amount for XXXXX County/City is $XXXXX.

Or

~~1.2.~~

i. The County shall continue monitoring the XXXX outfall and XXXX Creek in- stream station in the XXX watershed, or select and submit for MDE's approval a new watershed restoration project for monitoring. Monitoring activities shall occur where the cumulative effects of watershed restoration activities can be

Commented [KB10]: From Anne Arundel County:
This is an example of language that could be used under the pooled monitoring option.

assessed. One outfall and an associated in-stream station, or other locations based on a study design approved by MDE, shall be monitored. The minimum criteria for chemical, biological, and physical monitoring are as follows:

b. Chemical Monitoring:

i. Twelve (12) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;

ii. Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;

iii. At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136 and event mean concentrations (EMC) shall be calculated for:

Biochemical Oxygen Demand BOD_5	Total Lead
Total Kjeldahl Nitrogen (TKN)	Total Copper
Nitrate plus Nitrite	Total Zinc
Total Suspended Solids	Total Phosphorus
Total Petroleum Hydrocarbons (TPH)	Hardness
E. coli or enterococcus	

Commented [KB11]: Are all of these constituents required by federal regulation?

iv. Continuous flow measurements shall be recorded at the in-stream monitoring station or other practical locations based on the approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models. Pollutant load estimates shall be reported according to any EPA approved TMDL with a stormwater WLA.

c. Biological Monitoring:

v. Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and in-stream stations or other practical locations based on an MDE approved study design; and

vi. The County shall use the EPA Rapid Bioassessment Protocols (RBP), Maryland Biological Stream Survey (MBSS), or other similar method approved by MDE.

d. Physical Monitoring:

vii. A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on the approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;

viii. A stream habitat assessment shall be conducted using techniques

defined by the EPA's RBP, MBSS, or other similar method approved by MDE; and

ix. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

e. Annual Data Submittal: The County shall describe in detail its monitoring activities for the previous year and include the following:

x. EMCs submitted on MDE's long-term monitoring database as specified in PART V below;

xi. Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations; and

xii. Any requests and accompanying justifications for proposed modifications to the monitoring program.

2. Stormwater Management ~~Assessment~~Effectiveness Study

Commented [KB12]: From Anne Arundel County:
This is an example of language that could be used under the pooled monitoring option.

Effectiveness Study Option #1: Each Permittee that chooses this option shall pay into a collective fund to implement MPMP effectiveness studies. Payments into the collective fund are due to the Chesapeake Bay Trust beginning on June 1, 2020. The payment amount for XXXXXX County/City is $XXXXXX per year.

Or

Effectiveness Study Option #2:

a. The County shall continue monitoring the XXXXXXXXX watershed, or select and submit for MDE's approval a new watershed restoration project for determining the effectiveness of stormwater management practices for stream channel protection. Physical stream monitoring protocols shall include:

c. An annual stream profile and survey of permanently monumented cross-sections in XXXXX to evaluate channel stability;

d. A comparison of the annual stream profile and survey of the permanently monumented cross-sections with baseline conditions for assessing areas of aggradation and degradation; and

e. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC- RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

3. Alternative Assessment Option

Commented [KB13]: From Anne Arundel County
This is an example of language that could be used under the pooled monitoring option.

Rather than conduct its own Watershed Restoration Assessment and/or Stormwater Management Assessment, the County may make a financial contribution, equal to or greater than the cost of prior assessment work, to the Chesapeake Bay

Trust's Maryland Pooled Monitoring Program.

G. Program Funding

1. Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted as required in PART V below.

2. Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. Annual Reporting

1. Annual progress reports, required under 40 CFR 122.42(c), will facilitate the long-term assessment of XXXXX County's NPDES stormwater program. The County shall submit annual reports on or before the anniversary date of this permit and post these reports on the County's website. All information, data, and analyses shall be based on the fiscal year and include:

   a. The status of implementing the components of the stormwater management program that are established as permit conditions including:

      i. Source Identification;
      ii. Stormwater Management;
      iii. Erosion and Sediment Control;
      iv. Illicit Discharge Detection and Elimination;
      v. Litter and Floatables;
      vi. Property Management and Maintenance;
      vii. Public Education;
      viii. Watershed Assessment;
      ix. Restoration Plans;
      x. TMDL Compliance;
      xi. Assessment of Controls; and
      xii. Program Funding.

   b. A narrative summary describing the results and analyses of data, including monitoring data that is accumulated throughout the reporting year;

   c. Expenditures for the reporting period and the proposed budget for the upcoming year;

   d. A summary describing the number and nature of enforcement actions, inspections, and public education programs;

   e. The identification of water quality improvements and documentation of attainment and/or progress toward attainment of benchmarks and applicable WLAs developed under EPA approved TMDLs; and

f. The identification of any proposed changes to the County's program when WLAs are not being met.

2. To enable MDE to evaluate the effectiveness of permit requirements, the following information shall be submitted in a format consistent with Attachment A.

a. Storm drain system mapping (PART IV.C.1);

b. Urban BMP locations (PART IV.C.3);

c. Impervious surfaces (PART IV.C.4);

d. Water quality improvement project locations (PART IV.C.6);

e. Monitoring site locations (PART IV.C.5);

f. Chemical monitoring results (PART IV.F.1);

g. Pollutant load reductions (PART IV.E.4. and IV.F.1);

h. Biological and habitat monitoring (PART IV.F.1);

i. Illicit discharge detection and elimination activities (PART IV.D.3);

j. Erosion and sediment control, and stormwater program information (PART IV.D.1 and IV.D.2);

k. Grading permit information - quarterly (PART IV. D.2); and

l. Fiscal analyses - cost for NPDES related implementation (PART IV.G).

Commented [KB14]: The permittees would like to work with MDE to eliminate unnecessary duplication between the financial assurance plan and fiscal analysis in the annual report.

3. Because this permit uses an iterative approach to implementation, the County must evaluate the effectiveness of its programs in each annual report. BMP and program modifications shall be made within 12 months if the County's annual report does not demonstrate compliance with this permit and show progress toward meeting WLAs developed under EPA approved TMDLs.

B. Program Review

In order to assess the effectiveness of the County's NPDES program for eliminating non-stormwater discharges through the illicit connection program and reducing the discharge of pollutants to protect water quality, MDE will review program implementation, annual reports, and periodic data submittal. Procedures for the review of local erosion and sediment control and stormwater management programs exist in Maryland's sediment control and stormwater management laws. Additional evaluations may be conducted at MDE's discretion to determine compliance with permit conditions.

C. Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than 5 years unless administratively continued by

MDE. Continuation or reissuance of this permit beyond this permit term will require the County to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. Failure to reapply for coverage constitutes a violation of this permit.

As part of this application process, XXXXX County shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how the County is meeting the overall goal to ensure that each County watershed has been thoroughly evaluated and its progress in implementing water quality improvements. This application shall be used to gauge the effectiveness of the County's NPDES stormwater program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

1. XXXXXX County's NPDES stormwater program goals;

2. Program summaries for the permit term regarding:

   a. Illicit discharge detection and elimination results;

   b. Restoration plan status including County totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting WLAs developed under EPA approved TMDLs;

   c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved;

   ~~d. Impervious acres compared to the baseline and twenty percent restoration requirement in PART IV.E.2.a; and~~

   ~~e.~~d. Other relevant data and information for describing County programs;

3. Program operation and capital improvement costs for the permit term; and

4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the County's efforts to comply with the conditions of this permit.

Commented [KB15]: Refer to the replacement language for Section E. Restoration Plans and TMDLs

PART VI. SPECIAL PROGRAMMATIC CONDITIONS

A. Chesapeake Bay Restoration by 2025

A Chesapeake Bay TMDL has been developed by the EPA for the six Bay States (Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia) and the District of Columbia. The TMDL describes the level of effort that will be necessary for meeting water quality criteria and restoring Chesapeake Bay. This permit is requiring compliance with the Chesapeake Bay TMDL through the use of a strategy that calls for the restoration of ~~twenty~~ a percentage of previously developed impervious land with little or no controls within this five year permit term as described in Maryland's Watershed Implementation Plan. The TMDL is an aggregate of nonpoint sources or the load allocation (LA), point sources or WLA, and a margin of safety. The State is required to

issue NPDES permits to point source discharges that are consistent with the assumptions of any applicable TMDL, including those approved subsequent to permit issuance.

Urban stormwater is defined in the CWA as a point source discharge and will subsequently be a part of Maryland's WLA. The NPDES stormwater permits can play a significant role in regulating pollutants from Maryland's urban sector and in the development of Chesapeake Bay Watershed Implementation Plans. Therefore, Maryland's NPDES stormwater permits issued to Anne Arundel County and other municipalities will require coordination with MDE's Watershed Implementation Plan and be used as the regulatory backbone for controlling urban pollutants toward meeting the Chesapeake Bay TMDL by 2025.

~~**B. Comprehensive Planning**~~

~~XXXXXX County shall cooperate with other agencies during the completion of the Water Resources Element (WRE) as required by the Maryland Economic Growth, Resource Protection and Planning Act of 1992 (Article 66B, Annotated Code of Maryland). Such cooperation shall entail all reasonable actions authorized by law and shall not be restricted by the responsibilities attributed to other entities by separate State statute, including but not limited to reviewing and approving plans and appropriating funds.~~

PART VII. ENFORCEMENT AND PENALTIES

A. Discharge Prohibitions and Receiving Water Limitations

XXXXXXX County shall prohibit non-stormwater discharges through its MS4. NPDES permitted non-stormwater discharges are exempt from this prohibition. Discharges from the following will not be considered a source of pollutants when properly managed: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration to separate storm sewers; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation waters; springs; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; de-chlorinated swimming pool discharges (not including filter backwash); street wash water; and fire fighting activities.

Consistent with §402(p)(3)(B)(iii) of the CWA, the County shall take all reasonable steps to minimize or prevent the contamination or other alteration of the physical, chemical, or biological properties of any waters of the State, including a change in temperature, taste, color, turbidity, or odor of the waters or the discharge or deposit of any organic matter, harmful organism, or liquid, gaseous, solid, radioactive, or other substance into any waters of the State, that will render the waters harmful to:

1. Public health, safety, or welfare;

2. Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial use;

3. Livestock, wild animals, or birds; and

4. Fish or other aquatic life.

B. Duty to Mitigate

XXXXXX County shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

C. Duty to Comply

XXXXXXX County shall be responsible for complying with all conditions of this permit. Other entities may be used to meet various permit obligations provided that both the County and the other entity agree contractually. Regardless of any arrangement entered into however, the County remains responsible for permit compliance. In no case may this responsibility or permit compliance liability be transferred to another entity.

Failure to comply with a permit provision constitutes a violation of the CWA and is grounds for enforcement action; permit termination, revocation, or modification; or denial of a permit renewal application. The County shall comply at all times with the provisions of the Environment Article, Title 4, Subtitles 1, 2, and 4; Title 7, Subtitle 2; and Title 9, Subtitle 3 of the Annotated Code of Maryland.

The County shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the County to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the County only when the operation is necessary to achieve compliance with the conditions of the permit.

D. Sanctions

1. Penalties Under the CWA - Civil and Criminal

Section 309(g)(2) of the CWA, 33 USC §1319(g)(2) provides that any person who violates any permit condition is subject to a civil penalty not to exceed $10,000 per day for each violation, not to exceed $125,000. Pursuant to the Civil Monetary Penalty Inflation Adjustment Rule, 40 CFR Part 19, any person who violates any NPDES permit condition or limitation is liable for an administrative penalty not to exceed $16,000 per day for each such violation, up to a total penalty of $177,500. Pursuant to Section 309(c) of the CWA, 33 USC §1319(c), any person who negligently violates any permit condition is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. Any person who knowingly violates any permit condition is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both.

2. Penalties Under the State's Environment Article - Civil and Criminal

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the County from civil or criminal responsibilities and/or penalties for a violation of Title 4, Title 7, and Title 9 of the Environment Article, Annotated Code of Maryland, or any federal, local, or other State law or regulation. Section 9-342 of the Environment Article provides that a person who

violates any condition of this permit is liable to a civil penalty of up to $10,000 per violation, to be collected in a civil action brought by MDE, and with each day a violation continues being a separate violation. Section 9-342 further authorizes the MDE to impose upon any person who violates a permit condition, administrative civil penalties of up to $5,000 per violation, up to $50,000.

Section 9-343 of the Environment Article provides that any person who violates a permit condition is subject to a criminal penalty not exceeding $25,000 or imprisonment not exceeding 1 year, or both for a first offense. For a second offense, Section 9-343 provides for a fine not exceeding $50,000 and up to 2 years imprisonment.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who knowingly makes any false statement, representation, or certification in any records or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

E. Permit Revocation and Modification

1. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the County for a permit modification or a notification of planned changes or anticipated noncompliance does not stay any permit condition. A permit may be modified by MDE upon written request by the County and after notice and opportunity for a public hearing in accordance with and for the reasons set forth in COMAR 26.08.04.10.

After notice and opportunity for a hearing and in accordance with COMAR 26.08.04.10, MDE may modify, suspend, or revoke and reissue this permit in whole or in part during its term for causes including, but not limited to the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. A change in any condition that requires either a temporary reduction or elimination of the authorized discharge;

d. A determination that the permitted discharge poses a threat to human health or welfare or to the environment and can only be regulated to

acceptable levels by permit modification or termination;

e. To incorporate additional controls that are necessary to ensure that the permit effluent limit requirements are consistent with any applicable TMDL WLA allocated to the discharge of pollutants from the MS4; or

f. As specified in 40 CFR §§122.62, 122.63, 122.64, and 124.5.

2. Duty to Provide Information

The County shall furnish to MDE, within a reasonable time, any information that MDE may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit. The County shall also furnish to MDE, upon request, copies of records required to be kept by this permit.

F. Inspection and Entry

XXXXXXX County shall allow an authorized representative of the State or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulatory activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and obtain copies at reasonable times of any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times, without prior notice, any construction site, facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

G. Monitoring and Recordkeeping

Unless otherwise specified by this permit, all monitoring and records of monitoring shall be in accordance with 40 CFR Part 122.41(j).

H. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State or local law or regulations.

I. Severability

The provisions of this permit are severable. If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect. If

the application of any provision of this permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

J. Signature of Authorized Administrator and Jurisdiction

Each application, report, or other information required under this permit to be submitted to MDE shall be signed as required by COMAR 16.08.04.01-1. Signatories shall be a principal executive officer, ranking elected official, or other duly authorized employee.

~~Jay G. Sakai~~~~Lynn Buhl~~Lee Currey, Director Water Management Administration

Date

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 24 Jul 2017 00:42:53 +0000
To: "'JPGill@co.pg.md.us'" <JPGill@co.pg.md.us>; "Lisa Feldt" <Lisa.Feldt@montgomerycountymd.gov>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Tdevilbiss@ccg.carr.org" <Tdevilbiss@ccg.carr.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "buckley, christine (cmbuckley@harfordcountymd.gov)" <cmbuckley@harfordcountymd.gov>; "Karen Wiggen" <wiggenk@charlescounty.org>; "kwilen@ccgov.org" <kwilen@ccgov.org>; "jpippel@washco-md.net" <jpippel@washco-md.net>
Cc: "Jeff DeHan" <jmdehan@co.pg.md.us>; "Jerry Maldonado" <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Shofar, Steven" <Steven.Shofar@montgomerycountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Amy.Stevens@montgomerycountymd.gov" <Amy.Stevens@montgomerycountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "Karen Coffman" <kcoffman@sha.state.md.us>; "'rshreeve@sha.state.md.us'" <rshreeve@sha.state.md.us>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "Morris, Kimberly D." <Kimberly.Morris@montgomerycountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: FW: Discussion topics for July 24 meeting
Attachments: Draft Agenda for 072417.docx

Folks,

Note MDE's proposed agenda and the plan to end around noon.

From: Jennifer M. Smith - MDE [mailto:jenniferm.smith@maryland.gov]
Sent: Friday, July 21, 2017 5:21 PM
To: Karl Berger <kberger@mwcog.org>
Cc: Lee Currey -MDE- <lee.currey@maryland.gov>; Lynn Buhl -MDE- (lynn.buhl@maryland.gov) <lynn.buhl@maryland.gov>; Raymond Bahr -MDE- (raymond.bahr@maryland.gov) <raymond.bahr@maryland.gov>
Subject: Re: Discussion topics for July 24 meeting

Karl,

We have put together a draft agenda that can be used to shape the conversation on Monday. I have attached a copy for your use.

Also, we are planning to end the discussions at lunch time thinking by then we will have exhausted the discussion. However, we are open to a second follow up meeting.

Thank you and have a great weekend!

Jennifer

On Fri, Jul 21, 2017 at 2:39 PM, Karl Berger <kberger@mwcog.org> wrote:

Lee,

I have heard back from 3 of the 4, who will acquiesce to your request not to attend. I am hopeful the 4th will as well.

Sent from my iPhone

On Jul 20, 2017, at 8:42 AM, Lee Currey -MDE- <lee.currey@maryland.gov> wrote:

Karl,

Thanks for the agenda. I'll work with folks here regarding comments and suggested revisions.

We met with our in house counsel last Friday and given the ongoing litigation with several Phase I mediums we have been advised that they not be part of this meeting discussion.

Therefore we request that the meeting invites be revised to include Phase I large jurisdictions, SHA and Howard County.

Lee

On Wed, Jul 19, 2017 at 10:04 AM, Karl Berger <kberger@mwcog.org> wrote:

Lynn, Lee:

Here are some key aspects of the restoration issue that we would hope our discussion at Monday's meeting will address.

Schedule/time frame: Depending on how revoke and reissue is done, there could be consequences for the amount of time the MS4s will have to achieve permit requirements or for whether every MS4 is on the same schedule going forward.

Impervious surface vs. nutrient reduction: The MS4 group has varying positions on whether a new restoration metric should be denominated in impervious surface retrofit acres, nutrient and sediment reductions, or some combination of the two. We are looking forward to MDE's views on this issue.

Affordability and feasibility: Whatever metric is agreed upon for the next permit, it must take into account jurisdictions' ability to have both sufficient funding and adequate programmatic capacity to meet this target. This is related to defining Maximum Extent Practicable, but may take in other things.

Permit area: Whether or not the definition of permit area changes in the next permit will have significant consequences on the restoration component.

We welcome your ideas for other topics to be discussed.

Also, given the role of urban stormwater controls in achieving Chesapeake Bay TMDL goals and the impending development of the Phase III watershed implementation plans, **we would like to hear from MDE as to what level of nutrient and sediment reductions you anticipate needing from the urban stormwater sector to meet the state's Bay goals.**

As a reminder: we are scheduled to meet from 9 a.m. to 3 p.m. July 24 in SHA's Office of Maintenance (OOM) training room.

Entrance is the same as last meeting:

Statewide Operation Center
7491 Connelley Drive
Hanover, MD

Folks should plan to be on their own for lunch (presumably from 12 to 1). According to SHA folks, lunch spots in the immediate vicinity of the meeting are:

Burger King
Subway
Cancun Cantina
7-Eleven

Farther away at 1350 Dorsey Road Shopping Center, are:

Cantina Mamma Lucia (Italian)
Little Spice (Thai)
Allah Rakha Restaurant (Pakistani)
Phubs (Vietnamese)
Dunkin Donuts (for the sugar connoisseur)

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

--
D. Lee Currey, Director

Water and Science Administration
Maryland Department of the Environment (MDE)
Montgomery Park
1800 Washington Blvd., Ste. 4502
Baltimore, MD 21230-1718
Office: 410-537-3567
lee.currey@maryland.gov
www.mde.state.md.us
www.facebook.com/MDEnvironment
www.twitter.com/MDEnvironment

Click here to complete a three question customer experience survey.

--

Jennifer M. Smith, PE
Program Manager
Sediment, Stormwater and Dam Safety Program
Water and Science Administration
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

410-537-3561
410-537-3553 (fax)

Click here to complete a three question customer experience survey.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Wed, 19 Jul 2017 14:04:13 +0000
To: "Lynn Buhl -MDE- (lynn.buhl@maryland.gov)" <lynn.buhl@maryland.gov>; "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>
Cc: "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>
Subject: Discussion topics for July 24 meeting

Lynn, Lee:

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Allah Rakha Restaurant (Pakistani)
Phubs (Vietnamese)
Dunkin Donuts (for the sugar connoisseur)

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

From: "Karl Berger" <kberger@mwcog.org>
Sent: Tue, 8 Aug 2017 17:13:40 +0000
To: "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>
Cc: "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "JPGill@co.pg.md.us" <JPGill@co.pg.md.us>; "Jeff DeHan" <jmdehan@co.pg.md.us>; "Jerry Maldonado" <jgmaldonado@co.pg.md.us>; "Amy.Stevens@montgomerycountymd.gov" <Amy.Stevens@montgomerycountymd.gov>
Subject: MS4 Permit challenges survey template -- feedback requested
Attachments: MS4 Permit MEP Considerations to Meet Permit targets.draft survey.8 4 17 AA draft response.docx

Ray and Jennifer,

Attached is a survey questionnaire that the MS4s developed from our afternoon session at the July 24 meeting. It also includes initial responses from Erik Michelson of Anne Arundel County. We'd like you to review and comment, responding, in particular, to the following questions:

- Is this the sort of information that, when coupled with the FAP reports from 2016*, MDE is seeking to make the case for revoke and reissue?
- Is this the proper level of detail? Would summarizing the data in charts or other graphs be useful?
- Are there other areas of information that should be included?

Also, we would like MDE staff to provide us with a preliminary schedule for how the revoke-and-reissue option can be achieved by the end of 2018 deadline, with interim milestones.

* Here is a table I put together when the FAP reports first emerged. There may be some subsequent changes that have occurred. Certainly, a number of the MS4s have been adjusting their implementation plans based on updated information since the plans were developed. But it provides some illustration of the challenges of meeting the 20% ISR goal strictly through implementation of capital BMP projects.

	Acres Required to be Treated	Trading	Septic pumping	Street sweeping	Stormdrain cleaning
Anne Arundel	5,862	Y, 2,044 acres	Y, 100 acres	Y, 550 acres	N

Baltimore City	4,291	N	N	Y, 3,175 acres	Y, 215 acres
Baltimore Co	6,036	N	Y, 56.1 acres	Y, 519 acres	Y, 44.55 acres
Carroll	1,344	N	N	N	N
Charles	1,410	Y, 713 acres	Y, 25 acres	Y, 80 acres	Y, 14 acres
Frederick	1,013	Y, 255.8 acres	N	N	N
Harford	1,883	Y, 940 acres	Y, 300 acres	N	N
Howard	2,044	N	Y, 270 acres	N	N
Montgomery	3,777	N	N	N	N
Prince George's	6,105	N	N	Y, 2000 acres	N

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

NPDES Permit

County / Municipal Survey

Challenges Affecting Restoration Implementation Targets

The purpose of this survey is to better understand and consider municipal restoration challenges in meeting Chesapeake Bay targets and timelines prescribed in the State's WIP I, II, and forthcoming WIP III. This survey will be utilized by all participating counties and municipalities to highlight challenges encountered while implementing various programs under the MS4 which are contributory to the Bay restoration.

Jurisdiction: Anne Arundel County

Respondent: Erik Michelsen, Administrator, Watershed Protection & Restoration Program

I. Revenues / Resources

The following questions should be answered from the perspective of the County's or Municipality's age of stormwater management (SWM) programs. Typically the SWM programs in Maryland began in 1985 requiring revenues to fund Stormwater for attenuating discharges and sediment control. In 2002, the State increased its focus to also address water quality by issuing new standards for ESD. Acknowledging that revenues continue to stream in annually, describe the health of the SWM funds in relation to the debt service (principal & interest) on typical 20-year bond repayment term. Are the revenue streams saturated debt service obligations?

A. Percent Debt Service (By Fund Type)

Debt service is currently approximately 15% of annual revenues, but is expected to grow rapidly as capital implementation increases.

B. Percent revenue capacity (debt ceiling) to support additional bond debt service for sustained long term restoration expenditures.

The approximate borrowing capacity of the Watershed Protection and Restoration Fund at the current revenue level is $300 million. Currently, nearly all those dollars have been authorized.

C. Does the County or Municipality fully or partially fund the stormwater and water quality programs from general tax revenues? Please explain.

The vast majority of the revenue for the MS4 program comes from the County's Watershed Protection and Restoration Fee (WPRF). In FY18, there were supplemental General Fund dollars added to the Fund, with the expectation that that amount will increase into the future.

D. Does the County or Municipality collect dedicated revenues for the specific purposes of stormwater management and water quality? Please explain.

Yes, the County has a Watershed Protection & Restoration Fee assessed as a charge on existing impervious surfaces. The charge per ERU (2,940 sf) is currently $85/year.

II. Bond Types

A. Please describe how the County or Municipality presently funds its restoration programs (capital) for new or retrofit construction? and if they compete for the same dollars with other programs?
   i. General obligation bonds
   ii. Stormwater management bonds
   iii. State Revolving Loans

Currently, the only bond funding source for MS4 capital projects is WPRF bonds. They only compete with gray stormwater infrastructure projects for funding.

B. For revenues collected, does the County or Municipality sell bonds, use State Revolving Funds, or other to cover the cost of capital restoration?

The County sells WPRF bonds against its annual WPRF revenues.

III. Pay Go

A. To cover the cost of restoration is the County or Municipality restricted to the sole use of Paygo?

No, the County uses bonds to support capital project implementation. Paygo is used to pay the debt service.

B. What is the annual revenue allocated for water quality restoration work?

Approximately $50M/year in bond authorization over the 5-year life of the permit.

C. Are there other competitive programs (non-stormwater) utilizing the same revenue stream?

No.

IV. Cost of restoration (implementation)

The Chesapeake Bay region has been experiencing a higher demand for consultant and construction services, describe the impact this demand has on your County or Municipality as it relates to the following?

A. The variability of construction costs vs. King Study

Generally speaking, costs seem to be within about 5-10% of the King and Hagan costs for major project categories. Construction costs have definitely increased significantly since recession-era prices.

B. Cost depending on Contractor Capacity

Contractors are clearly busier than they were 3-4 years ago, though we routinely get 3-5 bids on construction projects.

C. Cost based on BMP type

Costs for LID/ESD practices seem to diverge most heavily from the King and Hagan report, with costs of $250-350k/acre routinely being reported by major, urban jurisdictions.

D. Permitting

The uncertainty of permitting, at the local, state, and federal government level has driven permitting costs up considerably. Though some progress has been made, there still seem to be insufficient processes in place to expedite restoration activity.

E. Land acquisition, easements

Working on private property, for Anne Arundel County, requires either easements or fee simple purchase. That component of a project, if all moves smoothly, routinely takes 6-12 months.

F. Staff costs/overhead to manage increased workload

Staffing expansion was built into the creation of the Watershed Protection and Restoration Program. In order to build our project management staffing capacity, it took roughly 3 years of vetting and hiring. Anecdotally, the private sector too is having difficulty hiring people to serve as project managers as well.

V. Cost for Operations and Maintenance (Post Construction)

A. Is the County or Municipality tasked to maintain all stormwater management and water quality related infrastructure as part of the public service?

The County maintains all public stormwater infrastructure (e.g., conveyance and BMPs). Private stormwater infrastructure is maintained by the property owner.

B. Given that maintenance costs cannot be covered through bond financing, are current maintenance costs competing for the same dollars described in the Revenues section of this survey, to cover other non-stormwater costs?

They are not competing against non-stormwater costs, but they are competing against debt service costs, as well as the other operational costs (e.g., personnel, monitoring) to carry out the broader obligations of the MS4 permit.

C. What is the distribution percentage of collected revenues (operating) allocated annually for maintenance?
   i. Traditional Costs for typical BMPs
   ii. O&M Stormwater and Water Quality
   iii. SWM Gray Infrastructure

Approximately 5-7% of operating revenues are dedicated to BMP maintenance on an annual basis, with another $6.3M in capital funding (and its accompanying debt service) being used for the repair and replacement of SWM gray infrastructure on an annual basis.

VI. NPDES Permit Implementation Cost for Compliance (operating only)

A. What is the County or Municipal annual operating cost needed to support programs listed under the NPDES MS4 Permit?

(Cost should include staff, overhead, studies, restoration plans, monitoring, public participation, stormwater management plan review, sediment and erosion control, annual report preparation, and geodatabase maintenance)

Current operating costs (which include debt service on capital bonds) are approximately $22 M/year.

VII. Restoration Land Availability (what can be treated)

A. The following questions should address the ability or limitations of property access by a County or Municipality to treat and install BMP devices. Indicate challenges by type and the percent of eligible land types against MS4 footprint and percent remaining for treatment?
   i. Private Land (i.e. cost, access, owner participation)
   ii. Park Land
   iii. School Property
   iv. Public Property
   v. SHA Property
   vi. Federal Property
   vii. State Property

All classes of property above present their own unique challenges. Private land, if there is landowner cooperation, is perhaps the most straightforward. It requires a permanent easement or fee simple purchase from the property owner. School property requires the affirmative agreement of the school system, who may have programmatic needs for their property that they are not willing to sacrifice for stormwater projects, and who may not have any particular interest in participating, given that they are not named as co-permittees. Discussions around using parkland and other public properties involve coordination with the agencies who control those properties and an accommodation of their needs or intended uses. Anne Arundel County currently has an MOU in place with SHA, and conducts quarterly coordination meetings with SHA to discuss joint projects and projects that may occur on one another's properties. Generally speaking, Anne Arundel County has not pursued projects on State or Federal Property.

VIII. Time of Performance

A. Explain through the following categories, the County or Municipality concerns relating to time performance affecting the implementation of restoration projects?

i. Annual budget process (Budget, Finance, Procurement, Council)

This process routinely takes 9 months, starting in September of any given year, with the budget approved by July of the following year.

ii. County Procurement (Bids and Project Award)

Depending on the design procurement vehicle used, this process can take between 30 to 180 days. The shorter procurement timeframes are for open end and task order contracts, which took approximately 1 year to put in place originally.

iii. Project Planning

Project planning, including agreement on conceptual design, routinely takes 3 to 6 months.

iv. Project Design (consultant services, resources)

Project design, depending on the complexity of the project can take between 1 to 2 years.

v. Utility conflicts (gas, Water, Sewer, power, cable, etc.)

If Utility conflicts are present, they can routinely add 3 to 6 months to the construction of a project, and hundreds of thousands of dollars in construction costs.

vi. Permitting (county, state, federal)

Permitting timeframes are highly variable depending on the complexity of the project but can range from 3 months to 3 years+.

vii. Procurement (specific restrictions imposed by a County or Municipality)

viii. Construction (contractor availability, expertise, etc.)

Construction procurement for larger projects ($500k+) routinely takes 6 months. For smaller projects, it can take 30 days, using blanket order construction contracts. Similar to the shorter design contracts, this process took approximately 1 year to put in place originally.

ix. Maintenance (high number of ESD's versus Pond retrofits)

Maintenance, if funding is available, can be accomplished fairly quickly using blanket order contracts.

x. Seasonal work (constraints limiting restoration to certain times of the year)

Fish closures and other seasonal constraints can easily shut down work for between 3 to 6 months of the year.

xi. Community acceptance to certain BMPs. (street bump outs, tree planting, etc.)

We factor in approximately 1 year of community outreach for projects which are likely to attract strong community interest or opposition.

xii. Addressing existing conditions before restoration (substandard drainage systems)

To the extent possible, we try to address drainage concerns concurrently with our restoration work.

IX. Potential Project Costs Increases

A. Describe the impact on project cost escalation associated with restoration advancing projects advancing through initial project inventories ("low hanging fruit") to advanced cohorts of project inventories?
   i. Site Constraints
   ii. Public Acceptance
   iii. Land Owner Issues
   iv. Perceived Public Safety
   v. Community Priorities
   vi. Extent of Public Relations
   vii. Other

As the "low hanging fruit," stormwater facility retrofits on property that the County controls, are completed, the amount of energy and time required to get community acceptance, easements/property acquisition, increases dramatically. Permitting time is expected to increase significantly as well. We should have a better handle on these differential costs within the next 2 years or so.

From: "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>
Sent: Thu, 10 Aug 2017 15:19:53 +0000
To: "Karl Berger" <kberger@mwcog.org>
Cc: "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>; "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "JPGill@co.pg.md.us" <JPGill@co.pg.md.us>; "Jeff DeHan" <jmdehan@co.pg.md.us>; "Jerry Maldonado" <jgmaldonado@co.pg.md.us>; "Amy.Stevens@montgomerycountymd.gov" <Amy.Stevens@montgomerycountymd.gov>
Subject: Re: MS4 Permit challenges survey template -- feedback requested

Hi Karl,

Thanks to everyone who worked on this.

We'll give the survey and your questions a review and comment back prior to distribution.

Thanks again,

Ray

On Tue, Aug 8, 2017 at 1:13 PM, Karl Berger <kberger@mwcog.org> wrote:

> Ray and Jennifer,
>
> Attached is a survey questionnaire that the MS4s developed from our afternoon session at the July 24 meeting. It also includes initial responses from Erik Michelson of Anne Arundel County. We'd like you to review and comment, responding, in particular, to the following questions:
>
> - Is this the sort of information that, when coupled with the FAP reports from 2016*, MDE is seeking to make the case for revoke and reissue?
>
> - Is this the proper level of detail? Would summarizing the data in charts or other graphs be useful?

- Are there other areas of information that should be included?

Also, we would like MDE staff to provide us with a preliminary schedule for how the revoke-and-reissue option can be achieved by the end of 2018 deadline, with interim milestones.

* Here is a table I put together when the FAP reports first emerged. There may be some subsequent changes that have occurred. Certainly, a number of the MS4s have been adjusting their implementation plans based on updated information since the plans were developed. But it provides some illustration of the challenges of meeting the 20% ISR goal strictly through implementation of capital BMP projects.

	Acres Required to be Treated	Trading	Septic pumping	Street sweeping	Stormdrain cleaning
Anne Arundel	5,862	Y, 2,044 acres	Y, 100 acres	Y, 550 acres	N
Baltimore City	4,291	N	N	Y, 3,175 acres	Y, 215 acres
Baltimore Co	6,036	N	Y, 56.1 acres	Y, 519 acres	Y, 44.55 acres
Carroll	1,344	N	N	N	N
Charles	1,410	Y, 713 acres	Y, 25 acres	Y, 80 acres	Y, 14 acres
Frederick	1,013	Y, 255.8 acres	N	N	N
Harford	1,883	Y, 940 acres	Y, 300 acres	N	N
Howard	2,044	N	Y, 270 acres	N	N
Montgomery	3,777	N	N	N	N
Prince George's	6,105	N	N	Y, 2000 acres	N

Karl Berger

Principal Environmental Planner

Metropolitan Washington Council of Governments

202-962-3350

--
Raymond P. Bahr
Program Review Division Chief
Sediment, Stormwater, and Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1708
(410) 537-3545

Next Generation MS4 Permit

Discussion on Restoration Options

July 24, 2017
9 a.m. – 3 p.m.

Office of Maintenance (OOM) training room
SHA Statewide Operation Center
7491 Connelley Drive
Hanover, MD

Draft Agenda

1. Introductions
2. Welcoming Remarks - MDE
3. Presentation of Next Generation Permit Restoration - MDE
    a. The Bay TMDL Story
    b. Guiding Principles for the Next Generation Permit
4. What is Your Experience with Determining MEP - Each Phase I MS4 Large jurisdiction is given 5 minutes to discuss their experience defining MEP
5. Open Discussion
6. Next Steps

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 31 Jul 2017 15:11:39 +0000
To: "'JPGill@co.pg.md.us'" <JPGill@co.pg.md.us>; "Lisa Feldt" <Lisa.Feldt@montgomerycountymd.gov>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Tdevilbiss@ccg.carr.org" <Tdevilbiss@ccg.carr.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "buckley, christine (cmbuckley@harfordcountymd.gov)" <cmbuckley@harfordcountymd.gov>; "Karen Wiggen" <wiggenk@charlescounty.org>; "kwilen@ccgov.org" <kwilen@ccgov.org>; "jpippel@washco-md.net" <jpippel@washco-md.net>
Cc: "Jeff DeHan" <jmdehan@co.pg.md.us>; "Jerry Maldonado" <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Shofar, Steven" <Steven.Shofar@montgomerycountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Amy.Stevens@montgomerycountymd.gov" <Amy.Stevens@montgomerycountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "Karen Coffman" <kcoffman@sha.state.md.us>; "'rshreeve@sha.state.md.us'" <rshreeve@sha.state.md.us>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: MDE's documents from July 24 meeting
Attachments: Chesapeake Bay TMDL Story.from MDE.pdf, Guiding Principles for Next Generation Permit.from MDE.pdf

MD MS4 managers,

Attached are the two documents from which Lee Currey was reading at our meeting July 24.

I have also attached the text of Lee's email message accompanying the documents.

Also note: The subgroup that met in the afternoon to come up with a set of questions to supplement the existing FAP documentation to help make the case for revoke and reissue expects to have a completed questionnaire ready for distribution by the end of the week.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

From: Lee Currey -MDE- [mailto:lee.currey@maryland.gov]
Sent: Friday, July 28, 2017 4:27 PM
To: Karl Berger <kberger@mwcog.org>
Cc: Lynn Buhl -MDE- (lynn.buhl@maryland.gov) <lynn.buhl@maryland.gov>; Raymond Bahr -MDE- (raymond.bahr@maryland.gov) <raymond.bahr@maryland.gov>; Jennifer Smith -MDE-

(jenniferm.smith@maryland.gov) <jenniferm.smith@maryland.gov>
Subject: Re: Discussion topics for July 24 meeting

Karl,

As a follow up to Monday's meeting, I have attached the two documents that were distributed at the meeting. You are welcome to send them to the attendees.

I was very pleased with the robust discussion and the outcome of the meeting. We have great feedback, some clear "next steps" and owe you a workplan for review, which is in development.

I also wanted you to know that we are currently building from the comments we have received and are writing draft permit language. We'll get you a more detailed timeline, but we expect to have draft permit template language for discussion by late September. This gives us the last quarter (Oct-Dec) to work through the details.

Thanks again for your efforts.

Lee

Guiding Principles for Next Generation Permit

- State must operate under the Bay TMDL Cap
- Maintain impervious area restoration through stormwater practices for:
    - local water quality and
    - contribution toward Bay TN
- Strive for consistency in restoration requirements among MS4s
- No backsliding, i.e., permits cannot just be extended with current level of restoration without new information to justify
- Assess FAPs as an indicator of MS4 financial capacity
- Understand that BMP design and construction capacity are limiting factors for meeting the permit's deadlines
- Explore using trading to bridge differences between an MS4s' financial capacity and lack of construction capacity
- Consider a TN load reduction that may be met through:
    - Additional local stormwater controls
    - Trading with nonpoint sources, i.e., agricultural, septics, and unregulated stormwater
    - Trading with Point sources, i.e., WWTP, industry
- Develop a long-term restoration formula (beyond next permit term), based upon current implementation information, to meet the stormwater sector's Bay targets
- Understand that BMP maintenance and replacement costs are going to continue to grow and need to be factored into future MS4 restoration programs

The Chesapeake Bay TMDL Story

Bay TMDL and WIP Background

- The Chesapeake Bay TMDL/WIP is about each state collectively operating under a nitrogen, phosphorus and sediment pollution load cap by 2025.
- Each state is allocated a pollution cap by EPA that: 1) is based on "equity rules" agreed to by the Bay Partnership and 2) in total meets water quality standards in all waters of the Chesapeake Bay.
- To ensure progress is being made, an interim goal is set so that each state achieves 60% of their total required reduction by 2017. Two year milestones are also established that incrementally work toward the interim and final targets.
- The Maryland Phase I and II WIPs have detailed strategies to achieve at least 60% of the reductions toward the cap, in total, by 2017 and place the state on a path to reach 100% of the required reductions by 2025. In total means across all pollution source sectors.
- The Phase III WIP is to be designed to refine the strategies and formulate the next leg of the effort to meet 100% of the required reduction and begin operating under the pollution cap.

Key Plans, Reports and Letters

- 2009 EPA WIP Expectation Letter
- 2010 EPA Chesapeake Bay TMDL
- 2010 MD Phase I WIP
- 2012 MD Phase II WIP
- 2015 UMD Environmental Finance Center Report titled "MDs Chesapeake Bay Restoration Financing Strategy"
- 2015 Historical and Projected Chesapeake Bay Restoration Spending
- 2016 Historical and Projected Chesapeake Bay Restoration Spending

Goals of the Phase I, II and III WIPs as expressed in MD's Phase I WIP

- Demonstrate reasonable assurance those allocations would be achieved and maintained, and that the 2017 and 2025 targets will be achieved.
- The Phase I Plan is to be developed at the same time as the Bay TMDLs. In addition to setting final target loads that provide EPA the necessary information to establish TMDL allocations, the Plan also sets "interim target loads." EPA has set the year 2017 to achieve 60% of the needed implementation and 2025 as the deadline for achieving final target loads.
- A Phase II Plan, to be developed in 2011, will **refine** the details of the Phase I Plan by providing more geographic specificity regarding target loads. The Phase II Plan will also include greater detail about pollution controls that the State and partners will implement by the end of 2017. The time allotted for the Phase II planning process will allow significantly more interaction between the State and interested partners to refine the Phase I Plan.
- This Plan **builds upon** our Phase I Plan and provides a more detailed series of proposed strategies that will exceed our 2017 target (60% of the total implementation needed to meet

water quality standards). This Phase II Plan has significantly more local input than Phase I. The local input provides additional detail at the local level, increasing "reasonable assurance" of implementation.

- A Phase III Plan will be developed in 2017 and will address reductions needed from 2018 to 2025. The TMDL allocations may again be revised to reflect better data, a greater understanding of the natural systems and to make use of enhanced analytical tools, such as updated watershed and water quality models.

Interim and Final Targets - What do they mean?:

- EPA Expectations
    - EPA expects the States and the District to commit to meet the interim and final target loads fur nutrients and sediments in the Bay.
    - EPA expects the Phase I and II Watershed Implementation Plans to indicate **how** the States and the District will have necessary controls in place to achieve the interim target load of at least 60% of necessary reductions by no later than 2017.
    - EPA's expectation for Interim Target strategies is to achieve levels of BMP implementation consistent with meeting 60% of the Final Target for nutrients and sediment by 2017.
    - This "interim target load" provides the Agency and the public with a measure of assurance that the jurisdictions are on schedule to meet the 2025 goal. The Chesapeake Bay Program models also indicate that achieving 60% of nutrient and sediment reduction goals would result in the majority of impaired segments complying with States' and the District's dissolved oxygen water quality standards. (2009 Expectations Letter)
- Interim Target:
    - The Plan details a set of strategies that will meet the 60% reduction goal for nitrogen, phosphorus and sediments. Agricultural and wastewater strategies are a significant portion of this Phase and so are basically "front loaded". These strategies encompass extensions of current 2-year Milestone commitments and additional proposed strategies. (MD WIP)
    - Maryland's Phase II Interim Target strategy is projected to achieve the following levels of implementation statewide by 2017: Nitrogen: 89% of the Final Target Phosphorus: 119% of the Final Target Sediment: 409% of the Final Target
- Final Target:
    - There is greater uncertainty regarding this Target, due to the longer timeframe and associated anticipated changes in technology and programs beyond 2017. Because reductions from point sources will be credited between now and 2017, achieving the remaining reduction is expected to largely be accomplished in the non-point source sectors.

- MD Strategies for achieving the final targets:
    - The Phase I plan identified a need to increase capacity in order to achieve the 2025 targets
    - The Phase I WIP suggests the "how" is developing new technology and approaches prior to 2017. Examples of innovations might include development of seeds and crops that require less fertilizer and processes to reduce ammonia released from poultry manure. Increase the scope of implementation of existing strategies. Examples include upgrading additional small WWTPs, increasing acres retrofitted with stormwater controls; and more efficient urban runoff controls. Improve regulatory requirements to increase reductions achieved.
    - The Phase II WIP final targets do not consider cost and suggest that some type of trading among sectors will be needed.

Phase I/II Urban Stormwater Strategies for Phase I Counties

- The Phase I WIP identifies a schedule where from 2010 to 2017 jurisdictions are to achieve nutrient and sediment reductions equivalent to treatment of 30% " pre 1985 impervious surface areas. 10% by 2011 and another 20% between 2012 to 2017.
- The Phase II WIP identities the interim, by 2017, stormwater strategy as 30% for Phase I MS4 permits.
- The Phase I narrative strategy to achieve the interim goal is to renew permits to require Nutrient and Sediment reductions equivalent to stormwater treatment on 30% of the impervious surface that does not have adequate stormwater controls for MD's largest counties subject to Phase I Municipal Separate Storm Sewer System (MS4) Permits. In 2011, convene workgroup to determine funding options, schedules, and most cost effective practices with local government. In 2012, if local utilities or other systems of charges are not being implemented, seek legislation requiring local stormwater utilities. Alternative cost effective practices include forest buffer planting, stream restoration, wetland restoration, pavement removal and operational practices. Selection of practices and timing of implementation will be based on cost-effectiveness, pollutant removal efficiency and maximizing available funding.
- The Phase II plan describes that the final strategies were assigned using a set of BMPs from the E3 scenario at a level to close the gap for each county. These resulted in additional reductions beyond 2017.

2015 Report from the Environmental Finance Center

- Developed in cooperation with MD State agencies
- "Our analysis indicates that the resources are in place to achieve interim and final restoration targets. In other words, no new state-based fees or taxes are required moving forward."

- The report also surmised that success will be primarily the result of the state's aggressive efforts to finance advanced wastewater treatment, which enabled reductions in that sector to go beyond those required in the Total Maximum Daily Load and the Watershed Implementation Plan

Three EFC caveats

- EFC Report Caveat #1: The state applies its expected excess wastewater treatment plant allocation (i.e. urban growth capacity) today to offset expected shortfalls in the stormwater and septic sectors and then builds the capacity for growth back into the system.
    - Given the socioeconomic also technical challenges with reducing nutrients attributed to stormwater and septic, implementation in these sectors is projected to extend beyond 2025.
    - If allocations are loaned from wastewater to stormwater/septic, then assurances, with contingencies, must be established to ensure wastewater capacity is restored when needed.
    - Ideas for ensuring wastewater treatment plant growth allocation loans are repaid in a timely way include: continued implementation of nutrient reductions through the MS4 permits after 2025
- EFC Report Caveat #2: Assume that the current level of regulation will be maintained within each of the four pollution sectors and that enforcement will be consistent and effective.
    - The permitted entities are held responsible for financing and meeting their permit requirements.
    - The state is within reach of achieving its 2025 Total Maximum Daily Load requirements with current funding levels, but only if it is assumed that permitted entities cover the costs of meeting their permit requirements and the state funding is used to address non-permitted cost effective restoration responsibilities.
- **EFC Report Caveat #3**: Current state Chesapeake Bay grant programs are fully funded and applied in the most cost effective manners possible.

2015 and 2016 Report from the Governor's Bay Cabinet to the Legislature

- A key message from the Center is that projected total nitrogen and phosphorus reductions in Maryland are on track to achieve the 2017 interim goal and the 2025 final targets are within reach, even with septics and stormwater anticipated to reach their ultimate targets after 2025.
- Any changes that increase our current nutrient loads, decrease in implementation of annual and new nutrient reduction practices, or failure of permitted entities (ex. MS4 jurisdictions) from meeting their required implementation and schedule, will prevent us from meeting our 2025 reduction targets.
- Six elements of Maryland's Bay Restoration Framework will be used to address the Environmental Finance Center caveats and guide the state's strategies moving forward:
    - 1. Use wastewater treatment plant growth allocations wisely to preserve future options for local growth and identify solutions to build capacity back into the system: Although the stormwater and septic system sectors are projected to fall short of their

2025 nutrient loading targets, the municipal wastewater sector is projected to be further ahead of its target with capacity to grow. This provides an opportunity to cover the shortfall in the stormwater and septic sectors with the surplus in the wastewater sector temporarily. If the wastewater surplus is effectively loaned to cover the shortfall, the state would need to establish mechanisms to ensure future wastewater growth capacity is available when needed after 2025. This suggests that continued reductions from stormwater and septic systems will be necessary after 2025. To ensure success, we will need a full toolbox including grants, low interest loans, trading, public-private partnerships, and permit flexibility that allows for innovation. This also implies that the state must mitigate new growth in loads, which could necessitate regulatory action.

- 2. Mitigate the future impact of growth in pollutant loads:
- 3. Focus on pollution reduction targets and transition to a credit based financing and accounting system:
- 4. Reaffirm that restoration responsibility starts and ends with the states: ...The state also has the opportunity to fully embrace nutrient pollution trading and innovative public-private partnerships to advance successful implementation.
- 5. Complete a strategy to address the estimated $5.1 billion cost to implement remaining nutrient and sediment reductions. The majority of these costs, approximately 65 percent or $3.3 billion, are associated with meeting urban stormwater management permit obligations by the ten Phase I MS4 jurisdictions and the Maryland Department of Transportation's State Highway Administration.
- 6. Recognize that success doesn't end in 2025: It is important to stress that the ultimate financing and restoration goal is not solely to achieve the 2025 pollution reduction requirements, but to also maintain those reductions over time.

Where we are today?

- Surplus Large WWTP loading capacity credit may allow the State to meet its overall 2025 WIP targets, even if some pollutant sectors, i.e., septics, stormwater, do not reach their its final targets by 2025. There are many demands on this capacity.
- WWTP capacity will be diminishing over time as the State's population continues to grow. The time horizon has been estimated to be out to about 2035-40 and MDE/MDP are currently revisiting the estimates.
- The 20% stormwater restoration requirement was a significant lift that stretched MS4 resources, e.g., financially and physically, to their maximum ability for implementation
- Lessons learned under the current permit and the FAP planning process have provided important information regarding the MS4s' fiscal and implementation capacity
- Water quality trading regulations are now in draft. WWTP capacity credits are not available for sale as part of this program and only performance credits can be purchased. This does not preclude the state from developing an implementation plan that considers the use of capacity credits.

- The stormwater sector's strategy for 2017 was building upon the 10% restoration requirement in previous permits, and adding 20% restoration requirement that is now being implemented in current permits, for a total of 30% restoration by 2017

Where do we go from here?

- We now have new information from the past seven years, that includes both physical and financial implementation capacity. We must use this information to establish a path forward for both the next MS4 permit and the Phase III WIP
- Some questions to consider
    - Using new information, what are the jurisdiction's time horizons for meeting the 10%+20% restoration requirement?
    - Using information gained through this process, how we estimate the time horizon for the stormwater sector's ability to meet the final WIP target?
    - Is there a "sweet spot" where the diminishing WWTP capacity credit and the MS4s' growing capacity to implement stormwater controls intersect?
    - What do jurisdictions see as opportunities for water quality trading and also using performance based WWTP credits?
    - How does trading, public-private partnerships, and long-term BMP maintenance factor into this equation?
- *Our goal today is to work with the MS4s to develop the necessary road map, and possibly a formula, to implement in future MS4 permits that can successfully achieve local and State water quality goals and restoration of the Bay*
- Let's take a look at some guiding principles for our discussion today. (see attached)

From: "Karl Berger" <kberger@mwcog.org>
Sent: Tue, 29 Aug 2017 15:34:12 +0000
To: "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>
Cc: "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>; "Lynn Buhl -MDE- (lynn.buhl@maryland.gov)" <lynn.buhl@maryland.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "JPGill@co.pg.md.us" <JPGill@co.pg.md.us>; "Jeff DeHan" <jmdehan@co.pg.md.us>; "Jerry Maldonado" <jgmaldonado@co.pg.md.us>; "Amy.Stevens@montgomerycountymd.gov" <Amy.Stevens@montgomerycountymd.gov>
Subject: Planning for Sept. 12 meeting
Attachments: Survey of MS4 Permit MEP Considerations.draft survey.8 4 17.AA draft response.docx

Lee,

As usual, a not-so-lazy summer is accelerating into a formidable fall. Our next meeting, scheduled for Tuesday afternoon, Sept. 12 from 1 – 3 p.m. at the Prince George's County DoE offices, is only two weeks away.

The MS4s are working on filling out the survey regarding permit challenges that was developed out of our last meeting on July 24. I provided a draft of this questionnaire with initial responses from Erik Michelson of Anne Arundel County a few weeks back (attached again). We were hoping that MDE staff might have some suggestions for improving the questionnaire, but we will go ahead with what we have.

The MS4s also have asked MDE to provide a preliminary schedule for how the revoke-and-reissue option can be achieved by the end of 2018 deadline, with interim milestones. Although I think all of the MS4s support the path forward envisioned at the end of the last meeting, there is concern that we will not have time to implement it before some of the current permits expire.

So to sum up:

Sept 12 agenda items:

- Permit challenges survey results (from MS4s)
- Schedule for revoke-and-reissue option (from MDE)

Other items?

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments

202-962-3350

NPDES Permit

County / Municipal Survey

Challenges Affecting Restoration Implementation Targets

The purpose of this survey is to better understand and consider municipal restoration challenges in meeting Chesapeake Bay targets and timelines prescribed in the State's WIP I, II, and forthcoming WIP III. This survey will be utilized by all participating counties and municipalities to highlight challenges encountered while implementing various programs under the MS4 which are contributory to the Bay restoration.

Jurisdiction: Anne Arundel County

Respondent: Erik Michelsen, Administrator, Watershed Protection & Restoration Program

I. Revenues / Resources

The following questions should be answered from the perspective of the County's or Municipality's age of stormwater management (SWM) programs. Typically the SWM programs in Maryland began in 1985 requiring revenues to fund Stormwater for attenuating discharges and sediment control. In 2002, the State increased its focus to also address water quality by issuing new standards for ESD. Acknowledging that revenues continue to stream in annually, describe the health of the SWM funds in relation to the debt service (principal & interest) on typical 20-year bond repayment term. Are the revenue streams saturated debt service obligations?

A. Percent Debt Service (By Fund Type)

Debt service is currently approximately 15% of annual revenues, but is expected to grow rapidly as capital implementation increases.

B. Percent revenue capacity (debt ceiling) to support additional bond debt service for sustained long term restoration expenditures.

The approximate borrowing capacity of the Watershed Protection and Restoration Fund at the current revenue level is $300 million. Currently, nearly all those dollars have been authorized.

C. Does the County or Municipality fully or partially fund the stormwater and water quality programs from general tax revenues? Please explain.

The vast majority of the revenue for the MS4 program comes from the County's Watershed Protection and Restoration Fee (WPRF). In FY18, there were supplemental General Fund dollars added to the Fund, with the expectation that that amount will increase into the future.

D. Does the County or Municipality collect dedicated revenues for the specific purposes of stormwater management and water quality? Please explain.

Yes, the County has a Watershed Protection & Restoration Fee assessed as a charge on existing impervious surfaces. The charge per ERU (2,940 sf) is currently $85/year.

II. Bond Types

A. Please describe how the County or Municipality presently funds its restoration programs (capital) for new or retrofit construction? and if they compete for the same dollars with other programs?
   i. General obligation bonds
   ii. Stormwater management bonds
   iii. State Revolving Loans

Currently, the only bond funding source for MS4 capital projects is WPRF bonds. They only compete with gray stormwater infrastructure projects for funding.

B. For revenues collected, does the County or Municipality sell bonds, use State Revolving Funds, or other to cover the cost of capital restoration?

The County sells WPRF bonds against its annual WPRF revenues.

III. Pay Go

A. To cover the cost of restoration is the County or Municipality restricted to the sole use of Paygo?

No, the County uses bonds to support capital project implementation. Paygo is used to pay the debt service.

B. What is the annual revenue allocated for water quality restoration work?

Approximately $50M/year in bond authorization over the 5-year life of the permit.

C. Are there other competitive programs (non-stormwater) utilizing the same revenue stream?

No.

IV. Cost of restoration (implementation)

The Chesapeake Bay region has been experiencing a higher demand for consultant and construction services, describe the impact this demand has on your County or Municipality as it relates to the following?

A. The variability of construction costs vs. King Study

Generally speaking, costs seem to be within about 5-10% of the King and Hagan costs for major project categories. Construction costs have definitely increased significantly since recession-era prices.

B. Cost depending on Contractor Capacity

Contractors are clearly busier than they were 3-4 years ago, though we routinely get 3-5 bids on construction projects.

C. Cost based on BMP type

Costs for LID/ESD practices seem to diverge most heavily from the King and Hagan report, with costs of $250-350k/acre routinely being reported by major, urban jurisdictions.

D. Permitting

The uncertainty of permitting, at the local, state, and federal government level has driven permitting costs up considerably. Though some progress has been made, there still seem to be insufficient processes in place to expedite restoration activity.

E. Land acquisition, easements

Working on private property, for Anne Arundel County, requires either easements or fee simple purchase. That component of a project, if all moves smoothly, routinely takes 6-12 months.

F. Staff costs/overhead to manage increased workload

Staffing expansion was built into the creation of the Watershed Protection and Restoration Program. In order to build our project management staffing capacity, it took roughly 3 years of vetting and hiring. Anecdotally, the private sector too is having difficulty hiring people to serve as project managers as well.

V. Cost for Operations and Maintenance (Post Construction)

A. Is the County or Municipality tasked to maintain all stormwater management and water quality related infrastructure as part of the public service?

The County maintains all public stormwater infrastructure (e.g., conveyance and BMPs). Private stormwater infrastructure is maintained by the property owner.

B. Given that maintenance costs cannot be covered through bond financing, are current maintenance costs competing for the same dollars described in the Revenues section of this survey, to cover other non-stormwater costs?

They are not competing against non-stormwater costs, but they are competing against debt service costs, as well as the other operational costs (e.g., personnel, monitoring) to carry out the broader obligations of the MS4 permit.

C. What is the distribution percentage of collected revenues (operating) allocated annually for maintenance?
   i. Traditional Costs for typical BMPs
   ii. O&M Stormwater and Water Quality
   iii. SWM Gray Infrastructure

Approximately 5-7% of operating revenues are dedicated to BMP maintenance on an annual basis, with another $6.3M in capital funding (and its accompanying debt service) being used for the repair and replacement of SWM gray infrastructure on an annual basis.

VI. NPDES Permit Implementation Cost for Compliance (operating only)

A. What is the County or Municipal annual operating cost needed to support programs listed under the NPDES MS4 Permit?

(Cost should include staff, overhead, studies, restoration plans, monitoring, public participation, stormwater management plan review, sediment and erosion control, annual report preparation, and geodatabase maintenance)

Current operating costs (which include debt service on capital bonds) are approximately $22 M/year.

VII. Restoration Land Availability (what can be treated)

A. The following questions should address the ability or limitations of property access by a County or Municipality to treat and install BMP devices. Indicate challenges by type and the percent of eligible land types against MS4 footprint and percent remaining for treatment?
   i. Private Land (i.e. cost, access, owner participation)
   ii. Park Land
   iii. School Property
   iv. Public Property
   v. SHA Property
   vi. Federal Property
   vii. State Property

All classes of property above present their own unique challenges. Private land, if there is landowner cooperation, is perhaps the most straightforward. It requires a permanent easement or fee simple purchase from the property owner. School property requires the affirmative agreement of the school system, who may have programmatic needs for their property that they are not willing to sacrifice for stormwater projects, and who may not have any particular interest in participating, given that they are not named as co-permittees. Discussions around using parkland and other public properties involve coordination with the agencies who control those properties and an accommodation of their needs or intended uses. Anne Arundel County currently has an MOU in place with SHA, and conducts quarterly coordination meetings with SHA to discuss joint projects and projects that may occur on one another's properties. Generally speaking, Anne Arundel County has not pursued projects on State or Federal Property.

VIII. Time of Performance

A. Explain through the following categories, the County or Municipality concerns relating to time performance affecting the implementation of restoration projects?

i. Annual budget process (Budget, Finance, Procurement, Council)

This process routinely takes 9 months, starting in September of any given year, with the budget approved by July of the following year.

ii. County Procurement (Bids and Project Award)

Depending on the design procurement vehicle used, this process can take between 30 to 180 days. The shorter procurement timeframes are for open end and task order contracts, which took approximately 1 year to put in place originally.

iii. Project Planning

Project planning, including agreement on conceptual design, routinely takes 3 to 6 months.

iv. Project Design (consultant services, resources)

Project design, depending on the complexity of the project can take between 1 to 2 years.

v. Utility conflicts (gas, Water, Sewer, power, cable, etc.)

If Utility conflicts are present, they can routinely add 3 to 6 months to the construction of a project, and hundreds of thousands of dollars in construction costs.

vi. Permitting (county, state, federal)

Permitting timeframes are highly variable depending on the complexity of the project but can range from 3 months to 3 years+.

vii. Procurement (specific restrictions imposed by a County or Municipality)

viii. Construction (contractor availability, expertise, etc.)

Construction procurement for larger projects ($500k+) routinely takes 6 months. For smaller projects, it can take 30 days, using blanket order construction contracts. Similar to the shorter design contracts, this process took approximately 1 year to put in place originally.

ix. Maintenance (high number of ESD's versus Pond retrofits)

Maintenance, if funding is available, can be accomplished fairly quickly using blanket order contracts.

x. Seasonal work (constraints limiting restoration to certain times of the year)

Fish closures and other seasonal constraints can easily shut down work for between 3 to 6 months of the year.

xi. Community acceptance to certain BMPs. (street bump outs, tree planting, etc.)

We factor in approximately 1 year of community outreach for projects which are likely to attract strong community interest or opposition.

xii. Addressing existing conditions before restoration (substandard drainage systems)

To the extent possible, we try to address drainage concerns concurrently with our restoration work.

IX. Potential Project Costs Increases

A. Describe the impact on project cost escalation associated with restoration advancing projects advancing through initial project inventories ("low hanging fruit") to advanced cohorts of project inventories?
   i. Site Constraints
   ii. Public Acceptance
   iii. Land Owner Issues
   iv. Perceived Public Safety
   v. Community Priorities
   vi. Extent of Public Relations
   vii. Other

As the "low hanging fruit," stormwater facility retrofits on property that the County controls, are completed, the amount of energy and time required to get community acceptance, easements/property acquisition, increases dramatically. Permitting time is expected to increase significantly as well. We should have a better handle on these differential costs within the next 2 years or so.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Fri, 1 Sep 2017 19:29:31 +0000
To: "'JPGill@co.pg.md.us'" <JPGill@co.pg.md.us>; "Lisa Feldt" <Lisa.Feldt@montgomerycountymd.gov>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Jeff DeHan" <jmdehan@co.pg.md.us>; "Jerry Maldonado" <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Shofar, Steven" <Steven.Shofar@montgomerycountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Amy.Stevens@montgomerycountymd.gov" <Amy.Stevens@montgomerycountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Karen Coffman" <kcoffman@sha.state.md.us>; "'rshreeve@sha.state.md.us'" <rshreeve@sha.state.md.us>; "Janis Markusic" <pwmark02@aacounty.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>
Subject: FW: MS4 Permit challenges survey template -- feedback requested

MD MS4 managers,

Please see message below from Ray Bahr regarding some new thinking re path forward, responses to the survey (no longer needed) and some new information MDE is seeking ahead of our Sept. 12 meeting.

I think we will want to convene a call to discuss this ahead of the Sept. 12 meeting. I will be in touch early next week re times for such a call.

From: Raymond Bahr -MDE- [mailto:raymond.bahr@maryland.gov]
Sent: Friday, September 01, 2017 3:09 PM
To: Karl Berger <kberger@mwcog.org>
Cc: jenniferm.smith@maryland.gov; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: MS4 Permit challenges survey template -- feedback requested

Hi Karl,

MDE met today and our latest thinking is to issue a permit modification. There are many reasons for this that we can explain further at our upcoming MACO meeting, but the primary one is that the Department is getting ready to release trading regulations. Once they are formally adopted, MS4s can simply request a permit modification to use them.

So basically, we no longer need a long litany of reasons why the permits are physically impossible, which was the point of the survey. What we do need though, is that for each jurisdiction that wants to use trading with a local WWTP to meet MS4 permit reqirements:

- What WWTP facility will they be trading with and what TN concentration can that plant operate at ?

For example, if performance credits were to be allowed for concentrations below 3.5 mg/l, then what concentration and TN lbs reduced is achievable locally. Current MS4 Guidance allows an equivalent impervious acre of credit for every 8 lbs of TN reduced.

MDE thinks that it is more important for us to have this WWTP information at this time rather than gathering the survey information that we recently came up with.

Please share this with the MACO group not under litigation and let us know preliminary results by September 9, 2017, so that we can discuss further at our meeting on September 12, 2017.

Finally, I will be out the next three weeks on vacation, so please work with both Jennifer and Stew on these important matters.

Thank you,

Ray

On Tue, Aug 29, 2017 at 3:56 PM, Karl Berger <kberger@mwcog.org> wrote:

> Ray,
>
> I did just send it out. But I will tell them to hold up until we hear back from you. The sooner the better. True, a lot of folks are still on vacation and lots of other work to do. But this is a priority for them.
>
> **From:** Raymond Bahr -MDE- [mailto:raymond.bahr@maryland.gov]
> **Sent:** Tuesday, August 29, 2017 3:49 PM
> **To:** Karl Berger <kberger@mwcog.org>
> **Cc:** jenniferm.smith@maryland.gov
> **Subject:** Re: MS4 Permit challenges survey template -- feedback requested
>
> Hi Karl,
>
> Thanks for your patience.
>
> We have reviewed the survey and discussed in-house and have another meeting this Friday to discuss permit renewal issues. After that, either Jennifer or I will give you a call and let you know what we need for the survey. I request that you hold off distributing it to the MS4s at this time as I am sure that everyone is busy with other stormwater work.
>
> Ray
>
> On Tue, Aug 8, 2017 at 1:13 PM, Karl Berger <kberger@mwcog.org> wrote:
>
> > Ray and Jennifer,
> >
> > Attached is a survey questionnaire that the MS4s developed from our afternoon session at the July 24 meeting. It also includes initial responses from Erik Michelson of Anne Arundel County. We'd like you to review and comment, responding, in particular, to the following questions:

- Is this the sort of information that, when coupled with the FAP reports from 2016*, MDE is seeking to make the case for revoke and reissue?

- Is this the proper level of detail? Would summarizing the data in charts or other graphs be useful?

- Are there other areas of information that should be included?

Also, we would like MDE staff to provide us with a preliminary schedule for how the revoke-and-reissue option can be achieved by the end of 2018 deadline, with interim milestones.

* Here is a table I put together when the FAP reports first emerged. There may be some subsequent changes that have occurred. Certainly, a number of the MS4s have been adjusting their implementation plans based on updated information since the plans were developed. But it provides some illustration of the challenges of meeting the 20% ISR goal strictly through implementation of capital BMP projects.

	Acres Required to be Treated	Trading	Septic pumping	Street sweeping	Stormdrain cleaning
Anne Arundel	5,862	Y, 2,044 acres	Y, 100 acres	Y, 550 acres	N
Baltimore City	4,291	N	N	Y, 3,175 acres	Y, 215 acres
Baltimore Co	6,036	N	Y, 56.1 acres	Y, 519 acres	Y, 44.55 acres
Carroll	1,344	N	N	N	N
Charles	1,410	Y, 713 acres	Y, 25 acres	Y, 80 acres	Y, 14 acres
Frederick	1,013	Y, 255.8 acres	N	N	N
Harford	1,883	Y, 940 acres	Y, 300 acres	N	N
Howard	2,044	N	Y, 270 acres	N	N
Montgomery	3,777	N	N	N	N
Prince George's	6,105	N	N	Y, 2000 acres	N

Karl Berger

Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

--

Raymond P. Bahr
Program Review Division Chief
Sediment, Stormwater, and Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1708
(410) 537-3545

Click here to complete a three question customer experience survey.

--

Raymond P. Bahr
Program Review Division Chief
Sediment, Stormwater, and Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1708
(410) 537-3545

Click here to complete a three question customer experience survey.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 11 Sep 2017 18:45:04 +0000
To: "'JPGill@co.pg.md.us'" <JPGill@co.pg.md.us>; "Lisa Feldt" <Lisa.Feldt@montgomerycountymd.gov>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Jeff DeHan" <jmdehan@co.pg.md.us>; "Jerry Maldonado" <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Shofar, Steven" <Steven.Shofar@montgomerycountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Amy.Stevens@montgomerycountymd.gov" <Amy.Stevens@montgomerycountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Karen Coffman" <kcoffman@sha.state.md.us>; "'rshreeve@sha.state.md.us'" <rshreeve@sha.state.md.us>; "Janis Markusic" <pwmark02@aacounty.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>
Subject: Revised agenda for Sept. 12 MDE-MS4 meeting
Attachments: MDE-MS4 Meeting Agenda for 091217.final.docx

Folks,

Based on feedback from MDE staff, I have revised the agenda for tomorrow's meeting. Basically, I have listed the presentations that MDE staff will provide as numbered agenda items and listed the major discussion topics that we want to address as bulleted items.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MS4 and MDE Meeting
Sept. 12, 2017

Prince George's County DoE, Potomac Conference Room
Tuesday, Sept. 12, 1 - 3 p.m.

2017 original quarterly meeting schedule

- ~~March 14~~ March 29
- ~~June 13~~
- Sept. 12
- Dec. 12

Agenda

1. Introductions / Opening Remarks (MDE – Lee Currey)

2. Presentation of Gap Analysis (MDE - Greg Busch)

3. Options for Current Permit (MDE - Jennifer Smith)

4. Proposed Restoration Framework for Next Generation Permit (MDE - Jennifer Smith)

5. Information Needed from Phase I Permittees (MDE - Lee Currey)

MS4 group questions – to be addressed during discussion

- Major modification/trading vs. revoke and reissue
- Proposed schedule / fit with trading regulations
- How much reduction does state need from stormwater sector in 2025
- Wastewater performance baseline – 4 mg/l vs. 3.5
- Need for trading options beyond jurisdictional wastewater plants
- Cap on use of credits for meeting current restoration requirement acreage targets
- Trading option in next permit cycle

6. Next Steps/Future Meeting Schedule
    a. Need for full group to meet

From: "Karl Berger" <kberger@mwcog.org>
Sent: Tue, 17 Oct 2017 13:05:42 +0000
To: "'JPGill@co.pg.md.us'" <JPGill@co.pg.md.us>; "Lisa Feldt" <Lisa.Feldt@montgomerycountymd.gov>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>
Cc: "Jeff DeHan" <jmdehan@co.pg.md.us>; "Jerry Maldonado" <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Amy.Stevens@montgomerycountymd.gov" <Amy.Stevens@montgomerycountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: FW: Phase 1 MS4 Permit Template - Version: 2016 10 16
Attachments: Draft Next Gen MS4 Permit - 10_16_2017.docx, Restoration Memorandum 10_16_2017.docx

MS4 managers,

Here is MDE's draft for the new permit template.

For discussion at our Oct. 27 meeting, ahead of the Nov. 14 meeting with MDE.

From: Lee Currey -MDE- [mailto:lee.currey@maryland.gov]
Sent: Monday, October 16, 2017 5:44 PM
To: Caitlin Wall <wall@potomac.org>; Karl Berger <kberger@mwcog.org>
Cc: Raymond Bahr -MDE- <raymond.bahr@maryland.gov>; Jennifer Smith -MDE- <jenniferm.smith@maryland.gov>; Gregory Busch -MDE- <gregory.busch@maryland.gov>; Lynn Buhl -MDE- <lynn.buhl@maryland.gov>
Subject: Phase 1 MS4 Permit Template - Version: 2016 10 16

Karl and Caitlin:

I want to thank you for your time and feedback in working to collaboratively develop the next generation Phase I MS4 permit template. We appreciate the comments received and thoughtful discussions that have occurred over the past several months and have made every effort to find a balanced solution to tough issues such as stormwater restoration requirements and future monitoring in this first draft. We have also captured an emerging environmental concern, the usage of road salt, where solutions have the potential to result in both environmental and economic gains.

The thinking underlying this first draft is to learn from our experience and use this to find the best path forward for advancing restoration of local waters and the Chesapeake Bay. To that end, please find attached a draft version of the next Phase I MS4 permit template. Also, attached is a memo that

describes the assumptions used in the restoration formula included in the draft permit template. The actual numbers used in this draft template are for example only.

We respectfully request that you provide us with comments by November 15. We are also working to schedule meetings with each of you for further discussion and feedback. I think we already have a meeting with MACO scheduled. I would also like to know if the two groups would be interested in a joint meeting to discuss any issues you may have related to this draft. Recall that we have committed to deliver a draft permit template to EPA by December 22, which is quickly approaching.

Please forward this email and attachments to the appropriate members in your respective groups.

We look forward to you feedback,

Lee

--
D. Lee Currey, Director
Water and Science Administration
Maryland Department of the Environment (MDE)
Montgomery Park
1800 Washington Blvd., Ste. 4502
Baltimore, MD 21230-1718
Office: 410-537-3567
lee.currey@maryland.gov
www.mde.state.md.us
www.facebook.com/MDEnvironment
www.twitter.com/MDEnvironment

MARYLAND DEPARTMENT OF THE ENVIRONMENT

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

PART I. IDENTIFICATION

A. Permit Number: XX-XX-XXXX XXXXXXXXX

B. Permit Area

This permit covers all stormwater discharges from the municipal separate storm sewer system (MS4) owned or operated jurisdiction-wide by XXXXX County/City/Agency, Maryland.

C. Effective Date: To be determined (TBD)

D. Expiration Date: TBD

PART II. DEFINITIONS

Terms used in this permit are defined in relevant chapters of Title 40 of the Code of Federal Regulations (CFR) Parts 122 - 124 or the Code of Maryland Regulations (COMAR) 26.08.01, 26.17.01, and 26.17.02. Terms not defined in CFR or COMAR shall have the meanings attributed by common use.

PART III. WATER QUALITY

XXXXX County/City/Agency must manage, implement, and enforce stormwater management programs in accordance with the Clean Water Act (CWA) and corresponding stormwater National Pollutant Discharge Elimination System (NPDES) regulations, 40 CFR Part 122, to meet the following requirements:

1. Effectively prohibit pollutants in stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with Maryland's receiving water quality standards;

2. Attain applicable stormwater wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with Title 33 of the U.S. Code (USC) §1342(p)(3)(B)(iii); 40 CFR §122.44(k)(2) and (3); and

3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with all the conditions contained in PARTs IV through VII of this permit shall constitute compliance with §402(p)(3)(B)(iii) of the CWA and adequate progress toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs for this permit term.

PART IV. STANDARD PERMIT CONDITIONS

A. Permit Administration

XXXXX County/City/Agency shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County/City/Agency shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County/City/Agency shall submit in its annual reports to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

B. Legal Authority

XXXXX County/City/Agency shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County/City/Agency shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County/City/Agency's annual report.

C. Source Identification

Sources of pollutants in stormwater runoff jurisdiction-wide shall be identified by XXXXX County/City/Agency and linked to specific water quality impacts on a watershed basis. A georeferenced database shall be submitted annually in accordance with *Maryland Department of the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017),* hereafter (MS4 Geodatabase) that includes information on the following:

1. Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;

2. Industrial and commercial sources: industrial and commercial land uses and sites that the County/City/Agency has determined have the potential to contribute significant pollutants;

3. Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;

4. Impervious surfaces: public and private land cover delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;

5. Monitoring locations: locations established by the County/City/Agency for chemical, biological, and physical monitoring of watershed restoration efforts and the *2000 Maryland Stormwater Design Manual,* or as part a pooled monitoring approach as described in Part IV.F; and

6. Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.

D. Management Programs

The following management programs shall be implemented jurisdiction-wide by XXXXX County/City/Agency. These management programs are designed to control stormwater discharges and reduce associated pollutant loadings to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems.

1. Stormwater Management

An acceptable stormwater management program shall be maintained by the County/City/Agency in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the *2000 Maryland Stormwater Design Manual*. This includes:

   i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;
   ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and
   iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.

b. Maintaining programmatic and implementation information including, but not limited to:

i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;
ii. Number of redevelopment projects received;
iii. Number of stormwater exemptions issued; and
iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.

Stormwater program data shall be recorded in MDE's MS4 Geodatabase and submitted as required in PART V of this permit.

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by the County/City/Agency.

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County/City/Agency's annual reports.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall be maintained by the County/City/Agency and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the County/City/Agency's erosion and sediment control enforcement authority;

b. Ensure that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE;

c. Program activity shall be recorded in MDE's MS4 Geodatabase and submitted as required in PART V of this permit; and

d. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

3. Illicit Discharge Detection and Elimination

The County/City/Agency shall implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:

a. Field screening at least 150 outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit. An alternative program may be submitted by the County/City/Agency for MDE approval that methodically identifies, investigates, and eliminates illegal discharges to the County/City/Agency's MS4;

b. Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;

c. Maintaining a program to address, and if necessary, respond to illegal discharges, dumping, and spills;

d. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting; and

e. Reporting illicit discharge detection and elimination activities in MDE's MS4 Geodatabase and as specified in PART V of this permit.

4. Litter and Floatables

The County/City/Agency shall evaluate current litter control problems associated with discharges from its MS4 and develop and implement a public outreach and education program as needed on a watershed by watershed basis.

a. As part of the County/City/Agency watershed assessments under PART IV.E.1 of this permit, the County/City/Agency shall document all litter

control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.

b. The County/City/Agency shall implement a public education and outreach program to reduce littering and increase recycling. This shall include, but not be limited to:

i. Educating the public on the importance of reducing, reusing, and recycling;
ii. Disseminating information by using signs, articles, and other media outlets; and
iii. Promoting educational programs in schools, businesses, community associations, etc.

c. Evaluating annually the effectiveness of the education program.

d. Submit annually, a report which details progress toward implementing the public education and outreach program. The report shall describe the status of public outreach efforts including resources (e.g., personnel and financial) expended and the effectiveness of all program components.

5. Property Management and Maintenance

a. The County/City/Agency shall ensure that a Notice of Intent (NOI) has been submitted to MDE and a pollution prevention plan developed for each County/City/Agency owned industrial facility requiring NPDES stormwater general permit coverage. A list of these properties shall be updated and submitted to MDE annually.

b. The County/City/Agency shall develop, implement, and maintain a good housekeeping plan (GHP) for County/City/Agency owned properties not required to be covered under an NPDES Industrial Stormwater Discharge Permit, where the following activities are performed: maintenance or storage of vehicles or equipment; use, handling, transport, or storage of fertilizers, pesticides, landscaping materials, or hazardous materials or other materials that could pollute stormwater runoff. A standard GHP may be created to address multiple properties where similar activities are conducted. The GHP shall include, but not be limited to:

i. A description of site activities;
ii. A site map identifying all buildings; stormwater conveyances including ditches, pipes, and swales; direction of stormwater flow (use arrows); water bodies receiving discharges; and locations of all existing

structural control measures or BMPs;

iii. A list of potential pollutants and their sources and locations, including run-on from adjacent properties;

iv. Written good housekeeping procedures designed to reduce the potential for stormwater pollution from the property;

v. Procedures for routine site inspections to detect and correct stormwater discharges, releases, and any spills or leaks; and

vi. Documentation of any discharge, release, leak, or spill, including date, findings, and response actions.

c. The County/City/Agency shall ensure that appropriate staff and private contractors receive training annually. The training shall be designed to reduce or eliminate the discharge of pollutants during municipal operations. Topics shall include spill prevention and response, proper disposal of waste, and routine inspections to detect and correct potential discharges from properties owned or operated by the County/City/Agency.

d. The County/City/Agency shall continue to implement a program to reduce pollutants associated with the maintenance of jurisdiction-wide properties including local roads and parks. The maintenance program shall include the following activities where applicable:

i. Street sweeping;
ii. Inlet inspection and cleaning;
iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management;
iv. Stabilization of eroded areas;
v. Litter removal; and
vi. Pet waste removal.

e. The County/City/Agency shall reduce the use of winter weather deicing materials by developing a County/City/Agency Salt Management Plan (SMP) to be submitted to MDE in its second year annual report. The SMP shall be based the guidance provided on best road salt management practices described in *the Maryland Department of Transportation, State Highway Administration's Maryland Statewide Salt Management Plan, October 2017*. The County/City/Agency's SMP shall include, but not be limited to:

i. County/City/Agency technological improvements that limit salt application rates

- Hybrid rubber plow blades

- Improved salt spreaders/spinners attached to dump trucks
- Software that tracks salt application locations and rates
- Use of specialty equipment such as snow blowers and front end loaders
- Installing tow plows that increase the effectiveness of plow trucks
- Using materials such as sand or brine
- Using loader scales for the equipment filling the trucks

ii. Training and outreach

- Creating a local "Salt Academy" that annually provides County/City/Agency personnel and contractors with the latest training in salt management, or the participation of County/City/Agency personnel and contractors in a "Salt Academy" administered by another MS4 jurisdiction or State agency
- Developing best salt management practices outreach for educating private landscapers, commercial snow removal businesses, and homeowners within the County/City/Agency

iii. Tracking and reporting

- During storm events where de-icing materials are applied to County/City/Agency roads, track and record the amount of de-icing materials used and snowfall per event
- Report the salt application by event or date, and the monthly and annual salt tonnage usage per lane mile per inch of snow

f. The County/City/Agency shall report annually on the changes in its Property Management and Maintenance programs and the overall pollutant reductions resulting from these programs.

6. Public Education

The County/City/Agency shall continue to implement a public education and outreach program to reduce stormwater pollutants. Outreach efforts may be integrated with other aspects of the County/City/Agency's activities. These efforts are to be documented and summarized in each annual report. The County/City/Agency shall implement a public outreach and education campaign with specific performance goals and deadlines including, but not limited to:

a. Maintaining a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

b. Providing information to inform the general public about the benefits of:

i. Increasing water conservation;
ii. Residential and community stormwater management implementation and facility maintenance;
iii. Proper erosion and sediment control practices;
iv. Increasing proper disposal of household hazardous waste;
v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal, cash for clippers, etc.);
vi. Residential car care and washing; and
vii. Proper pet waste management.

E. Restoration for Total Maximum Daily Loads and Chesapeake Bay

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable stormwater WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Attachment B). Additionally, the nutrient reductions that will result from the restoration requirements described below are consistent with Maryland's Phase III Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL, contributing to the State's efforts to meet its 2025 nutrient load targets. Annually, XXXX County/City/Agency shall provide MDE with jurisdiction-wide watershed assessments and impervious surface and TMDL restoration plans, perform required restoration activities, report on implementation status, and provide for opportunities for public participation.

1. Watershed Assessments

a. The County/City/Agency shall complete watershed assessments jurisdiction-wide and update as necessary. Watershed assessments conducted during previous permit cycles may be used to comply with this requirement, provided the assessments include all of the items listed in PART IV.E.1.b. Assessments shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County/City/Agency water quality analysis.

b. Watershed assessments by the County/City/Agency shall:

i. Determine current water quality conditions;
ii. Include the results of a visual watershed inspection;
iii. Identify and rank water quality problems; and
iv. Prioritize all structural and nonstructural water quality

improvement projects.

2. Impervious Surface Restoration

   a. The County/City/Agency shall commence and complete the restoration of 2,500 unmanaged impervious acres during this permit term with stormwater management BMPs and alternative practices in accordance with the latest version of MDE's *Accounting for Stormwater Waste Load Allocations and Impervious Acres Treated* (MS4 Guidance). These BMPs shall be implemented to replace any nutrient and sediment credits that were acquired by the County/City/Agency under its prior permit term.

   b. All nutrient and sediment credits acquired during the prior permit term shall be verified annually in accordance with the requirements of the Water Quality Trading Regulations (COMAR xxxxxx) until they are replaced by stormwater management BMPs and alternative practices in accordance with Maryland's MS4 Guidance.

   c. The County/City/Agency shall continue to work toward impervious surface restoration beyond the 2,500 impervious acres required under this permit term. Restoration of an additional 2,500 unmanaged impervious acres shall be required in subsequent permit terms for making progress toward meeting all EPA approved stormwater WLAs within the County/City/Agency, including those for rivers, lakes, reservoirs, and Chesapeake Bay.

   d. Additional impervious acres restored during this permit term beyond the 2,500 impervious acres required shall be credited toward future impervious surface restoration requirements in subsequent permit terms.

   e. For any local TMDL with a stormwater WLA that is approved by EPA subsequent to the issuance of this permit, the County/City/Agency shall submit a restoration plan within one year of that approval date. These plans shall include a detailed schedule and final dates for implementing all structural and nonstructural water quality projects, enhanced stormwater management programs, and alternative stormwater controls for meeting applicable stormwater WLAs.

3. Chesapeake Bay Restoration

   a. Consistent with Maryland's Phase III Chesapeake Bay WIP, the County/City/Agency shall reduce 15,000 lbs of total nitrogen (TN) by the end of this permit term. These reductions are in addition to the TN reductions achieved with the impervious surface restoration required in Part IV.E.2.a and Part IV.E.2.c. The County/City/Agency shall reduce this TN load through any combination of the following approved methods:

i. Implementing stormwater BMPs from the list of practices in the *2000 Maryland Stormwater Design Manual*, including the 2009 supplement for ESD to the MEP, and associated TN load reductions in accordance with Maryland's MS4 Guidance;
ii. Using alternative BMPs, e.g., tree planting, street sweeping, stream restoration, and the associated TN load reductions in accordance with Maryland's MS4 Guidance;
iii. Trading for TN credits in accordance with Maryland's Water Quality Trading Program regulations; and
iv. Innovative practices that have been approved by MDE with monitoring data that documents pollutant load reductions.

4. Implementation Status

a. For tracking progress within this permit term, the County/City/Agency shall propose in its first year annual report:

i. Annual benchmarks for impervious surface restoration, and Chesapeake Bay TN pollutant load reductions; and
ii. Second and fourth year pollutant load reduction benchmarks for all approved stormwater WLAs within the County/City/Agency.

b. The County/City/Agency shall continue to implement, evaluate, and update annually all of its existing plans for each EPA approved TMDL with a stormwater WLA by:

i. Providing detailed information and costs for all completed and proposed projects and programs;
ii. Evaluating and tracking the implementation of impervious surface restoration through monitoring or modeling to estimate the net change in pollutant load reductions or the water quality response and document progress toward meeting established schedules, benchmarks, deadlines, and stormwater WLAs;
iii. Completing the MS4 geodatabase for BMP implementation, impervious area restoration, and Chesapeake Bay and local TMDL reporting; and
iv. Developing an ongoing, iterative process that continuously implements structural and nonstructural restoration projects, program enhancements, new and additional programs, and alternative BMPs when stormwater WLAs are not being met according to established schedules, benchmarks, and deadlines.

5. Public Participation

The County/City/Agency shall provide continual outreach to the public regarding the development of its watershed assessments and restoration plans. Additionally, the County/City/Agency shall allow for public participation in the

TMDL process, solicit input, and incorporate any relevant ideas and program improvements that can aid in achieving stormwater WLAs, TMDL water quality endpoints and water quality standards. The County/City/Agency shall provide:

a. Notice in a local newspaper and the County/City/Agency's web site outlining how the public may obtain information on the development of watershed assessments and stormwater watershed restoration plans and opportunities for comment;

b. Procedures for providing copies of watershed assessments and stormwater watershed restoration plans to interested parties upon request;

c. A minimum 30 day comment period before finalizing watershed assessments and stormwater watershed restoration plans; and

d. A summary in each annual report of how the County/City/Agency addressed or will address any material comment received from the public.

F. Assessment of Controls

XXXXX County/City/Agency shall conduct BMP effectiveness and jurisdiction-wide trend monitoring for tracking progress toward improving local water quality and restoring Chesapeake Bay.

1. BMP Effectiveness Monitoring

By April 5, 2019, the County/City/Agency shall notify MDE which option it chooses for BMP effectiveness monitoring. The two options are:

a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by the Chesapeake Bay Trust (Trust) for determining monitoring needs and selecting appropriate monitoring studies. To implement the required monitoring, the County/City/Agency shall pay a minimum of $XX,XXX (*based on recent cost survey and MS4 annual report data*) annually, pegged to an annual inflation rate as determined by the U.S. Consumer Price Index, into a pooled monitoring Trust fund by July 1 of each year (See *Appendix X – Chesapeake Bay Trust Pooled Monitoring Program)*. Enrollment in the program shall be demonstrated through a memorandum of understanding (MOU) between the County/City/Agency and the Trust. The County/City/Agency shall remain in the program for the duration of this permit term ; or

b. The County/City/Agency shall continue monitoring the (*said*) outfall and (*said*) in-stream station in the (*said*) watershed, or select and submit for MDE's approval a new BMP effectiveness study for monitoring. Monitoring activities shall occur where the cumulative effects of watershed restoration activities, performed in compliance with this permit, can be assessed. The

minimum criteria for chemical, biological, and physical monitoring are as follows:

i. Chemical Monitoring:

- Twelve (12) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;
- Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;
- At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136, and event mean concentrations (EMCs) shall be calculated for the following parameters:

Biochemical Oxygen Demand BOD_5	Total Lead
Total Kjeldahl Nitrogen (TKN)	Total Copper
Nitrate plus Nitrite	Total Zinc
Total Suspended Solids	Total Phosphorus
Total Petroleum Hydrocarbons (TPH)	Hardness
E. coli or enterococcus	

- Continuous flow measurements shall be recorded at the in-stream monitoring station or other practical locations based on the approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models.

ii. Biological Monitoring:

- Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and in-stream stations or other practical locations based on an MDE approved study design; and
- The County/City/Agency shall use the Maryland Biological Stream Survey (MBSS) protocols.

iii. Physical Monitoring:

- A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on the approved study design. This

assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;

- A stream habitat assessment shall be conducted using techniques defined by MBSS; and
- A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

iv. Annual Data Submittal: The County/City/Agency shall describe in detail its monitoring activities for the previous year and include the following:

- EMCs submitted on MDE's long-term monitoring MS4 Geodatabase as specified in PART V below;
- Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations; and
- Any requests and accompanying justifications for proposed modifications to the monitoring program.

2. Jurisdiction-Wide Trend Monitoring

By April 5, 2019, the County/City/Agency shall notify MDE which option it chooses for jurisdiction-wide trend monitoring. The two options are as follows:

a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by the Trust for determining appropriate jurisdiction-wide trend monitoring. To implement the required monitoring, the County/City/Agency shall pay a minimum of $XX,XXX (*based on recent cost survey and MS4 annual report data*) annually, pegged to an annual inflation rate as determined by the U.S. Consumer Price Index, into a pooled monitoring Trust fund by July 1 of each year (See *Appendix X – Chesapeake Bay Trust Pooled Monitoring Program)*. Enrollment in the program shall be demonstrated through an MOU between the County/City/Agency and the Trust. The County/City/Agency shall remain in the program for the duration of this permit term; or

b. The County/City/Agency shall annually perform trend monitoring for biological, bacteria, and chloride impairments, according to the following guidelines:

i. Biological and habitat assessment monitoring of XX randomly selected stream sites using MBSS protocols;

ii. Bacteria, i.e., E. coli, enterococcus, or fecal coliform, monitoring according to MDE guidance (see Appendix Y). Samples shall be collected at regular intervals once per month, and shall be characterized as storm or base flow;
iii. Chloride assessments through hourly conductivity monitoring at XX locations (see Appendix Z); and
iv. Alternatively, the County/City/Agency may submit a comprehensive plan for jurisdiction-wide trend monitoring for biological, bacteria, and chloride for MDE's review and approval by April 5, 2019.

G. Program Funding

1. Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted by XXXXX County/City/Agency as required in PART V below.

2. Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. Annual Reporting

1. Annual progress reports, required under 40 CFR 122.42(c), will facilitate the long-term assessment of XXXXX County/City/Agency's NPDES stormwater program. The County/City/Agency shall submit annual reports on or before the anniversary date of this permit and post these reports on the County/City/Agency's website. All information, data, and analyses shall be based on the fiscal year and include:

   a. An executive summary on the status of implementing the County/City/Agency's MS4 programs that are established as permit conditions including:

      i. Permit Administration;
      ii. Legal Authority;
      iii. Source Identification;
      iv. Stormwater Management;
      v. Erosion and Sediment Control;
      vi. Illicit Discharge Detection and Elimination;
      vii. Litter and Floatables;
      viii. Property Management and Maintenance;
      ix. Public Education;
      x. Watershed Assessments;

xi. Impervious Surface Area and Chesapeake Bay Restoration Plans;
xii. TMDL and Stormwater WLA Compliance;
xiii. Assessment of Controls; and
xiv. Program Funding.

b. A narrative summary describing the results and analyses of data, including monitoring data that is accumulated throughout the reporting year;

c. Expenditures for the reporting period and the proposed budget for the upcoming year;

d. A summary describing the number and nature of enforcement actions, inspections, and public education programs;

e. The identification of water quality improvements and documentation of attainment and/or progress toward attainment of schedules, benchmarks, deadlines, and applicable stormwater WLAs developed under EPA approved TMDLs; and

f. The identification of any proposed changes to the County/City/Agency's program when stormwater WLAs are not being met.

2. All annual reporting specified in PARTs IV.C, D, E, F, and G, or required anywhere within this permit shall be made using the most recent version of MDE's MS4 Geodatabase. A corresponding User's Guide provides guidance for data requirements and entry into the MS4 Geodatabase. The geodatabase establishes a consistent reporting structure for Maryland's MS4 community for submitting program data and enables MDE a fair way to efficiently evaluate the effectiveness of implementation and compliance with permit requirements.

3. Because this permit uses an iterative approach to implementation, the County/City/Agency must evaluate the effectiveness of its programs in each annual report. BMP and program modifications shall be made within 12 months if the County/City/Agency's annual report does not demonstrate compliance with this permit and show progress toward meeting stormwater WLAs developed under EPA approved TMDLs.

B. Program Review

In order to assess the effectiveness of XXXXX County/City/Agency's NPDES stormwater program for reducing the discharge of pollutants to the MEP and working toward meeting water quality standards, MDE will review annual reports, conduct field inspections, and periodically make requests for additional data to determine permit compliance. Procedures for the review of local erosion and sediment control and

stormwater management programs exist in Maryland State law and regulations. Additional evaluations and field inspections shall be conducted for IDDE, public property management, assessment of controls, and impervious surface area and Chesapeake Bay restoration to determine compliance with permit conditions.

C. Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than 5 years unless administratively continued by MDE. Continuation or reissuance of this permit beyond this permit term will require XXXXX County/City/Agency to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. Failure to reapply for coverage constitutes a violation of this permit.

As part of this application process, the County/City/Agency shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how each County/City/Agency watershed has been thoroughly evaluated, and the status of implementing water quality improvement projects and all schedules, benchmarks, and deadlines toward meeting stormwater WLAs. This application shall be used to gauge the effectiveness of the County/City/Agency's NPDES stormwater program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

1. The County/City/Agency's NPDES stormwater program goals;

2. Program summaries for the permit term regarding:

    a. Illicit discharge detection and elimination results;

    b. Impervious Surface and Chesapeake Bay Restoration status including County/City/Agency totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting stormwater WLAs developed under EPA approved TMDLs;

    c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved;

    d. Other relevant data and information for describing County/City/Agency programs;

3. Program operation and capital improvement costs for the permit term; and

4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the County/City/Agency's efforts to comply with the conditions of this permit.

PART VI. SPECIAL PROGRAMMATIC CONDITIONS

A. Maryland's baseline programs, including the 1991 Forest Conservation Act, 1997 Priority Funding Areas Act, 2007 Stormwater Management Act, 2009 Smart, Green & Growing Planning Legislation, 2010 Sustainable Communities Act, 2011 Best Available Technology Regulation, and the 2012 Sustainable Growth & Agricultural Preservation Act effectively mitigate the majority of the impacts from new development. Any additional loads will be offset through Maryland's alignment for growth policies and procedures as articulated through Chesapeake Bay milestone achievement. The overriding goal shall be no net growth in loads and XXXXX County/City/Agency shall reflect these policies, programs, and implementation as part of its net WLA accounting as stipulated in Part IV.E.4.b.ii of this permit.

PART VII. ENFORCEMENT AND PENALTIES

A. Discharge Prohibitions and Receiving Water Limitations

XXXXX County/City/Agency shall prohibit non-stormwater discharges through its MS4. NPDES permitted non-stormwater discharges are exempt from this prohibition. Discharges from the following will not be considered a source of pollutants when properly managed: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration to separate storm sewers; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation waters; springs; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; de-chlorinated swimming pool discharges (not including filter backwash); street wash water; and fire fighting activities.

Consistent with §402(p)(3)(B)(iii) of the CWA, the County/City/Agency shall take all reasonable steps to minimize or prevent the contamination or other alteration of the physical, chemical, or biological properties of any waters of the State, including a change in temperature, taste, color, turbidity, or odor of the waters or the discharge or deposit of any organic matter, harmful organism, or liquid, gaseous, solid, radioactive, or other substance into any waters of the State, that will render the waters harmful to:

1. Public health, safety, or welfare;

2. Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial use;

3. Livestock, wild animals, cats or birds; and

4. Fish or other aquatic life.

B. Duty to Mitigate

XXXXX County/City/Agency shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

C. Duty to Comply

XXXXX County/City/Agency shall be responsible for complying with all conditions of this permit. Other entities may be used to meet various permit obligations provided that both the County/City/Agency and the other entity agree contractually. Regardless of any arrangement entered into however, the County/City/Agency remains responsible for permit compliance. In no case may this responsibility or permit compliance liability be transferred to another entity.

Failure to comply with a permit provision constitutes a violation of the CWA and is grounds for enforcement action; permit termination, revocation, or modification; or denial of a permit renewal application. The County/City/Agency shall comply at all times with the provisions of the Environment Article, Title 4, Subtitles 1, 2, and 4; Title 7, Subtitle 2; and Title 9, Subtitle 3 of the Annotated Code of Maryland.

The County/City/Agency shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the County/City/Agency to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the County/City/Agency only when the operation is necessary to achieve compliance with the conditions of the permit.

D. Sanctions

1. Penalties Under the CWA - Civil and Criminal

Section 309(g)(2) of the CWA, 33 USC §1319(g)(2) provides that any person who violates any permit condition is subject to a civil penalty not to exceed $10,000 per day for each violation, not to exceed $125,000. Pursuant to the Civil Monetary Penalty Inflation Adjustment Rule, 40 CFR Part 19, any person who violates any NPDES permit condition or limitation is liable for an administrative penalty not to exceed $16,000 per day for each such violation, up to a total penalty of $177,500. Pursuant to Section 309(c) of the CWA, 33 USC §1319(c), any person who negligently violates any permit condition is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. Any person who knowingly violates any permit condition is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3

years, or both.

2. Penalties Under the State's Environment Article - Civil and Criminal

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the County/City/Agency from civil or criminal responsibilities and/or penalties for a violation of Title 4, Title 7, and Title 9 of the Environment Article, Annotated Code of Maryland, or any federal, local, or other State law or regulation. Section 9-342 of the Environment Article provides that a person who violates any condition of this permit is liable to a civil penalty of up to $10,000 per violation, to be collected in a civil action brought by MDE, and with each day a violation continues being a separate violation. Section 9-342 further authorizes the MDE to impose upon any person who violates a permit condition, administrative civil penalties of up to $5,000 per violation, up to $50,000.

Section 9-343 of the Environment Article provides that any person who violates a permit condition is subject to a criminal penalty not exceeding $25,000 or imprisonment not exceeding 1 year, or both for a first offense. For a second offense, Section 9-343 provides for a fine not exceeding $50,000 and up to 2 years imprisonment.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who knowingly makes any false statement, representation, or certification in any records or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

E. Permit Revocation and Modification

1. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by XXXXX County/City/Agency for a permit modification or a notification of planned changes or anticipated noncompliance does not stay any permit condition. A permit may be modified by MDE upon written request by the County/City/Agency and after notice and opportunity for a public hearing in accordance with and for the reasons set

forth in COMAR 26.08.04.10.

After notice and opportunity for a hearing and in accordance with COMAR 26.08.04.10, MDE may modify, suspend, or revoke and reissue this permit in whole or in part during its term for causes including, but not limited to the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. A change in any condition that requires either a temporary reduction or elimination of the authorized discharge;

d. A determination that the permitted discharge poses a threat to human health or welfare or to the environment and can only be regulated to acceptable levels by permit modification or termination;

e. To incorporate additional controls that are necessary to ensure that the permit effluent limit requirements are consistent with any applicable TMDL WLA allocated to the discharge of pollutants from the MS4; or

f. As specified in 40 CFR §§122.62, 122.63, 122.64, and 124.5.

2. Duty to Provide Information

The County/City/Agency shall furnish to MDE, within a reasonable time, any information that MDE may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit. The County/City/Agency shall also furnish to MDE, upon request, copies of records required to be kept by this permit.

F. Inspection and Entry

XXXXX County/City/Agency shall allow an authorized representative of the State or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulatory activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and obtain copies at reasonable times of any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times, without prior notice, any construction site, facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

G. Monitoring and Recordkeeping

Unless otherwise specified by this permit, all monitoring and records of monitoring shall be in accordance with 40 CFR Part 122.41(j).

H. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State or local law or regulations.

I. Severability

The provisions of this permit are severable. If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect. If the application of any provision of this permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

J. Signature of Authorized Administrator and Jurisdiction

Each application, report, or other information required under this permit to be submitted to MDE shall be signed as required by COMAR 16.08.04.01-1. Signatories shall be a principal executive officer, ranking elected official, or other duly authorized employee.

_____ _____

Lee Currey, Director **Date**
Water and Science Administration

Memorandum

To: **Maryland Municipal Separate Storm Sewer System (MS4) Stakeholders**
From: **Maryland Department of the Environment (MDE)**
Re: **Example MS4 Restoration Formula**
Date: **October 16, 2017**

Assumptions:

- MDE approved *Maryland* County's impervious surface baseline analysis of 25,000 untreated impervious acres under its prior permit term
- The County was required to restore 5,000 impervious acres (IAs), or 20% of its untreated impervious surfaces, under its prior MS4 permit term
    - 25,000 untreated IAs (x) 20% = 5,000 IAs
- The County only completed 2,500 IAs of restoration under its prior permit and used Maryland's nutrient trading regulations to reduce an amount of TN equivalent to restoring an additional 2,500 IAs
    - 2,500 IAs restored by stormwater (+) 2,500 IAs of equivalent nutrient credits = Compliance with the 5,000 IA permit restoration requirement

Formulas for Populating *Maryland* County's new MS4 Permit:

- Impervious Surface Restoration Plan: The impervious surfaces that the County did not restore with stormwater BMPs in its prior MS4 permit term, or 2,500 IAs, will be required for restoration using stormwater BMPs in its new MS4 permit term. This will replace bay-wide nutrient reductions with local stormwater management projects. All BMPs and alternative practices approved in MDE's MS4 Guidance will be allowed for restoration. An example IA calculation for restoration for the new MS4 permit is:

    - 5,000 IAs required for restoration under its prior MS4 permit
    - 2,500 IAs were restored with stormwater BMPs under its prior MS4 permit
    - 2,500 IAs shall be required for restoration with stormwater practices in the County's new MS4 permit

        5,000 IAs required under the previous permit
        (-) 2,500 IAs implemented with stormwater BMPs in the previous permit
        2,500 IAs required for stormwater BMP implementation in the County's new MS4 permit

    - The number of remaining impervious acres from the County's prior permit term shall be based on its fourth year MS4 annual report submittal, baseline updates, and MDE approval.
    - The County will need to continue to purchase the TN credits that were purchased under its prior permit term until they are replaced during this permit term with stormwater BMPs that treat 2,500 IAs.

- An additional 2,500 IAs will be required in the County's subsequent permit, establishing a criterion of 10% IA restoration per five year permit term. This rate of implementation is based on local MEP and FAP analysis, and Maryland's Chesapeake Bay WIP III gap analysis for the waste water and stormwater sectors. To ensure that this gap is closed, the County's new MS4 permit will have an additional Chesapeake Bay nutrient reduction goal expressed as a waste load allocation (WLA)

- Chesapeake Bay Restoration Plan: MDE has determined that an additional 5% restoration of the County's IA baseline is an adequate contribution from Maryland's stormwater sector toward meeting the Chesapeake Bay TMDL. However, due to the cost of implementing stormwater BMPs, this level of restoration will be expressed as a nutrient load and MS4s will have the ability to trade for meeting this new Bay WLA. The nutrient load shall initially be based on total nitrogen (TN) for ease of permit administration and because TN is the toughest and probably the most important Bay nutrient to address.

    - Five percent (5%) (x) 25,000 IA baseline = 1,250 IAs required for restoration

    - The level of treatment for restoring an impervious acre in the County's new permit will need to be equivalent to implementing ESD to the MEP, or 75% efficiency, for meeting WIP III and as a way to encourage green infrastructure.

    - An average MS4 TN urban load of 16 lbs of nitrogen/acre/year (CBP 5.3.2) is used in the following Chesapeake Bay WLA calculation:

        - 16 TN lbs/acre/year (x) 75% efficiency = 12 TN lbs/acre/year reduction
        - 1,250 IA restoration requirement (x) 12 TN lbs/acre reduction efficiency = 15,000 TN lbs reduction required in new MS4 permits as a Chesapeake Bay WLA

    - The MS4 Guidance document will be updated with new green infrastructure implementation criteria, and Bay Program urban nutrient loads, BMPs, and efficiencies.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 23 Oct 2017 16:02:00 +0000
To: "'JPGill@co.pg.md.us'" <JPGill@co.pg.md.us>; "Lisa Feldt" <Lisa.Feldt@montgomerycountymd.gov>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>
Cc: "Jeff DeHan" <jmdehan@co.pg.md.us>; "Jerry Maldonado" <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Amy.Stevens@montgomerycountymd.gov" <Amy.Stevens@montgomerycountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: Strikeout/redline version of new permit template
Attachments: Draft Next Gen MS4 Permit - 10_16_2017 Track Changes.docx

MD MS4 managers,

Attached is a strikeout/redline version of the new permit template MDE released last week, in which MDE staff used "compare documents" between Anne Arundel County's current permit and the new template.

Again, my hope for the internal meeting this Friday is that the group can review all the changes and develop consensus comments – if needed – for each section. However, we will need to spend the bulk of our limited time on the provisions in Section E Restoration…, so please be prepared to handle the other sections as expeditiously as possible.

I also anticipate having some more information about the Restoration requirements/formula memo ahead of Friday's meeting, based on some analysis that Erik and Shannon have done.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MARYLAND DEPARTMENT OF THE ENVIRONMENT

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

PART I. IDENTIFICATION

A. ~~A.~~ Permit Number: ~~11-DP-3316 MD0068306~~XX-XX-XXXX XXXXXXXXX

B. ~~B.~~ Permit Area

This permit covers all stormwater discharges from the municipal separate storm sewer system (MS4) owned or operated jurisdiction-wide by ~~Anne Arundel~~XXXXX County/City/Agency, Maryland.

C. ~~C.~~ **Effective Date:** ~~February 12, 2014~~ To be determined (TBD)

D. ~~D.~~ **Expiration Date:** ~~February 11, 2019~~ TBD

PART II. DEFINITIONS

Terms used in this permit are defined in relevant chapters of Title 40 of the Code of Federal Regulations (CFR) Parts 122 - 124 or the Code of Maryland Regulations (COMAR) 26.08.01, 26.17.01, and 26.17.02. Terms not defined in CFR or COMAR shall have the meanings attributed by common use.

PART III. WATER QUALITY

~~The permittee~~XXXXX County/City/Agency must manage, implement, and enforce ~~a~~ stormwater management ~~program (SWMP)~~programs in accordance with the Clean Water Act (CWA) and corresponding stormwater National Pollutant Discharge Elimination System (NPDES) regulations, 40 CFR Part 122, to meet the following requirements:

1. Effectively prohibit pollutants in stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with Maryland's receiving water quality standards;

2. Attain applicable stormwater wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with Title 33 of the U.S. Code (USC) §1342(p)(3)(B)(iii); 40 CFR §122.44(k)(2) and (3); and

3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with all the conditions contained in PARTs IV through VII of this permit shall constitute compliance with §402(p)(3)(B)(iii) of the CWA and adequate progress toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs for this permit term.

PART IV. STANDARD PERMIT CONDITIONS

A. ~~A.~~ Permit Administration

~~Anne Arundel~~XXXXX County/City/Agency shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County/City/Agency shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County/City/Agency shall submit in its annual reports to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

B. ~~B.~~ Legal Authority

~~Anne Arundel~~XXXXX County/City/Agency shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County/City/Agency shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the ~~County's~~County/City/Agency's annual report.

C. ~~C.~~ Source Identification

Sources of pollutants in stormwater runoff ~~countywide~~jurisdiction-wide shall be identified by XXXXX County/City/Agency and linked to specific water quality impacts on a watershed basis. ~~The source identification process shall be used to develop watershed restoration plans. The following information~~ A georeferenced database shall be submitted annually ~~for all County watersheds within the permit area~~ in ~~geographic information system (GIS) format~~accordance with ~~associated tables as required in PART V~~*Maryland Department of* ~~this permit~~*the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017),* hereafter (MS4 Geodatabase) that includes information on the following:

1. Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;

2. Industrial and commercial sources: industrial and commercial land uses and sites that the County/City/Agency has determined have the potential to contribute significant pollutants;

3. Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;

4. Impervious surfaces: public and private land ~~use~~cover delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;

5. Monitoring locations: locations established by the County/City/Agency for chemical, biological, and physical monitoring of watershed restoration efforts and the *2000 Maryland Stormwater Design Manual*~~; and~~, or as part a pooled monitoring approach as described in Part IV.F; and

6. Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.

D. ~~D.~~ Management Programs

The following management programs shall be implemented ~~in areas served~~jurisdiction-wide by ~~Anne Arundel County's MS4.~~XXXXX County/City/Agency. These management programs are designed to control stormwater discharges and reduce associated pollutant loadings to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. ~~The County shall modify these programs according to needed program improvements identified as a result of periodic evaluations by MDE.~~

1. ~~1.~~ Stormwater Management

An acceptable stormwater management program shall ~~continue to~~ be maintained by the County/City/Agency in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the *2000 Maryland Stormwater Design Manual*. This includes:

i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;

ii. Tracking the progress toward satisfying the requirements of

the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and

iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.

b. Maintaining programmatic and implementation information including, but not limited to:

~~b.~~

i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;

ii. Number of redevelopment projects received;

iii. Number of stormwater exemptions issued; and

iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.

Stormwater program data shall be recorded ~~on~~in MDE's ~~annual report database~~MS4 Geodatabase and submitted as required in PART V of this permit.

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by ~~Anne Arundel~~the County/City/Agency.

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the ~~County's~~County/City/Agency's annual reports.

2. ~~2.~~ Erosion and Sediment Control

An acceptable erosion and sediment control program shall ~~continue to~~ be

maintained by the County/City/Agency and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the ~~County's~~County/City/Agency's erosion and sediment control enforcement authority;

b. ~~At least three times per year, conducting responsible personnel certification classes to educate~~Ensure that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE;

c. Program activity shall be recorded ~~on~~in MDE's ~~annual report database~~MS4 Geodatabase and submitted as required in PART V of this permit; and

d. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

~~3.~~

3. Illicit Discharge Detection and Elimination

~~Anne Arundel~~The County/City/Agency shall ~~continue to~~ implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:~~–~~

a. Field screening at least 150 outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit. ~~Within one year of permit issuance, an~~An alternative program may be submitted by the County/City/Agency for MDE approval that methodically identifies, investigates, and eliminates illegal ~~connections~~discharges to the ~~County's storm drain system~~County/City/Agency's MS4;

b. Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;

c. Maintaining a program to address, and if necessary, respond to illegal discharges, dumping, and spills;

d. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting; and

e. Reporting illicit discharge detection and elimination activities in MDE's MS4 Geodatabase and as specified in PART V of this permit.

~~4.~~

4. Litter and Floatables

~~This section of the permit requires Anne Arundel~~The County ~~to address problems associated with litter and floatables in waterways that adversely affect water quality. Increases in litter discharges to receiving waters have become a growing concern both nationally and within Maryland and cannot be ignored. Anne Arundel County needs to~~/City/Agency shall evaluate current litter control problems associated with discharges from its ~~storm drain system~~MS4 and develop and implement a public outreach and education program as needed on a watershed by watershed basis.

a. As part of ~~Anne Arundel County's~~the County/City/Agency watershed assessments under PART IV.E.1 of this permit, ~~Anne Arundel~~the County/City/Agency shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.

b. ~~Within one year of permit issuance, as part of the public education program described in PART IV.D.6., Anne Arundel County shall develop and~~The County/City/Agency shall implement a public education and outreach program to reduce littering and increase recycling. This shall include, but not be limited to:

i. Educating the public on the importance of reducing, reusing, and recycling;
ii. Disseminating information by using signs, articles, and other media outlets; and
iii. Promoting educational programs in schools, businesses, community associations, etc.

c. Evaluating annually the effectiveness of the education program.

d. Submit annually, a report which details progress toward implementing the public education and outreach program. The report shall describe the status of public outreach efforts including resources (e.g., personnel and

financial) expended and the effectiveness of all program components.

~~5.~~

5. Property Management and Maintenance

a. ~~Anne Arundel~~The County/City/Agency shall ensure that a Notice of Intent (NOI) has been submitted to MDE and a pollution prevention plan developed for each County-/City/Agency owned ~~municipal~~industrial facility requiring NPDES stormwater general permit coverage. ~~The status~~A list of ~~pollution prevention plan development and implementation for each County-owned municipal facility~~these properties shall be ~~reviewed, documented,~~updated and submitted to MDE annually.

b. The County/City/Agency shall develop, implement, and maintain a good housekeeping plan (GHP) for County/City/Agency owned properties not required to be covered under an NPDES Industrial Stormwater Discharge Permit, where the following activities are performed: maintenance or storage of vehicles or equipment; use, handling, transport, or storage of fertilizers, pesticides, landscaping materials, or hazardous materials or other materials that could pollute stormwater runoff. A standard GHP may be created to address multiple properties where similar activities are conducted. The GHP shall include, but not be limited to:

i. A description of site activities;
ii. A site map identifying all buildings; stormwater conveyances including ditches, pipes, and swales; direction of stormwater flow (use arrows); water bodies receiving discharges; and locations of all existing structural control measures or BMPs;
iii. A list of potential pollutants and their sources and locations, including run-on from adjacent properties;
iv. Written good housekeeping procedures designed to reduce the potential for stormwater pollution from the property;
v. Procedures for routine site inspections to detect and correct stormwater discharges, releases, and any spills or leaks; and
vi. Documentation of any discharge, release, leak, or spill, including date, findings, and response actions.

c. The County/City/Agency shall ensure that appropriate staff and private contractors receive training annually. The training shall be designed to reduce or eliminate the discharge of pollutants during municipal operations. Topics shall include spill prevention and response, proper

disposal of waste, and routine inspections to detect and correct potential discharges from properties owned or operated by the County/City/Agency.

~~b.~~d. The County/City/Agency shall continue to implement a program to reduce pollutants associated with the maintenance ~~activities at County-owned facilities~~of jurisdiction-wide properties including local roads and parks~~, roadways, and parking lots.~~. The maintenance program shall include ~~these or MDE-approved alternative~~the following activities where applicable:

i. Street sweeping;
ii. Inlet inspection and cleaning;
iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management ~~through increased use of integrated pest management;~~;
~~iv. Reducing the use of winter weather deicing materials through research, continual testing and improvement of materials, equipment calibration, employee training, and effective decision-making; and~~
~~v. Ensuring that all County staff receive adequate training in pollution prevention and good housekeeping practices.~~

iv. ~~The County~~Stabilization of eroded areas;
v. Litter removal; and
vi. Pet waste removal.

e. The County/City/Agency shall reduce the use of winter weather deicing materials by developing a County/City/Agency Salt Management Plan (SMP) to be submitted to MDE in its second year annual report. The SMP shall be based the guidance provided on best road salt management practices described in *the Maryland Department of Transportation, State Highway Administration's Maryland Statewide Salt Management Plan, October 2017*. The County/City/Agency's SMP shall include, but not be limited to:

i. County/City/Agency technological improvements that limit salt application rates

- Hybrid rubber plow blades
- Improved salt spreaders/spinners attached to dump trucks
- Software that tracks salt application locations and rates
- Use of specialty equipment such as snow blowers and front end loaders
- Installing tow plows that increase the effectiveness of plow trucks
- Using materials such as sand or brine

- Using loader scales for the equipment filling the trucks

ii. Training and outreach

- Creating a local "Salt Academy" that annually provides County/City/Agency personnel and contractors with the latest training in salt management, or the participation of County/City/Agency personnel and contractors in a "Salt Academy" administered by another MS4 jurisdiction or State agency
- Developing best salt management practices outreach for educating private landscapers, commercial snow removal businesses, and homeowners within the County/City/Agency

iii. Tracking and reporting

- During storm events where de-icing materials are applied to County/City/Agency roads, track and record the amount of de-icing materials used and snowfall per event
- Report the salt application by event or date, and the monthly and annual salt tonnage usage per lane mile per inch of snow

f. The County/City/Agency shall report annually on the changes in ~~any maintenance practices~~ its Property Management and Maintenance programs and the overall pollutant reductions resulting from ~~the maintenance program. Within one year of permit issuance, an alternative maintenance program may be submitted for MDE approval indicating the activities to be undertaken and associated pollutant reductions.~~these programs.

~~6.~~

6. Public Education

~~Anne Arundel~~The County/City/Agency shall continue to implement a public education and outreach program to reduce stormwater pollutants. Outreach efforts may be integrated with other aspects of the ~~County's~~County/City/Agency's activities. These efforts are to be documented and summarized in each annual report. The County/City/Agency shall ~~continue to~~ implement a public outreach and education campaign with specific performance goals and deadlines including, but not limited to:

a. ~~Maintain~~Maintaining a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

b. ~~Provide~~Providing information to inform the general public about the benefits of:

i. Increasing water conservation;
ii. Residential and community stormwater management implementation and facility maintenance;
iii. Proper erosion and sediment control practices;
iv. Increasing proper disposal of household hazardous waste;
v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal, cash for clippers, etc.);
vi. Residential car care and washing; and
vii. Proper pet waste management.

~~c. Provide information regarding the following water quality issues to the regulated community when requested:~~

~~i. NPDES permitting requirements;~~
~~ii. Pollution prevention plan development;~~
~~iii. Proper housekeeping; and~~
~~iv. Spill prevention and response.~~

E. ~~E.~~ Restoration ~~Plans and~~for Total Maximum Daily Loads and Chesapeake Bay

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable stormwater WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Attachment B). Additionally, the nutrient reductions that will result from the restoration requirements described below are consistent with Maryland's Phase III Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL, contributing to the State's efforts to meet its 2025 nutrient load targets. Annually, XXXX County/City/Agency shall provide MDE with jurisdiction-wide watershed assessments and impervious surface and TMDL restoration plans, perform required restoration activities, report on implementation status, and provide for opportunities for public participation.

~~Anne Arundel County shall annually provide watershed assessments, restoration plans, opportunities for public participation, and TMDL compliance status to MDE. A systematic assessment shall be conducted and a detailed restoration plan developed for all watersheds within Anne Arundel County. As required below, watershed assessments and restoration plans shall include a thorough water quality analysis, identification of water quality improvement opportunities, and a schedule for BMP and programmatic implementation to meet stormwater WLAs included in EPA approved TMDLs.~~

1. ~~1.~~ Watershed Assessments

a. ~~By the end of the permit term, Anne Arundel~~The County/City/Agency shall complete ~~detailed~~ watershed assessments ~~for the entire County~~jurisdiction-wide and update as necessary. Watershed assessments conducted during previous permit cycles may be used to comply with this requirement, provided the assessments include all of the items listed in PART IV.E.1.b ~~below.~~. Assessments shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County/City/Agency water quality analysis~~;~~.

b. Watershed assessments by the County/City/Agency shall:

i. Determine current water quality conditions;
ii. Include the results of a visual watershed inspection;
iii. Identify and rank water quality problems; and
iv. Prioritize all structural and nonstructural water quality improvement projects~~; and~~.
~~v. Specify pollutant load reduction benchmarks and deadlines that demonstrate progress toward meeting all applicable stormwater WLAs.~~

~~2.~~

2. Impervious Surface Restoration ~~Plans~~

~~a. Within one year of permit issuance, Anne Arundel County shall submit an impervious surface area assessment consistent with the methods described in the MDE document *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits* (MDE, June 2011 or subsequent versions). Upon approval by MDE, this impervious surface area assessment shall serve as the baseline for the restoration efforts required in this permit.~~

~~By the end of this permit term, Anne Arundel County shall commence and complete the implementation of restoration efforts for twenty percent of the County's impervious surface area consistent with the methodology described in the MDE document cited in PART IV.E.2.a. that has not already been restored to the MEP. Equivalent acres restored of impervious surfaces, through new retrofits or the retrofit of pre-2002 structural BMPs, shall be based upon the treatment of the WQ_v criteria and associated list of practices defined in the *2000 Maryland Stormwater Design Manual*. For alternate BMPs, the basis for calculation of equivalent impervious acres restored is based upon the pollutant loads from forested cover.~~

~~b. Within one year of permit issuance, Anne Arundel County shall submit to MDE for approval a restoration plan for each stormwater WLA approved by EPA prior to the effective date of the permit. The County shall submit restoration plans for subsequent TMDL WLAs within one year of EPA approval. Upon approval by MDE, these restoration plans will be enforceable under this permit. As part of the restoration plans, Anne Arundel County shall:~~

a. ~~Include the final date for meeting applicable WLAs and a detailed schedule~~The County/City/Agency shall commence and complete the restoration of 2,500 unmanaged impervious acres during this permit term with stormwater management BMPs and alternative practices in accordance with the latest version of MDE's *Accounting for Stormwater Waste Load Allocations and Impervious Acres Treated* (MS4 Guidance). These BMPs shall be implemented to replace any nutrient and sediment credits that were acquired by the County/City/Agency under its prior permit term.

b. All nutrient and sediment credits acquired during the prior permit term shall be verified annually in accordance with the requirements of the Water Quality Trading Regulations (COMAR xxxxxx) until they are replaced by stormwater management BMPs and alternative practices in accordance with Maryland's MS4 Guidance.

c. The County/City/Agency shall continue to work toward impervious surface restoration beyond the 2,500 impervious acres required under this permit term. Restoration of an additional 2,500 unmanaged impervious acres shall be required in subsequent permit terms for making progress toward meeting all EPA approved stormwater WLAs within the County/City/Agency, including those for rivers, lakes, reservoirs, and Chesapeake Bay.

d. Additional impervious acres restored during this permit term beyond the 2,500 impervious acres required shall be credited toward future impervious surface restoration requirements in subsequent permit terms.

~~i.~~e. For any local TMDL with a stormwater WLA that is approved by EPA subsequent to the issuance of this permit, the County/City/Agency shall submit a restoration plan within one year of that approval date. These plans shall include a detailed schedule and final dates for implementing all structural and nonstructural water quality projects, enhanced stormwater management programs, and alternative stormwater ~~control initiatives necessary~~controls for meeting applicable stormwater WLAs~~;~~.
~~Provide~~

3. Chesapeake Bay Restoration

a. Consistent with Maryland's Phase III Chesapeake Bay WIP, the County/City/Agency shall reduce 15,000 lbs of total nitrogen (TN) by the end of this permit term. These reductions are in addition to the TN reductions achieved with the impervious surface restoration required in Part IV.E.2.a and Part IV.E.2.c. The County/City/Agency shall reduce this TN load through any combination of the following approved methods:

i. Implementing stormwater BMPs from the list of practices in the *2000 Maryland Stormwater Design Manual*, including the 2009 supplement for ESD to the MEP, and associated TN load

reductions in accordance with Maryland's MS4 Guidance;

ii. Using alternative BMPs, e.g., tree planting, street sweeping, stream restoration, and the associated TN load reductions in accordance with Maryland's MS4 Guidance;

iii. Trading for TN credits in accordance with Maryland's Water Quality Trading Program regulations; and

iv. Innovative practices that have been approved by MDE with monitoring data that documents pollutant load reductions.

4. Implementation Status

a. For tracking progress within this permit term, the County/City/Agency shall propose in its first year annual report:

i. Annual benchmarks for impervious surface restoration, and Chesapeake Bay TN pollutant load reductions; and

ii. Second and fourth year pollutant load reduction benchmarks for all approved stormwater WLAs within the County/City/Agency.

b. The County/City/Agency shall continue to implement, evaluate, and update annually all of its existing plans for each EPA approved TMDL with a stormwater WLA by:

i. Providing detailed ~~cost estimates for individual~~information and costs for all completed and proposed projects~~,~~ and programs~~, controls,~~;

~~ii.~~ Evaluating and ~~plan~~tracking the implementation~~;~~

~~iii.~~ii. ~~Evaluate and track the implementation~~ of impervious surface restoration ~~plans~~ through monitoring or modeling to estimate the net change in pollutant load reductions or the water quality response and document progress toward meeting established schedules, benchmarks, deadlines, and stormwater WLAs; ~~and~~

iii. ~~Develop~~Completing the MS4 geodatabase for BMP implementation, impervious area restoration, and Chesapeake Bay and local TMDL reporting; and

iv. Developing an ongoing, iterative process that continuously implements structural and nonstructural restoration projects, program enhancements, new and additional programs, and alternative BMPs ~~where EPA approved TMDL~~when stormwater WLAs are not being met according to ~~the~~established schedules, benchmarks, and deadlines ~~established as part of the County's watershed assessments~~.

5. ~~3.~~ Public Participation

~~Anne Arundel~~ The County/City/Agency shall provide continual outreach to the public regarding the development of its watershed assessments and restoration plans. Additionally, the County/City/Agency shall allow for public participation in the TMDL process, solicit input, and incorporate any relevant ideas and

program improvements that can aid in achieving ~~TMDLs~~stormwater WLAs, TMDL water quality endpoints and water quality standards. ~~Anne Arundel~~The County/City/Agency shall provide:

a. Notice in a local newspaper and the ~~County's~~County/City/Agency's web site outlining how the public may obtain information on the development of watershed assessments and stormwater watershed restoration plans and opportunities for comment;

b. Procedures for providing copies of watershed assessments and stormwater watershed restoration plans to interested parties upon request;

c. A minimum 30 day comment period before finalizing watershed assessments and stormwater watershed restoration plans; and

d. A summary in each annual report of how the County/City/Agency addressed or will address any material comment received from the public.

~~4. TMDL Compliance~~

~~Anne Arundel County shall evaluate and document its progress toward meeting all applicable stormwater WLAs included in EPA approved TMDLs. An annual TMDL assessment report with tables shall be submitted to MDE. This assessment shall include complete descriptions of the analytical methodology used to evaluate the effectiveness of the County's restoration plans and how these plans are working toward achieving compliance with EPA approved TMDLs. Anne Arundel County shall further provide:~~

~~a. Estimated net change in pollutant load reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives;~~

~~b. A comparison of the net change in pollutant load reductions detailed above with the established benchmarks, deadlines, and applicable stormwater WLAs;~~

~~c. Itemized costs for completed projects, programs, and initiatives to meet established pollutant reduction benchmarks and deadlines;~~

~~d. Cost estimates for completing all projects, programs, and alternatives necessary for meeting applicable stormwater WLAs; and~~

~~e. A description of a plan for implementing additional watershed restoration actions that can be enforced when benchmarks, deadlines, and applicable stormwater WLAs are not being met or when projected funding is inadequate.~~

F. ~~F.~~ Assessment of Controls

~~Anne Arundel County and ten other municipalities in Maryland have been conducting discharge characterization monitoring since the early 1990s. From this expansive monitoring, a statewide~~

~~database has been developed that includes hundreds of storms across numerous land uses. Analyses of this dataset and other research performed nationally effectively characterize stormwater runoff in Maryland for NPDES municipal stormwater purposes. To build on existing information and to better track progress toward meeting TMDLs, better data are needed on ESD performance and BMP efficiencies and effectiveness.~~

~~Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. The County shall use chemical, biological, and physical monitoring to assess watershed restoration efforts, document BMP effectiveness, or calibrate water quality models for showing progress toward meeting any applicable WLAs developed under EPA approved TMDLs identified above. Additionally, the County shall conduct physical stream monitoring to assess the implementation of the latest version of the *2000 Maryland Stormwater Design Manual*. Specific monitoring requirements are described below.~~

~~1. Watershed Restoration Assessment~~

~~**The County**~~XXXXX County/City/Agency shall conduct BMP effectiveness and jurisdiction-wide trend monitoring for tracking progress toward improving local water quality and restoring Chesapeake Bay.

1. BMP Effectiveness Monitoring

   By April 5, 2019, the County/City/Agency shall notify MDE which option it chooses for BMP effectiveness monitoring. The two options are:

   a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by the Chesapeake Bay Trust (Trust) for determining monitoring needs and selecting appropriate monitoring studies. To implement the required monitoring, the County/City/Agency shall pay a minimum of $XX,XXX (*based on recent cost survey and MS4 annual report data*) annually, pegged to an annual inflation rate as determined by the U.S. Consumer Price Index, into a pooled monitoring Trust fund by July 1 of each year (See *Appendix X – Chesapeake Bay Trust Pooled Monitoring Program)*. Enrollment in the program shall be demonstrated through a memorandum of understanding (MOU) between the County/City/Agency and the Trust. The County/City/Agency shall remain in the program for the duration of this permit term ; or

   b. The County/City/Agency shall continue monitoring the ~~Parole Plaza~~(*said*) outfall and ~~Church Creek~~(*said*) in-stream station in the ~~South River~~(*said*) watershed, or select and submit for MDE's approval a new ~~watershed restoration project~~BMP effectiveness study for monitoring. Monitoring activities shall occur where the cumulative effects of watershed restoration activities ~~can be assessed. One outfall and an associated in-stream station, or other locations based on a study design approved by MDE, shall be monitored.~~, performed in compliance with this permit, can be assessed. The

minimum criteria for chemical, biological, and physical monitoring are as follows:

~~a.~~i. Chemical Monitoring:

~~i.~~• Twelve (12) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;

~~ii.~~• Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;

~~iii.~~• At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136, and event mean concentrations (~~EMC~~EMCs) shall be calculated for~~:~~ the following parameters:

_____Biochemical Oxygen Demand ~~(~~BOD_5~~)~~ _____Total Lead
_____Total Kjeldahl Nitrogen (TKN)_____ ____ Total Copper
_____Nitrate plus Nitrite_____ _____ Total Zinc
_____Total Suspended Solids_____ _ Total Phosphorus
_____Total Petroleum Hydrocarbons (TPH)_____ _____Hardness
_____E. coli or enterococcus

~~iv.~~• Continuous flow measurements shall be recorded at the in-stream monitoring station or other practical locations based on the approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models. ~~Pollutant load estimates shall be reported according to any EPA approved TMDL with a stormwater WLA.~~

~~b.~~ii. Biological Monitoring:

~~i.~~• Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and in-stream stations or other practical locations based on an MDE approved study design; and

~~ii.~~• The County/City/Agency shall use the ~~EPA Rapid Bioassessment Protocols (RBP),~~ Maryland Biological Stream Survey (MBSS~~),~~

~~or other similar method approved by MDE~~) protocols.

~~c.~~iii. Physical Monitoring:

~~i.~~• A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on the approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;

~~ii.~~• A stream habitat assessment shall be conducted using techniques defined by ~~the EPA's RBP, MBSS, or other similar method approved by MDE~~MBSS; and

~~iii. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.~~

~~a.~~• A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

~~d.~~iv. Annual Data Submittal: ~~-~~The County/City/Agency shall describe in detail its monitoring activities for the previous year and include the following:

~~i.~~• EMCs submitted on MDE's long-term monitoring ~~database~~MS4 Geodatabase as specified in PART V below;

~~ii.~~• Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations; and

~~iii.~~• Any requests and accompanying justifications for proposed modifications to the monitoring program.

~~2. Stormwater Management Assessment~~

2. ~~The~~ Jurisdiction-Wide Trend Monitoring

By April 5, 2019, the County/City/Agency shall ~~continue~~notify MDE which option it chooses for jurisdiction-wide trend monitoring ~~the Picture Spring Branch in the Severn River watershed, or select and submit for MDE's approval a new watershed restoration project~~. The two options are as follows:

a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by the Trust for determining ~~the effectiveness of stormwater management practices for~~

~~stream channel protection. Physical stream~~appropriate jurisdiction-wide trend monitoring ~~protocols shall include:~~. To implement the required monitoring, the County/City/Agency shall pay a minimum of $XX,XXX (*based on recent cost survey and MS4 annual report data*) annually, pegged to an annual inflation rate as determined by the U.S. Consumer Price Index, into a pooled monitoring Trust fund by July 1 of each year (See *Appendix X – Chesapeake Bay Trust Pooled Monitoring Program)*. Enrollment in the program shall be demonstrated through an MOU between the County/City/Agency and the Trust. The County/City/Agency shall remain in the program for the duration of this permit term; or

~~b. An annual stream profile and survey of permanently monumented cross-sections in Picture Spring Branch to evaluate channel stability;~~

~~c. A comparison of the annual stream profile and survey of the permanently monumented cross-sections with baseline conditions for assessing areas of aggradation and degradation; and~~

~~d.~~ ~~A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.~~

b. ~~G.~~ The County/City/Agency shall annually perform trend monitoring for biological, bacteria, and chloride impairments, according to the following guidelines:

i. Biological and habitat assessment monitoring of XX randomly selected stream sites using MBSS protocols;
ii. Bacteria, i.e., E. coli, enterococcus, or fecal coliform, monitoring according to MDE guidance (see Appendix Y). Samples shall be collected at regular intervals once per month, and shall be characterized as storm or base flow;
iii. Chloride assessments through hourly conductivity monitoring at XX locations (see Appendix Z); and
iv. Alternatively, the County/City/Agency may submit a comprehensive plan for jurisdiction-wide trend monitoring for biological, bacteria, and chloride for MDE's review and approval by April 5, 2019.

G. Program Funding

~~1.~~

1. Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted by XXXXX County/City/Agency as required in PART V below.

2. ~~2.~~ Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. ~~A.~~ Annual Reporting

1. ~~1.~~ Annual progress reports, required under 40 CFR 122.42(c), will facilitate the long-term assessment of ~~Anne Arundel County's~~XXXXX County/City/Agency's NPDES stormwater program. The County/City/Agency shall submit annual reports on or before the anniversary date of this permit and post these reports on the ~~County's~~County/City/Agency's website. All information, data, and analyses shall be based on the fiscal year and include:

   a. ~~The~~ An executive summary on the status of implementing the ~~components of the stormwater management program~~County/City/Agency's MS4 programs that are established as permit conditions including:

      i. Permit Administration;
      ii. Legal Authority;
      ~~i.~~iii. Source Identification;
      ~~ii.~~iv. Stormwater Management;
      ~~iii.~~v. Erosion and Sediment Control;
      ~~iv.~~vi. Illicit Discharge Detection and Elimination;
      ~~v.~~vii. Litter and Floatables;
      ~~vi.~~viii. Property Management and Maintenance;
      ~~vii.~~ix. Public Education;
      ~~viii.~~x. Watershed ~~Assessment~~Assessments;
      ~~ix.~~xi. Impervious Surface Area and Chesapeake Bay Restoration Plans;
      ~~x.~~xii. TMDL and Stormwater WLA Compliance;
      ~~xi.~~xiii. Assessment of Controls; and
      ~~xii.~~xiv. Program Funding.

   b. A narrative summary describing the results and analyses of data, including monitoring data that is accumulated throughout the reporting year;

   c. Expenditures for the reporting period and the proposed budget for the upcoming year;

   d. A summary describing the number and nature of enforcement actions, inspections, and public education programs;

   e. The identification of water quality improvements and

documentation of attainment and/or progress toward attainment of schedules, benchmarks, deadlines, and applicable stormwater WLAs developed under EPA approved TMDLs; and

f. The identification of any proposed changes to the ~~County's~~County/City/Agency's program when stormwater WLAs are not being met.
~~WLAs are not being met.~~

~~2. To enable MDE to evaluate the effectiveness of permit requirements, the following information shall be submitted in a format consistent with Attachment A.~~

~~a. Storm drain system mapping (PART IV.C.1);~~

~~b. Urban BMP locations (PART IV.C.3);~~

~~c. Impervious surfaces (PART IV.C.4);~~

~~d. Water quality improvement project locations (PART IV.C.6);~~

~~e. Monitoring site locations (PART IV.C.5);~~

~~f. Chemical monitoring results (PART IV.F.1);~~

~~g. Pollutant load reductions (PART IV.E.4. and IV.F.1);~~

~~h. Biological and habitat monitoring (PART IV.F.1);~~

~~i. Illicit discharge detection and elimination activities (PART IV.D.3);~~

~~j. Erosion and sediment control, and stormwater program information (PART IV.D.1 and IV.D.2);~~

~~k. Grading permit information - quarterly (PART IV. D.2); and~~

~~l. Fiscal analyses - cost for NPDES related implementation (PART IV.G).~~

~~3.~~

2. All annual reporting specified in PARTs IV.C, D, E, F, and G, or required anywhere within this permit shall be made using the most recent version of MDE's MS4 Geodatabase. A corresponding User's Guide provides guidance for data requirements and entry into the MS4 Geodatabase. The geodatabase establishes a consistent reporting structure for Maryland's MS4 community for submitting program data and enables MDE a fair way to efficiently evaluate the effectiveness of implementation and compliance with permit requirements.

3. Because this permit uses an iterative approach to implementation, the County/City/Agency must evaluate the effectiveness of its programs in each annual report. BMP and program modifications shall be made within 12 months if the ~~County's~~County/City/Agency's annual report does not demonstrate compliance with this permit and show progress toward meeting stormwater WLAs developed under EPA approved TMDLs.

B. ~~B.~~ Program Review

In order to assess the effectiveness of ~~the County's~~XXXXX County/City/Agency's NPDES stormwater program for ~~eliminating non-stormwater discharges through the illicit connection program and~~ reducing the discharge of pollutants to ~~protect~~the MEP and working toward meeting water quality standards, MDE will review ~~program implementation,~~ annual reports, conduct field inspections, and ~~periodic~~periodically make requests for additional data ~~submittal~~to determine permit compliance. Procedures for the review of local erosion and sediment control and stormwater management programs exist in ~~Maryland's sediment control~~Maryland State law and ~~stormwater management laws.~~ regulations. Additional evaluations ~~may~~and field inspections shall be conducted ~~at MDE's discretion~~for IDDE, public property management, assessment of controls, and impervious surface area and Chesapeake Bay restoration to determine compliance with permit conditions.

C. ~~C.~~ Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than 5 years unless administratively continued by MDE. Continuation or reissuance of this permit beyond this permit term will require ~~the~~XXXXX County/City/Agency to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. Failure to reapply for coverage constitutes a violation of this permit.

As part of this application process, ~~Anne Arundel~~the County/City/Agency shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how ~~the County is meeting the overall goal to ensure that~~ each County/City/Agency watershed has been thoroughly evaluated, and ~~its progress in~~ the status of implementing water quality ~~improvements.~~improvement projects and all schedules, benchmarks, and deadlines toward meeting stormwater WLAs. This application shall be used to gauge the effectiveness of the ~~County's~~County/City/Agency's NPDES stormwater program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

1. ~~Anne Arundel County's~~The County/City/Agency's NPDES stormwater program goals;

2. Program summaries for the permit term regarding:

   a. Illicit discharge detection and elimination results;

   b. Impervious Surface and Chesapeake Bay Restoration ~~plan~~ status including County/City/Agency totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting stormwater WLAs developed under EPA approved TMDLs;

   c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved;

   ~~d. Impervious acres compared to the baseline and twenty percent restoration requirement in PART IV.E.2.a; and~~

   ~~e.~~d. Other relevant data and information for describing County/City/Agency programs;

3. Program operation and capital improvement costs for the permit term; and

4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the ~~County's~~County/City/Agency's efforts to comply with the conditions of this permit.

PART VI. SPECIAL PROGRAMMATIC CONDITIONS

~~A. Chesapeake Bay Restoration by 2025~~

~~A Chesapeake Bay TMDL has been developed by the EPA for the six Bay States (Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia) and the District of Columbia. The TMDL describes the level of effort that will be necessary for meeting water quality criteria and restoring Chesapeake Bay. This permit is requiring compliance with the Chesapeake Bay TMDL through the use of a strategy that calls for the restoration of twenty percent of previously developed impervious land with little or no controls within this five year permit term as described in Maryland's Watershed Implementation Plan. The TMDL is an aggregate of nonpoint sources or the load allocation (LA), point sources or WLA, and a margin of safety. The State is required to issue NPDES permits to point source discharges that are consistent with the assumptions of any applicable TMDL, including those approved subsequent to permit issuance.~~

~~Urban stormwater is defined in the CWA as a point source discharge and will subsequently be a part of Maryland's WLA. The NPDES stormwater permits can play a significant role in regulating pollutants from Maryland's urban sector and in the development of Chesapeake Bay Watershed Implementation Plans. Therefore, Maryland's NPDES stormwater permits issued to Anne Arundel County and other municipalities will require coordination with MDE's Watershed Implementation Plan and be used as the regulatory backbone for controlling urban pollutants~~

~~toward meeting the Chesapeake Bay TMDL by 2025.~~

~~**B. Comprehensive Planning**~~

~~Anne Arundel County shall cooperate with other agencies during the completion of the Water Resources Element (WRE) as required by the Maryland Economic Growth, Resource Protection and Planning Act of 1992 (Article 66B, Annotated Code of Maryland). Such cooperation shall entail all reasonable actions authorized by law and shall not be restricted by the responsibilities attributed to other entities by separate State statute, including but not limited to reviewing and approving plans and appropriating funds.~~

A. Maryland's baseline programs, including the 1991 Forest Conservation Act, 1997 Priority Funding Areas Act, 2007 Stormwater Management Act, 2009 Smart, Green & Growing Planning Legislation, 2010 Sustainable Communities Act, 2011 Best Available Technology Regulation, and the 2012 Sustainable Growth & Agricultural Preservation Act effectively mitigate the majority of the impacts from new development. Any additional loads will be offset through Maryland's alignment for growth policies and procedures as articulated through Chesapeake Bay milestone achievement. The overriding goal shall be no net growth in loads and XXXXX County/City/Agency shall reflect these policies, programs, and implementation as part of its net WLA accounting as stipulated in Part IV.E.4.b.ii of this permit.

PART VII. ENFORCEMENT AND PENALTIES

A. ~~A.~~ **Discharge Prohibitions and Receiving Water Limitations**

~~Anne Arundel~~XXXXX County/City/Agency shall prohibit non-stormwater discharges through its MS4. ~~-~~NPDES permitted non-stormwater discharges are exempt from this prohibition.~~-~~ Discharges from the following will not be considered a source of pollutants when properly managed:~~-~~ water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration to separate storm sewers; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation waters; springs; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; de-chlorinated swimming pool discharges (not including filter backwash); street wash water; and fire fighting activities.~~—~~

Consistent with §402(p)(3)(B)(iii) of the CWA, the County/City/Agency shall take all reasonable steps to minimize or prevent the contamination or other alteration of the physical, chemical, or biological properties of any waters of the State, including a change in temperature, taste, color, turbidity, or odor of the waters or the discharge or deposit of any organic matter, harmful organism, or liquid, gaseous, solid, radioactive, or other substance into any waters of the State, that will render the waters harmful to:

1. Public health, safety, or welfare;

2. Domestic, commercial, industrial, agricultural, recreational, or other legitimate

beneficial use;

3. Livestock, wild animals, cats or birds; and

4. Fish or other aquatic life.

B. ~~B.~~ Duty to Mitigate

~~Anne Arundel~~XXXXX County/City/Agency shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

C. ~~C.~~ Duty to Comply

~~Anne Arundel~~XXXXX County/City/Agency shall be responsible for complying with all conditions of this permit. Other entities may be used to meet various permit obligations provided that both the County/City/Agency and the other entity agree contractually. Regardless of any arrangement entered into however, the County/City/Agency remains responsible for permit compliance. In no case may this responsibility or permit compliance liability be transferred to another entity.

Failure to comply with a permit provision constitutes a violation of the CWA and is grounds for enforcement action; permit termination, revocation, or modification; or denial of a permit renewal application. The County/City/Agency shall comply at all times with the provisions of the Environment Article, Title 4, Subtitles 1, 2, and 4; Title 7, Subtitle 2; and Title 9, Subtitle 3 of the Annotated Code of Maryland.

The County/City/Agency shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the County/City/Agency to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the County/City/Agency only when the operation is necessary to achieve compliance with the conditions of the permit.

D. ~~D.~~ Sanctions

1. ~~1.~~ Penalties Under the CWA - Civil and Criminal

~~—~~Section 309(g)(2) of the CWA, 33 USC §1319(g)(2) provides that any person who violates any permit condition is subject to a civil penalty not to exceed $10,000 per day for each violation, not to exceed $125,000. Pursuant to the Civil Monetary Penalty Inflation Adjustment Rule, 40 CFR Part 19, any person who violates any NPDES permit condition or limitation is liable for an administrative penalty not to exceed $16,000 per day for each such

violation, up to a total penalty of $177,500. Pursuant to Section 309(c) of the CWA, 33 USC §1319(c), any person who negligently violates any permit condition is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. Any person who knowingly violates any permit condition is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both.

2. ~~2.~~ Penalties Under the State's Environment Article - Civil and Criminal

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the County/City/Agency from civil or criminal responsibilities and/or penalties for

a violation of Title 4, Title 7, and Title 9 of the Environment Article, Annotated Code of Maryland, or any federal, local, or other State law or regulation. Section 9-342 of the Environment Article provides that a person who violates any condition of this permit is liable to a civil penalty of up to $10,000 per violation, to be collected in a civil action brought by MDE, and with each day a violation continues being a separate violation. Section 9-342 further authorizes the MDE to impose upon any person who violates a permit condition, administrative civil penalties of up to $5,000 per violation, up to $50,000.

Section 9-343 of the Environment Article provides that any person who violates a permit condition is subject to a criminal penalty not exceeding $25,000 or imprisonment not exceeding 1 year, or both for a first offense. For a second offense, Section 9-343 provides for a fine not exceeding $50,000 and up to 2 years imprisonment.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who knowingly makes any false statement, representation, or certification in any records or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

E. ~~**E.**~~ **Permit Revocation and Modification**

1. ~~1.~~ Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by ~~the~~XXXXX County/City/Agency for a permit modification or a notification of planned changes or anticipated noncompliance does not stay any permit condition. A permit may be modified by MDE upon written request by the County/City/Agency and after notice and opportunity for a public hearing in accordance with and for the reasons set forth in COMAR 26.08.04.10.

After notice and opportunity for a hearing and in accordance with COMAR 26.08.04.10, MDE may modify, suspend, or revoke and reissue this permit in whole or in part during its term for causes including, but not limited to the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. A change in any condition that requires either a temporary reduction or elimination of the authorized discharge;

d. A determination that the permitted discharge poses a threat to human health or welfare or to the environment and can only be regulated to acceptable levels by permit modification or termination;

e. To incorporate additional controls that are necessary to ensure that the permit effluent limit requirements are consistent with any applicable TMDL WLA allocated to the discharge of pollutants from the MS4; or

~~f.~~ f. As specified in 40 CFR §§122.62, 122.63, 122.64, and 124.5.

2. ~~2.~~ Duty to Provide Information

The County/City/Agency shall furnish to MDE, within a reasonable time, any information that MDE may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit. The County/City/Agency shall also furnish to MDE, upon request, copies of records required to be kept by this permit.

F. ~~F.~~ Inspection and Entry

~~Anne Arundel~~XXXXX County/City/Agency shall allow an authorized representative of the State or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulatory activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and obtain copies at reasonable times of any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times, without prior notice, any construction site, facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

G. Monitoring and Recordkeeping

Unless otherwise specified by this permit, all monitoring and records of monitoring shall be in accordance with 40 CFR Part 122.41(j).

H. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State or local law or regulations.

~~any invasion of personal rights, nor any infringement of federal, State, or local law or regulations.~~

I. Severability

The provisions of this permit are severable. If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect. If the application of any provision of this permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

J. Signature of Authorized Administrator and Jurisdiction

Each application, report, or other information required under this permit to be submitted to MDE shall be signed as required by COMAR ~~26~~16.08.04.01-1. Signatories shall be a principal executive officer, ranking elected official, or other duly authorized employee.

~~Jay G. Sakai~~

Lee Currey, Director **Date**
Water Management Administration

From: "Karl Berger" <kberger@mwcog.org>
Sent: Thu, 9 Nov 2017 21:18:52 +0000
To: "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>; "Lynn Buhl -MDE- (lynn.buhl@maryland.gov)" <lynn.buhl@maryland.gov>; "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>; "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>
Cc: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Stevens, Amy" <Amy.Stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Gill, Joseph P." <JPGill@co.pg.md.us>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: MS4 permittee general comments on restoration section
Attachments: MS4 Response to Next Gen Permit - Restoration Section General Comments.11-9-2017.docx

Lee et al,

I know you have been having some conversations with various MS4 representatives about our views on the template draft. Attached is a set of general comments that reflect the group's internal conversations about the restoration section of the draft template. It represents a rough consensus, but, as usual, should not be interpreted as the official position of any individual permittee.

p.s. I separately have sent the group's technical comments and a proposed agenda for our meeting on Nov. 14.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MD MS4 Phase I – general comments in response to draft template for new permit
Nov. 7, 2017

(These comments are submitted on behalf of the MS4 technical program managers. They do not represent the formal position of any jurisdiction.)

Nutrient Trading

- Trading is not a feasible option for all jurisdictions.

- Those that cannot/do not trade should not be penalized.

- Trading for permit compliance only works as a no-cost transaction, e.g. trading in time with one's own wastewater plant; otherwise, the money spent decreases the total amount spent on restoration work that will have to be done anyway.

Current Permit Compliance

- For those intending to use trading in time to bridge impervious surface retrofit (ISR) acreage gap, there should not be a 50-percent ceiling on the use of trading to meet this requirement.

Draft MS4 Permit Template for 2019-2024 Permit

- Agree with continuation of 20-percent ISR goal through this permit.
    - If the permit just has this requirement in the Restoration section, it would not constitute anti-backsliding

- Do not support additional 5 percent Chesapeake Bay Restoration Plan requirement.
    - How is the 5% Chesapeake Bay Restoration goal consistent with the Phase III WIP? MDE needs to provide technical justification for this requirement.

- In general, MEP is represented by 10% ISR in each 5-year permit term.
    - To the extent that jurisdictions achieved 10-pecent ISR reduction before the current permit was issued, meeting the current 20-percent requirement would constitute the achievement of a 30-percent reduction goal by 2025 consistent with the state's Phase II Watershed Implementation Plan.

- Do not object to the idea of additional 10-percent ISR requirement in the 2024-2029 permit, but this does not need to be written into the permit.
    - This could be addressed in fact sheet and through the state's Phase III WIP.
    - Both MDE's gap analysis and individual MS4s' MEP analysis should be conducted during the 2019-2024 permit term and be used to adjust future permit requirements accordingly.

- Need clarity from MDE regarding how to translate impervious surface reduction into N credits.
    - A formula that requires 12 pounds of N for each impervious acre or that is based on more than one inch of retention for an ISR-acre credit is not viable.

From: "Lee Currey -MDE-" <lee.currey@maryland.gov>
Sent: Mon, 13 Nov 2017 23:00:57 +0000
To: "Karl Berger" <kberger@mwcog.org>
Cc: "Lynn Buhl -MDE- (lynn.buhl@maryland.gov)" <lynn.buhl@maryland.gov>; "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>; "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Stevens, Amy" <Amy.Stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Gill, Joseph P." <JPGill@co.pg.md.us>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Shannon Moore" <SMoore@frederickcountymd.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: Re: MS4 permittee general comments on restoration section

Thank you all for your input and I look forward to the discussion tomorrow.

Lee

On Thu, Nov 9, 2017 at 4:18 PM, Karl Berger <kberger@mwcog.org> wrote:

> Lee et al,
>
> I know you have been having some conversations with various MS4 representatives about our views on the template draft. Attached is a set of general comments that reflect the group's internal conversations about the restoration section of the draft template. It represents a rough consensus, but, as usual, should not be interpreted as the official position of any individual permittee.
>
> p.s. I separately have sent the group's technical comments and a proposed agenda for our meeting on Nov. 14.
>
> Karl Berger
>
> Principal Environmental Planner
>
> Metropolitan Washington Council of Governments
>
> 202-962-3350

--
D. Lee Currey, Director
Water and Science Administration
Maryland Department of the Environment (MDE)
Montgomery Park
1800 Washington Blvd., Ste. 4502
Baltimore, MD 21230-1718
Office: 410-537-3567
lee.currey@maryland.gov
www.mde.state.md.us
www.facebook.com/MDEnvironment
www.twitter.com/MDEnvironment

From: "Karl Berger" <kberger@mwcog.org>
Sent: Tue, 28 Nov 2017 21:03:49 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Stevens, Amy" <Amy.Stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Gill, Joseph P." <JPGill@co.pg.md.us>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "jjoiner@frederickcountymd.gov" <jjoiner@frederickcountymd.gov>
Cc: "Maldonado, Jerry G." <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>
Subject: FW: Property Management and Maintenance
Attachments: MS4 Monitoring Survey Results Public 111717.pdf, MDE Memo on BMPs and Completion Dates for MS4 Permit Requiremnts 11_7_2017 rpb.docx

Folks,

Feedback from MDE on items discussed at last meeting.

From: Raymond Bahr -MDE- [mailto:raymond.bahr@maryland.gov]
Sent: Monday, November 27, 2017 4:33 PM
To: Karl Berger <kberger@mwcog.org>
Subject: Re: Property Management and Maintenance

Hi Karl,

At our last MACO meeting we promised you the attached information:

1) MDE monitoring survey summary

2) MDE memo on historical BMP construction completion

We took the most recent KCI memo submitted by the Counties and formalized it into an MDE memo. Please have the committee review for any fatal flaws before our next MACO meeting.

3) Industrial/commercial survey examples

MDE has reviewed the Counties' annual reports and, in general, everyone is doing a good job of identifying these areas by using zoning data, NAICS codes, assessment and taxation codes, land use data, and aerial imagery. MDE is unsure of what is being requested from MACO? If the question is how to input into the geodatabase, then the answer is to submit the analysis as a narrative file.

MDE is looking forward to our next meeting and MS4 permit template proposals for meaningful local stormwater management.

Sincerely,

Raymond P. Bahr
Program Review Division Chief
Sediment, Stormwater, and Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1708
(410) 537-3545

On Wed, Nov 15, 2017 at 10:58 AM, Raymond Bahr -MDE- <raymond.bahr@maryland.gov> wrote:

> Steve, Rob, and Rob,
>
> As discussed yesterday, can you three take a crack at editing this section of the permit based on yesterday's discussions. Please start with the attached draft permit and use track changes.
>
> I think that we discussed a two week turn-around for this important information.
>
> Karl, we promised MACO the results of our monitoring survey, an example of an industrial/commercial survey, and BMP construction completion guidance; we'll forward them along as soon as they are ready.
>
> Thank you,
>
> Ray
>
> --
> Raymond P. Bahr
> Program Review Division Chief
> Sediment, Stormwater, and Dam Safety Program
> Maryland Department of the Environment
> 1800 Washington Boulevard
> Baltimore, MD 21230-1708
> (410) 537-3545

--

Click here to complete a three question customer experience survey.

MS4 Monitoring Survey Results

Key Questions Monitoring Should Answer

- Individual BMP effectiveness
  - Improve accuracy of current efficiencies
  - Improve precision of current efficiencies
    - i.e., variability by physiography
  - Establish efficiencies for BMPs not currently credited
- Major watershed load contributions to the bay
- Collective BMP effectiveness
- Assess progress towards TMDLs
- Assessment of WQSs

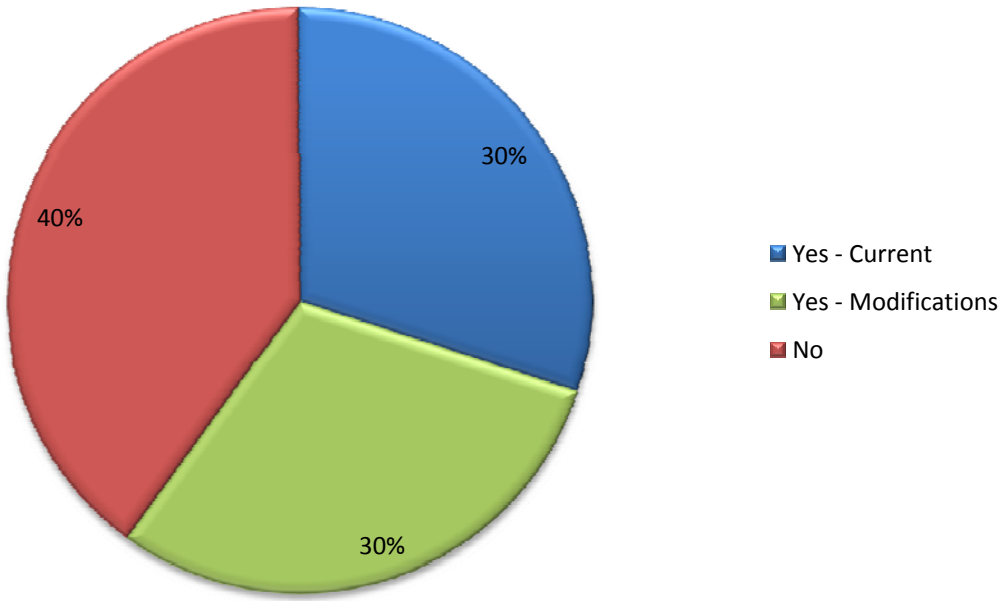
Watershed Restoration (WR) Monitoring

WR Monitoring Costs

Watershed Restoration Monitoring					
County/City/Agency	*Chemical*	*Biological*	*Physical*	*Total*	*Notes*
1	$38,735	$26,611	$11,328	$76,674	
2	$200,000	$50,000	$24,000	$274,000	
3	$8,200	$330	N/A	$8,530	Only costs are lab analysis and benthic ID
4	$80,204	$31,714	$80,445	$192,363	
5	$77,872	$1,200	$2,800	$81,872	
6	$110,000	$34,000	$48,000	$192,000	
7	$90,000	$14,000	$2,000	$106,000	
8	N/A	N/A	N/A	$500,000	No info. on cost per type. Only total
Average	**$86,430**	**$22,551**	**$28,096**	**$178,930**	

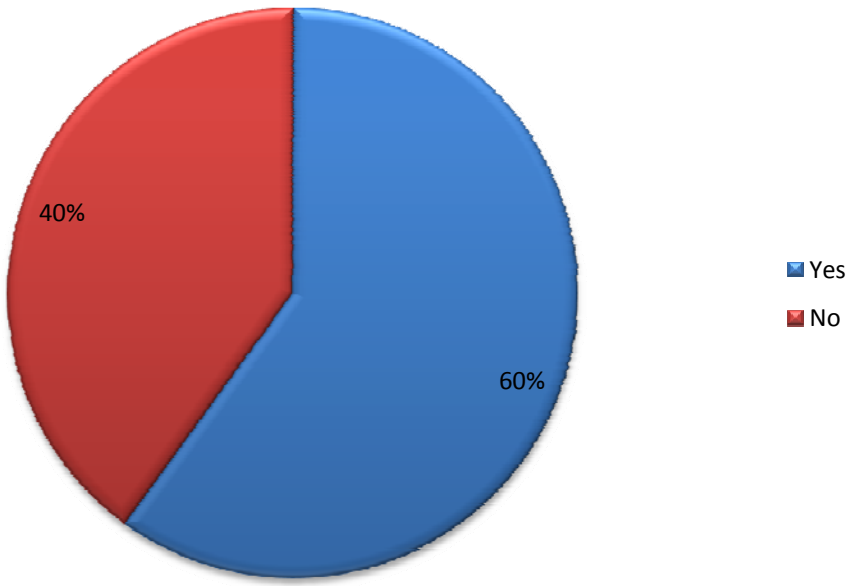
Note: One permitee could not provide costs, since all monitoring and analysis are done in house (costs = lab analysis + staff time)

Is the WR Chemical Monitoring Useful?



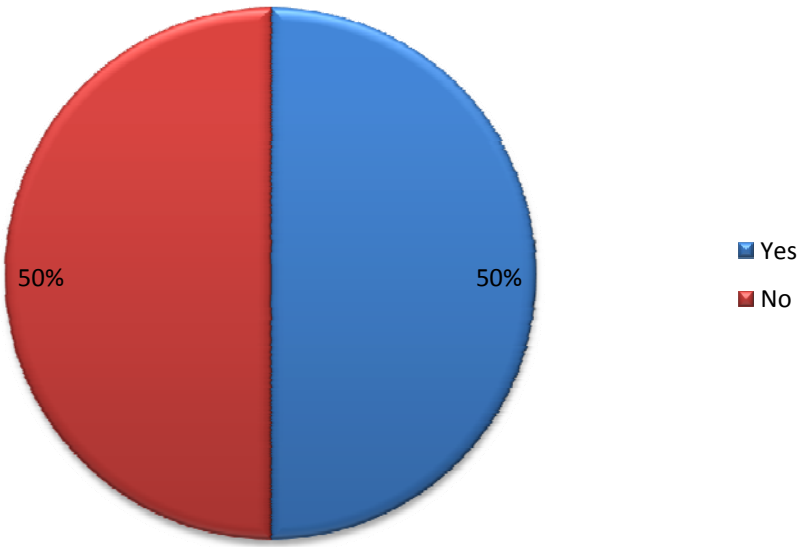
County/City/Agency	Notes
1	Just switched watersheds to a watershed with a significant amount of restoration still planned
2	Monitoring is set up to assess effectiveness of individual practices and relate them to downstream station
3	Have already seen results, i.e., peak flow reductions, post restoration. Would like to switch watershed
4	Been monitoring watershed for 10+ years, and have not noticed any trends. Accoridng to the permittee, restoration has been maxed out in watershed.
5	Permittee says there are too many variables and monitoring needs to be scaled up or down
6	Would like feedback from MDE on data collected to date; don't understand some parameters being monitored; need more specific research questions
7	Having a long-term record of data in an urban watershed that could detect trends of restoration is a good thing
8	Think current monitoring has potential, since still a lot of restoration to go into watershed, but would like to alter to answer specific research questions
9	Would like to keep current monitoring going, but would like to drop certain aspects, i.e., some of the parameters being monitored
10	Current monitoring does not address specific research questions

Is the WR Biological Monitoring Useful?



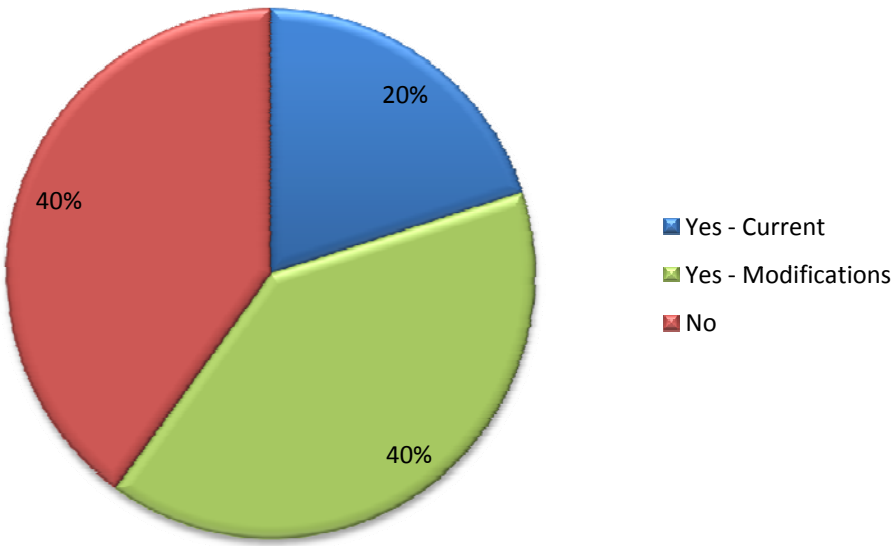
County/City/Agency	Notes
1	
2	
3	
4	Data haven't shown any improvement over 10 years
5	There are better ways to show progress than using biological data
6	
7	
8	Benthics can't recover if populations are non-existant
9	
10	MS4 opinion of BMP effectiveness not considered

Is the WR Physical Monitoring Useful?



County/City/Agency	Notes
1	
2	
3	
4	No, data haven't shown any improvements over a decade
5	No, only benefit of physical monitoring is to assess pre-conditions of a restoration project
6	Useful for determining stabilitiy of stream segment, but not for overall stream health
7	
8	Redundancy with ACOE monitoring, and channel shape completely changed post in-stream restoration project in monitored watershed
9	
10	

If Not a Permit Requirement, Would the Jurisdiction Continue the WR Monitoring?

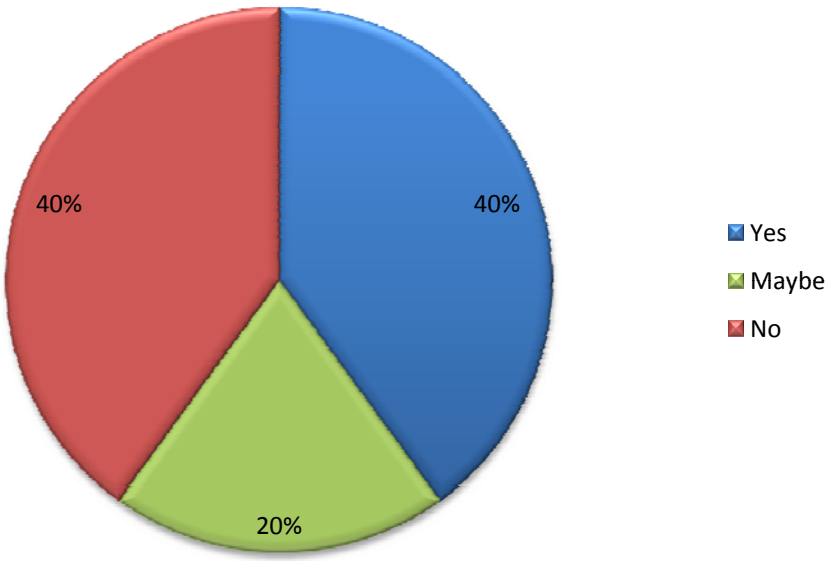


County/City/Agency	Notes
1	Can't justify costs
2	
3	Permittee would not continue on with the current "setup" of the monitoring program
4	Haven't learned anything from a decade's worth of data
5	Would do chemical monitoring at a smaller scale
6	
7	
8	Would continue on, but would want to change monitoring setup
9	Would want to drop the outfall station and some WQ parameters
10	Would continue with some sort of restoration monitoring, but it would be a completely different design

Suggestions for Improving the WR Monitoring

- No change to the monitoring design
  - Keep it going, since current watershed monitoring has only been in place for a few years
  - No change, but need to complete statewide analysis of data collected to date
- Changing the monitoring design
  - More site specific monitoring with case and control sites
  - Follow the lead of CB Trust (more targeted monitoring)
  - Drop certain WQ parameters
  - Drop outfall stations
  - More intensive monitoring needed, i.e., continuous WQ monitoring, not just a few storms
  - More scientific approach: develop specific hypothesis, plan for the study, and time frame to complete the study, for both individual and cumulative restoration practices

Would the Jurisdiction Contribute Money to a Pooled Effort for the WR Monitoring?



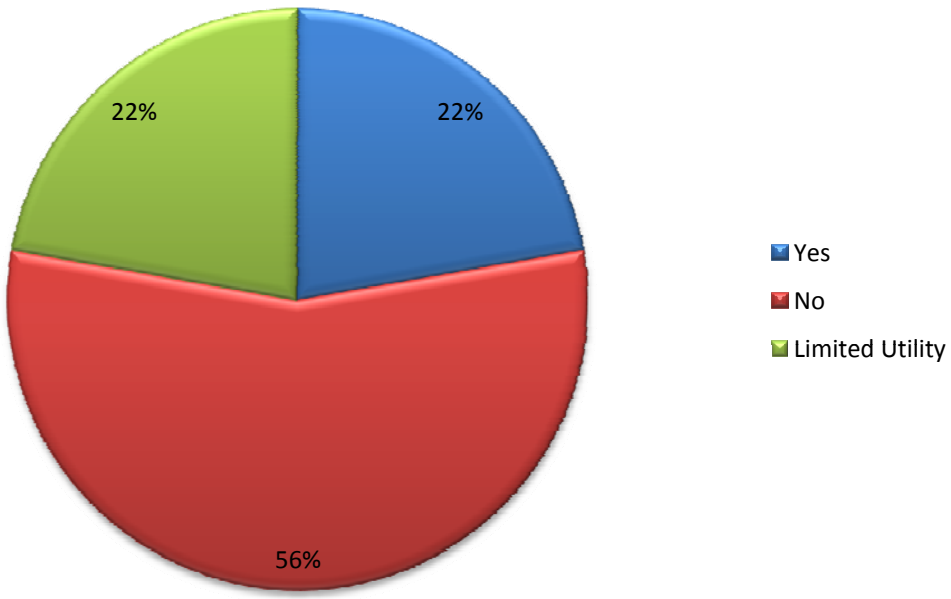
County/City/Agency	Notes
1	Different geographies, so a study in one jurisdiction might not be applicable to a study in another jurisdiction
2	
3	Different geographies, so a study in one jurisdiction might not be applicable to a study in another jurisdiction
4	
5	Only for chemical monitoring
6	
7	
8	Dependent on structure of pooled monitoring program
9	Might be willing to contribute money saved from potentially dropping WQ parameters, stations, etc, but would not be much money
10	

Stormwater Management (SWM) Effectiveness Monitoring

SWM Effectiveness Monitoring Costs

SWM Effectiveness Monitoring		
County/City/Agency	*Cost ($)*	*Notes*
1	$11,328	
2	$15,000	
3	$80,445	
4	$200,000	Has local monitoring reqt. (more extensive than other jurisdictions)
5	$36,000	
6	$20,000	
Average	**$60,462**	
Note: One permitee is N/A, and two permitees do this in-house (cost = staff time)		

Is the SWM Effectiveness Monitoring Useful?

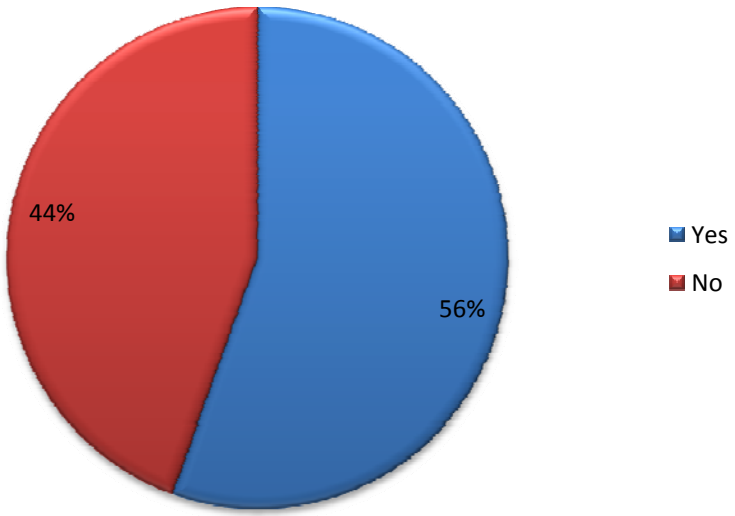


County/City/Agency	Notes
1	Current monitoring locations have large streamside buffers as required by new ESD reqts., so data may not reflect actual effects of SWM
2	Doesn't relate to any restoration work, and wouldn't result in changes to State SW regs.
3	Permitee asks what utility this monitoring provides?
4	Data collected so far (10+ years) indicate that the channel hasn't changed much
5	Since the State has already adopted ESD, this requirement is only applicable in special cases
6	Have not seen any useful results to date
7	
8	Permitee requires this monitoring anyway per local codes
9	

Suggestions for improving SWM Effectiveness monitoring

- Analyze the data that has been collected to date to determine if CPv being met
- More scientific design: clearly stated hypothesis, study, and time frame

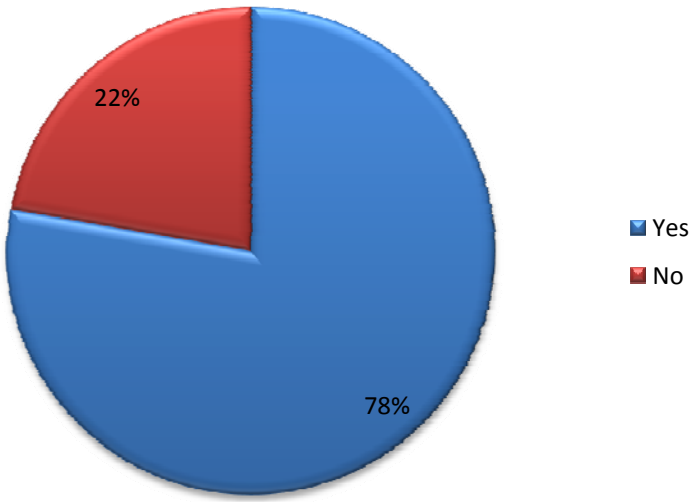
Would the Jurisdiction Contribute Money to a Pooled Effort for the SWM Effectiveness Monitoring?



County/City/Agency	Notes
1	
2	
3	
4	
5	Open to a pooled appraoch if can tie bay load reductions to specific BMPs
6	
7	
8	Have to perform monitoring anyway for own county codes
9	

Countywide Biological Monitoring

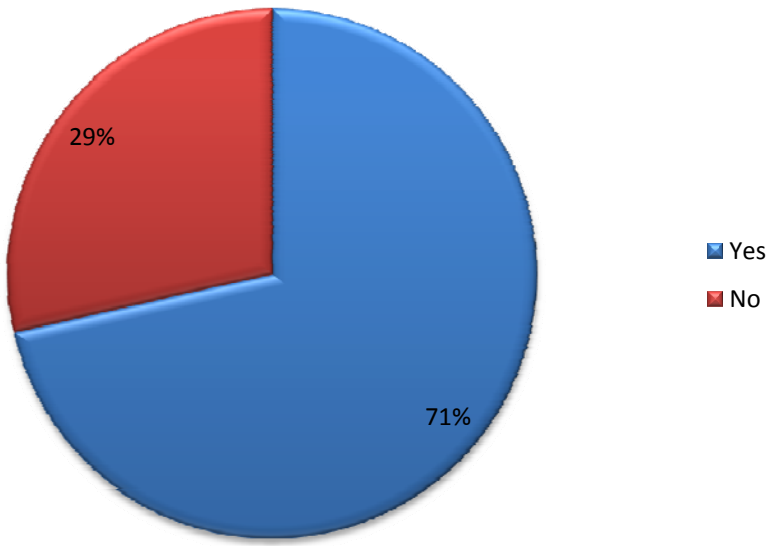
Does the Jurisdiction Have a Biological Monitoring Program?



County/City/Agency	Notes
1	Haven't considered implementing a program before, but would be ok with State doing the monitoring
2	
3	Only targeted monitoring downstream of retrofits
4	
5	
6	
7	Funding restrictions have limited the implementation of a program, but are ok with State doing monitoring
8	
9	

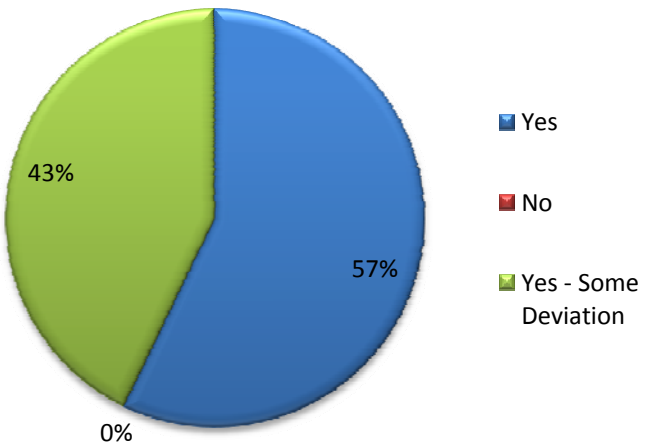
For Jurisdictions with a Biological Monitoring Program…..

Are Stations Randomly Selected?



County/City/Agency	Notes
1	All stations per round are randomly selected
2	Only targeted monitoring downstream of retrofits
3	All stations per round are randomly selected
4	All stations per round are randomly selected
5	Previously only random stations. Now, using some fixed going back to sites from earlier rounds
6	10% of stations randomly selected. Rest are fixed
7	All stations per round are randomly selected

Does Jurisdiction use MBSS Sampling Protocols?



County/City/Agency	Notes
1	
2	
3	Habitat and benthic sub-sampling is different
4	
5	Habitat assessment uses RBP
6	Taxonomic ID only to family level
7	

Would Jurisdictions Prefer to Pay the State to Monitor, or Continue With its Own Program?

- All jurisdictions would like to continue with own monitoring

Biological Monitoring Costs

Jurisdiction-wide Biological Monitoring				
County/City/Agency	*Cost/Yr ($)*	*Stations*	*Cost/Station ($/Station)*	*Notes*
1	$86,000	50	$1,720	
2	$2,800	13	$215	
3	$139,986	85	$1,647	
4	$769,159	110	$6,992	
5	$75,000	30	$2,500	
6	$290,000	88	$3,295	
Average	**$227,158**	**63**	**$2,728**	

Bacteria Monitoring and IDDE

Suggestions for improving IDDE

- No test kit if GW infiltration is known concern in the area, or if contributions from septics or leaking sanitary system has low potential
- Focus on outfalls in high priority areas:
  - Commercial/industrial areas
  - High/medium density residential
  - Older development
- Commercial/industrial visual surveys have no payoff

From: "Karl Berger" <kberger@mwcog.org>
Sent: Fri, 8 Dec 2017 17:27:24 +0000
To: "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>
Cc: "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Stevens, Amy" <Amy.Stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Gill, Joseph P." <JPGill@co.pg.md.us>; "Steve Stewart" <sstewart@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "jjoiner@frederickcountymd.gov" <jjoiner@frederickcountymd.gov>
Subject: Comments on Restoration Section of new permit template
Attachments: MS4 template permit - restoration section comment document_120817.docx

Lee:

Attached are the MD MS4 Phase I group's comments on the restoration section of MDE's new permit template. As usual, they should not be interpreted as the official position of any individual permittee.

By the way, we did try to set up a meeting with the Choose Clean Water representatives on Dec. 12, but those plans fell victim to some last-minute scheduling conflicts. We hope to schedule a meeting with the environmental folks in early January.

At this point, there are no meetings between us scheduled for 2018. It doesn't seem to make sense to set up a schedule of quarterly meetings, as that would be unlikely to meet our needs during this critical period for developing a new permit.

Perhaps we should plan to meet in mid- to late-January, after we have met with the environmental representatives, after we have seen the new permit draft that MDE has sent to EPA III, and when we have a better idea of progress on finalizing the trading regulations.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MS4 MACO group proposal for Section E. Restoration for Total Maximum Daily Loads and Chesapeake Bay in new permit template

DRAFT Dec. 8, 2017

(These comments are submitted on behalf of the MS4 technical program managers. They do not represent the formal position of any jurisdiction.)

Montgomery County exception: Because the permit issued to Montgomery County in February 2010 predated all other Phase I permits with similar provisions by almost four years or more, the county's MS4 program remains on a different schedule for implementation than the other Phase I jurisdictions. After the county's completion of the 20 percent impervious surface reduction requirement in 2020, it will be in a position to undertake additional impervious surface/nutrient reduction implementation in its next permit. The County anticipates working with the other jurisdictions and MDE to ensure there is equity among all jurisdictions with additional restoration requirements.

Re: Section 2. Impervious Surface Restoration

Support provision to make this requirement a continuation of the 20-percent impervious surface reduction target from the previous permit – with any trading credit phased out by the end of the new permit term.

- For almost all of the MS4 Phase I permittees, meeting this requirement will require a level of effort equal to or greater than what they are investing in the current permit term, i.e. there will likely be more acres to be restored in the 2019/20 – 2023/24 period as will be restored in the 2013/14 – 2018/19 period.
- If this were to remain the only provision in the Restoration section, the permits would not violate the anti-backsliding requirement of federal law, as the original restoration requirements have been acknowledged to have been unrealistic by both State and Federal regulatory staff.

Re: Section 3 Chesapeake Bay Restoration

Do not support inclusion of the provision for an additional 5 percent impervious surface reduction (ISR) -- or its equivalent in nitrogen reduction.

- The State's Phase II Watershed Implementation Plan established an overall 30-percent impervious surface reduction goal by 2025. Many MS4 Phase I permittees will have met this goal by 2025, counting ISR made prior to the issuance of the current permit and assuming achievement of the current 20 percent ISR requirement by the end of the next permit.
- It was not clear to us from the preliminary "gap analysis" data that MDE presented at our Sept. 12 meeting that further reductions from the urban stormwater source sector will be needed to meet the state's 2025 Bay TMDL nutrient load reduction targets (although stormwater reductions may be needed after 2025 as loads gradually increase from the wastewater sector).
    - We have not had an opportunity to review all of the assumptions MDE used in that analysis.

- The analysis was based on old Chesapeake Bay Program model information; it will have to be updated with new data from the Mid-Point Assessment process and the new suite of CBP models.

Other additive requirements

- Should MDE insist on further requirements under the Restoration section, many of the MS4 Phase I permittees would prefer the option of conducting separate restoration projects outside the framework of impervious surface or equivalent nutrient reduction in lieu of the Chesapeake Bay Restoration section's proposed 5% ISR or equivalent nitrogen reduction requirement. Further details on this alternative proposal follow.

Proposal for an alternative to the proposed Chesapeake Bay Restoration requirement

This proposal represents an idea developed by several of the MS4 Phase Is for restoration that is "additive," meaningful in terms of real water quality and/or habitat improvements, and provides an incentive/recognition for work that may be outside the traditional ISR and sediment and nutrient reduction accounting frameworks. The proposed work would improve local water quality, enhance habitat, and further the mission of the Clean Water Act to provide swimmable, drinkable, and fishable waters.

Our proposal is to implement "Supplemental Environmental Projects" (SEPs) over the life of the next permit term. Our expectation is that MDE would approve each jurisdiction's SEP proposals to allow the permits to be individually tailored and ensure that the level of effort exerted by each jurisdiction is sufficient. These projects could provide some progress towards impervious surface reduction and nutrient and sediment reduction goals, but their primary driver will be something else: local TMDL attainment, habitat enhancement, flood prevention, broad-scale public education, etc.

Each project would be negotiated between the permittee and MDE with the permittee presenting the benefits of the project outside or above and beyond the ISR requirements. Benefits may be habitat uplift, nutrient removal mechanisms not currently recognized for credit, environmental remediation benefits not currently captured under remediation objectives, etc.

Some potential examples are outlined in the following table.

Examples of potential SEPs

Jurisdiction	Project	Explanation/Environmental Benefit
Anne Arundel	PCB Remediation Pilot Project	As part of initial environmental assessments for a larger stream and wetland project, pre-existing pockets of PCB contamination were discovered on the subject property. The County is interested in pursuing a pilot project for *in situ* remediation of the PCBs prior to pursuing the stream and wetland work later in the next permit term. This project aims to engage a

		partnership with a local university and provide a test case for lower cost, less disruptive PCB remediation in the context of urban re-development. One of the primary goals of the project is to reduce downstream bioavailability of PCBs in aquatic organisms. Lessons learned and remediation protocols successfully tested will be applied to other sites within the County if PCBs should be discovered. Under the current terms of the MS4 permit, this effort would garner no "credit."
Frederick	Gravel Road Retrofit	Gravel roads are impervious and a large source of pollutant runoff from erosion. There is a CBP credit for these but nothing for impervious surface treatment. The rainmaker tool measures runoff from a 1" storm and can be used pre-and post-construction to determine pollutant load reductions and/or impervious surface reduction. It could also count as a SEP in the interim.
Howard	• Pet waste campaign • Environmental Education with the schools • Ellicott City flood control (a portion of it) • Stormwater infrastructure maintenance and repairs • Upgrading our salt program	
Prince George's	Habitat Creation	The County has multiple stream restoration projects in its inventory for water quality restoration. By combining habitat improvement design elements, the project will provide complete functional uplift through bank stabilization, nutrient reductions and biological aquatic habitat improvements.

Overall	New BMP vetting	Allow jurisdictions to install a BMP that is not already credited by MDE/EPA and demonstrate its value through a scientifically rigorous research effort. This is not currently an incentive to pursue this work as it is outside the existing ISR crediting framework.

The goals of these SEPs will be consistent with the intent of MS4 permitting and the Clean Water Act, and should result in pilot efforts at the County level that can be shared broadly and used to inform restoration efforts in future permit cycles. Additionally, the inclusion of a SEP option creates an incentive for the MS4 jurisdictions to undertake projects that have little or no direct benefit for ISR/nutrient reduction, but have many other benefits and strong local support. Such projects are difficult to justify in the current environment, in which programmatic resources are consumed with meeting ISR/nutrient reduction requirements.

The projects themselves could be outlined in the year 1 or 2 annual reports, and described in updates in subsequent annual reports as they move into completion. Our goal would be to have these projects become “showcase” efforts that the jurisdictions could use to promote their commitment to clean water, MDE could use to demonstrate the breadth of work being done in Maryland, and that we could collectively use to advance the science of stormwater and public support for our programs.

Maryland
Department of the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

Memorandum

Date: xxxxxxxxx

To: Maryland's Municipal Separate Storm Sewer System (MS4) Community

From: Maryland Department of the Environment (MDE), Sediment, Stormwater, and Dam Safety Program (SSDS)

Re: Stormwater Best Management Practices (BMPs) and Completion Dates for MS4 Permitting Purposes

****

The purpose of this memorandum is to provide guidance to local governments on how to record stormwater BMP implementation dates to capture missing construction completion documentation and determine the level of water quality treatment for the purpose of meeting NPDES MS4 permit requirements. Determining the BMP implementation date is also important to accurately document BMP location and condition, schedule required maintenance inspections, and characterize an MS4's stormwater assets. While the MDE's *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, 2014* (MS4 Guidance) provides some guidance, MDE recognizes there are situations where historical BMPs exist in good condition but as-built plans or other documentation of their construction date may be incomplete or non-existant. Therefore MDE offers the following framework to address these situations while ensuring a high level of confidence in the BMP data. Jurisdictions wishing to use an alternative method, other than as-built plans, to document BMP built date and determine water quality treatment shall use the minimum criteria below. These criteria shall be used to develop local standard operating procedures for MDE's review and approval.

1. Assurance of BMP water quality treatment and impervious acres treated shall be based on:
    a. Maryland's Stormwater Design Manual (2000) for water quality treatment analysis and MS4 Guidance for impervious acre credit analysis; and,
    b. As-built certification for BMPs constructed post-2000 Maryland stormwater regulation updates (*Updates*); or,
    c. Construction completion forms for BMPs constructed prior to Maryland's 2000 *Updates; or,*
    d. Local BMP water quality and impervious area verification inspection procedures following the criteria in this memo (see outline item number 3 below).

2. Stormwater management BMPs constructed prior to the 2000 *Update* may receive credit for up to a maximum of 1 inch of water quality treatment based on locally documented stormwater management ordinances, policies, plans, or reports.

a. Water quality treatment credit will be accepted for water quality BMPs including stormwater ponds, wetlands, infiltration, filtering systems, and open channel systems.
b. Dry ponds, extended detention or otherwise, and hydrodynamic structures do not provide adequate water quality and will not be accepted for water quality treatment credit.
c. In-stream stormwater management facilities may receive up to a maximum of 1/2 inch of water quality treatment credit on a case-by-case basis when:
    - The water quality volume provided in the facility can be related back to a depth of rainfall managed for the contributing impervious drainage area;
    - Runoff conditions and streams in the contributing drainage area are shown to be in good condition with no signs of erosion or known flooding problems; and,
    - The stream characteristics below the facility have been well-documented, photographed, and found to be in good and stable condition.

3. When construction completion documentation is unavailable, each jurisdiction will need to perform a BMP water quality and impervious area verification inspection. This is in addition to routine maintenance inspections, required by COMAR 26.17.02.11. The BMP verification inspection must include:
    a. A review and documentation of all existing BMP approvals, designs, reports and databases;
    b. Digital imagery documenting construction dates and BMP location;
    c. A well-documented field inspection that shall include, at a minimum, the following BMP measurements:
        - surface area measured at the water quality design elevation
        - bottom surface area
        - permanent wet pool or water quality feature depth
        - maximum ponding depth or depth at top of berm
        - depth of accumulated sediment (if removal is part of the acceptance plan)
        - inflow and outfall sizes, location, and relative invert
        - location, dimensions, material, of control structure and presence of trash rack(s)
        - location and surface area of forebays or micropools
        - infiltration trench or filtering system dimensions, i.e., length, width, depth
        - pictures and descriptions of any additional water quality features
        - description of current conditions, e.g., vegetation, trash, debris blockages, erosion, seepage, corrosion;
    d. Additionally, a stormwater management report documenting:
        - drainage area map
        - actual impervious acres that drain to the BMP
        - water quality treatment credits up to a maximum of 1 inch (1/2 inch for in-stream facilities); and,
    e. Additional review and documentation will be required for all BMPs that meet Maryland Pond Code 378 criteria to ensure the safe operation dams and emergency action plans.

4. All BMPs for water quality treatment credit must be in good condition and well-documented by routine maintenance inspections according to 26.17.02.11, or through the above listed BMP verification inspection program.

5. Jurisdictions will need to have the appropriate legal access to inspect BMPs and ensure that they are being maintained. Where legal access is not provided, jurisdictions need to develop procedures for obtaining BMP access for inspection prior to receiving water quality treatment or impervious acre credits.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Thu, 22 Mar 2018 20:06:33 +0000
To: "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>; "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>
Cc: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Stevens, Amy" <Amy.Stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Gill, Joseph P." <JPGill@co.pg.md.us>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "jjoiner@frederickcountymd.gov" <jjoiner@frederickcountymd.gov>; "Bennett, Katherine" <Katherine.Bennett@montgomerycountymd.gov>; "Maldonado, Jerry G." <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: Comments on 12-29-17 draft of next gen MS4 permit template
Attachments: MS4 group comments on Maryland Draft Next Gen MS4 Phase I Permit 12_29_2017 - DRAFT2.docx

Jennifer, Ray:

The MACO-COG MS4 group has compiled the attached set of comments (in redline/strikethrough format)on MDE's Dec. 29, 2017, draft of the next Phase I permit.

You will see that most of the comments are located in Section IV.E. and address either reporting requirements for the local TMDL implementation plans or the Chesapeake Bay Restoration section under part 3. (i.e. our proposal for "environmental improvement projects" in lieu of the additional ISR or nutrient reductions originally proposed in this section). Note that a majority of the group's members, but not everyone, supports this proposal. Dissenting jurisdictions will submit their own comments individually to MDE regarding this section.

As always, these comments are submitted on behalf of the MS4 technical program managers. They do not represent the formal position of any jurisdiction.

p.s. Ray, in response to your email of 3/6, yes, we should include a discussion of plans for a technical workgroup to advise MDE on updating of the Accounting Guidance in the agenda for our next meeting. (Still waiting on date(s) from Lee for that).

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MARYLAND DEPARTMENT OF THE ENVIRONMENT

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

PART I. IDENTIFICATION

A. Permit Number: XX-XX-XXXX XXXXXXXXX

B. Permit Area

This permit covers all stormwater discharges from the municipal separate storm sewer system (MS4) owned or operated jurisdiction-wide by XXXXX County/City/Agency, Maryland.

C. Effective Date: To be determined (TBD)

D. Expiration Date: TBD

PART II. DEFINITIONS

Terms used in this permit are defined in relevant chapters of Title 40 of the Code of Federal Regulations (CFR) Parts 122 - 124 or the Code of Maryland Regulations (COMAR) 26.08.01, 26.17.01, and 26.17.02. Terms not defined in CFR or COMAR shall have the meanings attributed by common use.

PART III. WATER QUALITY

XXXXX County/City/Agency must manage, implement, and enforce stormwater management programs in accordance with the Clean Water Act (CWA) and corresponding stormwater National Pollutant Discharge Elimination System (NPDES) regulations, 40 CFR Part 122, to meet the following requirements:

1. Effectively prohibit pollutants in stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with Maryland's receiving water quality standards;

2. Attain applicable stormwater wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with Title 33 of the U.S. Code (USC) §1342(p)(3)(B)(iii); 40 CFR §122.44(k)(2) and (3); and

3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with all the conditions contained in PARTs IV through VII of this permit shall constitute compliance with §402(p)(3)(B)(iii) of the CWA and adequate progress toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs for this permit term.

PART IV. STANDARD PERMIT CONDITIONS

A. Permit Administration

XXXXX County/City/Agency shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County/City/Agency shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County/City/Agency shall submit in its annual reports to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

B. Legal Authority

XXXXX County/City/Agency shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County/City/Agency shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County/City/Agency's annual report.

C. Source Identification

Sources of pollutants in stormwater runoff jurisdiction-wide shall be identified by XXXXX County/City/Agency and linked to specific water quality impacts on a watershed basis. A georeferenced database shall be submitted annually in accordance with *Maryland Department of the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017),* hereafter (MS4 Geodatabase) that includes information on the following:

1. Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;

2. Industrial and commercial sources: industrial and commercial land uses and sites that the County/City/Agency has determined have the potential to contribute significant pollutants;

3. Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;

4. Impervious surfaces: public and private land cover delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;

5. Monitoring locations: locations established by the County/City/Agency for chemical, biological, and physical monitoring of watershed restoration efforts and the *2000 Maryland Stormwater Design Manual,* or as part a pooled monitoring approach as described in Part IV.F; and

6. Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.

D. Management Programs

The following management programs shall be implemented jurisdiction-wide by XXXXX County/City/Agency. These management programs are designed to control stormwater discharges and reduce associated pollutant loadings to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. Annual Reports for the County's/City's/Agency's management programs shall be in accordance with Part V.A of this permit and the MS4 Geodatabase.

1. Stormwater Management

An acceptable stormwater management program shall be maintained by the County/City/Agency in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the *2000 Maryland Stormwater Design Manual*. This includes:

   i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;
   ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and
   iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.

b. Maintaining programmatic and implementation information including, but not limited to:

i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;
ii. Number of redevelopment projects received;
iii. Number of stormwater exemptions issued; and
iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by the County/City/Agency.

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County/City/Agency's annual reports.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall be maintained by the County/City/Agency and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the County/City/Agency's erosion and sediment control enforcement authority;

b. Ensure that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE; and

c. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

3. Illicit Discharge Detection and Elimination

The County/City/Agency shall implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:

a. Field screening at least 150 outfalls annually (*100 outfalls for Phase I Medium Jurisdictions*). Each outfall having a discharge shall be sampled using a chemical test kit. An alternative program may be submitted by the County/City/Agency for MDE approval that methodically identifies, investigates, and eliminates illegal discharges to the County/City/Agency's MS4;

b. Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;

c. Maintaining a program to address, and if necessary, respond to illegal discharges, dumping, and spills; and

d. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting.

4. Litter and Floatables

a. The County/City/Agency shall evaluate current litter control problems associated with discharges from portions of its MS4 that are not already addressed under a TMDL for trash (litter and floatables). Actions to address documented liter control problems shall be submitted to MDE and updated annually.

b. As part of the County/City/Agency watershed assessments under PART IV.E.1 of this permit, the County/City/Agency shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.

5. Property Management and Maintenance

a. The County/City/Agency shall ensure that a Notice of Intent (NOI) has been submitted to MDE and a pollution prevention plan developed for each County/City/Agency owned industrial facility requiring coverage under Maryland's NPDES General Permit for Discharges from Stormwater Associated with Industrial Activity (SW Industrial GP):

   i. An NOI for industrial activity is typically required where the following activities are performed: maintenance or storage of vehicles or equipment; use, handling, transport, or storage of fertilizers, pesticides, landscaping materials, hazardous materials, or other materials that could pollute stormwater runoff; and
   ii. A list of County/City/Agency properties requiring industrial stormwater permitting shall be updated and submitted to MDE annually.

b. The County/City/Agency shall develop, implement, and maintain a good housekeeping plan (GHP) for County/City/Agency owned properties not required to be covered under Maryland's SW Industrial GP. A standard GHP may be developed for all County owned property or separate GHPs may be developed for properties with similar use, e.g., recreation and parks property, school property. The GHP shall include, but not be limited to:

   i. A description of property management activities;
   ii. A map of the locations of properties covered by the GHP;
   iii. A list of potential pollutants and their sources that result from activities conducted at the facility or group of like facilities;
   iv. Written GHP procedures designed to reduce the potential for stormwater pollution from the property activity, including illegal discharges, dumping, and spills; and
   v. Procedures for assessing County/City/Agency properties in order to prevent the discharge of pollutants, spills, and leaks into its municipal separate storm sewer system.
   vi. Training for all appropriate County/City/Agency staff and contractors regarding best practices for preventing, reducing, and eliminating the discharge of pollutants during municipal operations.

c. The County/City/Agency shall continue to implement a program to reduce pollutants associated with the maintenance of jurisdiction-wide

properties including local roads and parks. The maintenance program shall include the following activities where applicable:

i. Street sweeping;
ii. Inlet inspection and cleaning;
iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management;
iv. Litter removal; and
v. Pet waste removal.

d. The County/City/Agency shall reduce the use of winter weather deicing and anti-icing materials by developing a County/City/Agency Salt Management Plan (SMP) to be submitted to MDE in its third year annual report. The SMP shall be based on the guidance provided on best road salt management practices described in *the Maryland Department of Transportation, State Highway Administration's Maryland Statewide Salt Management Plan, October 2017*. The County/City/Agency's SMP shall include, but not be limited to:

i. An anticipated schedule of equipment replacement that provides for technological improvements that limit salt application rates;
ii. Training and outreach:
- Creating a local "Salt Academy" that annually provides County/City/Agency personnel and contractors with the latest training in salt management, or the participation of County/City/Agency personnel and contractors in a "Salt Academy" administered by another MS4 jurisdiction or State agency; and
- Developing best salt management practices outreach for educating homeowners within the County/City/Agency; and

iii. Tracking and reporting:
- Starting with the fourth annual report, during storm events where deicing or anti-icing materials are applied to County/City/Agency roads, track and record the amount of materials used and snowfall per event; and
- Report the salt application by event or date, and the monthly and annual salt tonnage usage per lane mile per inch of snow.

e. The County/City/Agency shall report annually on the changes in its Property Management and Maintenance programs and the overall pollutant reductions resulting from these programs.

6. Public Education

The County/City/Agency shall continue to implement a public education and

outreach program to reduce stormwater pollutants. Education and outreach efforts may be integrated with other aspects of the County/City/Agency's activities. These efforts are to be documented and summarized in each annual report, with details on resources (e.g., personnel and financial) expended and method of delivery for education and outreach. The County/City/Agency shall implement a public outreach and education campaign with specific performance goals and deadlines including, but not limited to:

a. Maintaining a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

b. Providing information to inform the general public about the benefits of:

i. Increasing water conservation;
ii. Residential and community stormwater management implementation and facility maintenance;
iii. Proper erosion and sediment control practices;
iv. Increasing proper disposal of household hazardous waste;
v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal);
vi. Residential car care and washing;
vii. Litter reduction;
viii. Reducing, reusing, and recycling solid waste; and
ix. Proper pet waste management.

E. Restoration for Total Maximum Daily Loads and Chesapeake Bay

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable stormwater WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Appendix A). Additionally, the nutrient reductions from the restoration requirements described below are consistent with Maryland's Phase III Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL, contributing to the State's efforts to meet its 2025 nutrient load targets. ~~Annually,~~ XXXX County/City/Agency shall perform required restoration activities, report on implementation status, and provide opportunities for public comment for each project. These efforts shall be captured for reporting in the annual report.

1. TMDL Stormwater Implementation Plans

a. Within one year of permit issuance, the County/City/Agency shall propose a TMDL stormwater implementation plan for meeting each EPA approved local

and Chesapeake Bay stormwater WLA. A single plan may be developed for TMDLs targeting the same pollutant of concern, or a comprehensive plan may be developed to address all of the pollutants of concern. ~~Each~~ The TMDL stormwater implementation plan shall include estimated ~~interim and~~ final benchmarks for implementing stormwater BMPs, programmatic initiatives, and alternative control practices ~~for meeting~~consistent with the stormwater WLA within the permit term. The TMDL stormwater implementation plan shall report on the estimated continual maintenance costs of each stormwater BMP, programmatic initiative and alternative control practice and how the efforts contribute to the overall MEP towards restoration. TMDL stormwater implementation plans approved by MDE during the previous permit cycle may be used to comply with this requirement;

b. ~~Within one year of permit issuance, the County/City/Agency shall provide~~Each implementation plan shall include a ~~specific~~ list of stormwater BMPs, programmatic initiatives, and alternative control practices that will be completed during this permit term. ~~Specify~~The list shall include the estimated cost of each practice/program ~~on the list~~ and how the implementation of each will work toward meeting the local and Chesapeake Bay stormwater WLAs, impervious area restoration requirements in Part IV.E.2., and the additional Chesapeake Bay restoration requirement in Part IV.E.3. For tracking progress, the County/City/Agency shall ~~propose~~ report annually~~targets as follows~~:

i. The n~~N~~umerical stormwater BMP and alternative control practices ~~implementation benchmarks~~implemented that year;
ii. Narrative programmatic initiative milestones accomplished that year;
iii. Numerical impervious acre restoration ~~benchmarks~~achieved that year and its progress toward the final benchmark;
iv. Numerical pollutant load reduction benchmarks for TN and TP and progress toward Chesapeake Bay stormwater WLAs; and
v. Numerical (or narrative where appropriate) pollutant load reductions ~~benchmarks~~ for local stormwater WLAs.

~~MDE's approval of specific lists of stormwater BMPs, programmatic initiatives, and alternative control practices that will be completed during this permit term toward meeting established benchmarks and milestones shall be enforced.~~

c. Following submittal of TMDL stormwater implementation plan(s), XXXX County/City/Agency shall report annually on implementation progress, including any project substitutions. ~~In the event that an annual target is not met, the report on implementation progress shall include steps that XXXX County/City/Agency is taking to ensure that the missed target is met and that subsequent targets are met on schedule.~~

~~c.~~d. For any local TMDL with a stormwater WLA that is approved by EPA subsequent to the issuance of this permit, the County/City/Agency shall submit a

TMDL stormwater implementation plan within one year of that approval date to address changes from the previous local TMDL implementation plan:

i. TMDL stormwater implementation plans shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County/City/Agency water quality analysis; and

ii. Each TMDL stormwater implementation plan shall include estimated interim and final benchmarks for implementing the stormwater BMPs, programmatic initiatives, and alternative stormwater controls proposed as part of the plan.

2. Impervious Surface Restoration

a. The County/City/Agency shall commence and complete the restoration of XXXX unmanaged impervious acres (to be determined) during this permit term with stormwater BMPs, programmatic initiatives, and alternative control practices in accordance with MDE's 2019 Accounting for Stormwater Waste Load Allocations and Impervious Acres Treated (2019 MS4 Guidance). These BMPs, programmatic initiatives, and alternative practices shall be implemented to replace any nutrient and sediment credits that were acquired through the Maryland Water Quality Trading and Offset Program by the County/City/Agency under its prior permit term.

b. All nutrient and sediment credits acquired during the prior permit term shall continue to be owned by the permittee and be verified annually in accordance with the requirements of the Maryland Water Quality Trading and Offset Program, COMAR, 26.08.11, until they are replaced by local stormwater management BMPs, programmatic initiatives, and alternative practices in accordance with Maryland's 2019 MS4 Guidance.

c. The County/City/Agency shall continue to work toward impervious surface restoration beyond the XXXX impervious acres (to be determined) required under this permit term. Restoration of an additional XXXX unmanaged impervious acres (to be determined) shall be required in subsequent permit terms for making progress toward meeting all EPA approved stormwater WLAs within the County/City/Agency, including those for rivers, lakes, reservoirs, and Chesapeake Bay.

d. Additional impervious acres restored beyond the required XXXX impervious acres (to be determined) during this permit term beyond the XXXX impervious acres (to be determined) required may be credited toward future impervious surface restoration requirements in subsequent permit terms at the permittee's discretion.

3. ~~Additional Chesapeake Bay Restoration~~ Environmental Improvement Projects

The County/City/Agency shall undertake Environmental Improvement Projects (EIPs) over the life of the permit term aimed at providing environmental benefits outside the impervious surface reduction (ISR) framework. These projects may add to the pollutant load reductions achieved with impervious surface restoration or they may provide benefits outside the impervious surface restoration framework. EIP projects themselves should:

a. Be proposed no later than the year 2 MS4 Annual Report for approval by MDE;

b. Provide quantifiable benefits (e.g., habitat improvement, implementation of innovative BMPs, reduction of other pollutants, such as bacteria, PCBs, etc.) that may not be captured by projects focused solely on ISR improvements. MDE will work with the County/City/Agency to jointly determine the type and level of crediting for the proposed project(s).

~~Consistent with Maryland's Phase III Chesapeake Bay WIP, the County/City/Agency shall reduce an additional XXXX lbs of total nitrogen (TN) (to be determined) and an additional XXXX lbs of total phosphorus (TP) (to be determined) by the end of this permit term. These reductions are in addition to the TN and TP reductions achieved with the impervious surface restoration required in Part IV.E.2. The County/City/Agency shall reduce these TN and TP loads through any combination of the following approved methods:~~

~~a. Implementing stormwater BMPs from the list of practices in the 2000 Maryland Stormwater Design Manual, including the 2009 supplement for ESD to the MEP, and associated TN and TP load reductions in accordance with Maryland's 2019 MS4 Guidance;~~

~~b. Using alternative BMPs, e.g., tree planting, street sweeping, stream restoration, and the associated TN and TP load reductions in accordance with Maryland's 2019 MS4 Guidance;~~

~~c. Trading for TN and TP credits in accordance with Maryland's Water Quality Trading and Offset Program regulations; and~~

~~d. Innovative practices that have been approved by MDE with monitoring data that documents TN and TP pollutant load reductions.~~

4. Adaptive Management

The County/City/Agency shall continue to implement, evaluate, and update all of its existing plans for each EPA approved stormwater WLA by:

Commented [KB1]: Among the group, there is a majority in support of, but not a unanimous consensus on the alternative "EIP" language to the "Additional Chesapeake Bay Restoration" language that MDE has proposed in this section. Dissenting jurisdictions will submit their own comments individually to MDE regarding this section.

Commented [KB2]: In addition, we would expect that these projects would produce lessons that can be shared broadly, and whose results can be used to inform the requirements of future MS4 permits.

a. Evaluating and tracking the implementation of stormwater BMPs, programmatic initiatives, and alternative control practices through monitoring or modeling to estimate the net change in pollutant load reductions or a water quality response;

b. Documenting progress toward meeting established benchmarks, milestones, and final dates for stormwater WLAs; and

c. Developing an ongoing and iterative process that continuously implements new and additional stormwater BMPs, programmatic initiatives, and alternative control practices when stormwater WLAs ~~are not being~~have not been met ~~according to established benchmarks, milestones, and~~before the approved final dates.

5. Public Participation

The County/City/Agency shall provide ~~continual~~ outreach to the public regarding the development of its TMDL stormwater implemen~~m~~tation plans. ~~Additionally, the County/City/Agency shall allow for public participation in the TMDL process, solicit input, and incorporate any relevant ideas and program improvements that can aid in achieving stormwater WLAs, TMDL water quality endpoints and water quality standards.~~The County/City/Agency shall provide a comment period to the public regarding its TMDL stormwater implementation plans that will allow for suggestions on the draft version and comments on the final version. The County/City/Agency shall provide:

a. Notice in a local newspaper and the County/City/Agency's web site outlining how the public may obtain information on the development of TMDL stormwater implementation plans and opportunities for comment;

b. Procedures for providing electronic and/or paper copies of TMDL stormwater implementation ~~restoration~~ plans to interested parties upon request;

c. A minimum 30 day comment period before finalizing TMDL stormwater implementation plans;

~~c.~~d. The County/City/Agency shall continue to provide for public comment on individual local stormwater management BMPs, programmatic initiatives, and alternative practices targeted at achieving the TMDL plan;

~~d.~~c. A summary in each ~~annual report~~implementation plan of how the County/City/Agency addressed or will address any material comment received from the public.

F. Assessment of Controls

XXXXX County/City/Agency shall conduct BMP effectiveness and jurisdiction-wide trend monitoring for tracking progress toward improving local water quality and restoring Chesapeake Bay.

1. BMP Effectiveness Monitoring

   By April 5, 2019, the County/City/Agency shall notify MDE which option it chooses for BMP effectiveness monitoring. The two options are:

   a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by the Chesapeake Bay Trust (Trust) for determining monitoring needs and selecting appropriate monitoring studies. To implement the required monitoring, the County/City/Agency shall pay a minimum of ($100,000 *for Phase I Large jurisdictions and $75,000 for Phase I Medium jurisdictions*) into a pooled monitoring Trust fund by July 1 of each year (See *Appendix B – Chesapeake Bay Trust Pooled Monitoring Program)*. Enrollment in the program shall be demonstrated through a memorandum of understanding (MOU) between the County/City/Agency and the Trust. The County/City/Agency shall remain in the program for the duration of this permit term ; or

   b. The County/City/Agency shall continue monitoring the (*said*) outfall and (*said*) in-stream station in the (*said*) watershed, or select and submit for MDE's approval a new BMP effectiveness study for monitoring by April 5, 2019. Monitoring activities shall occur where the cumulative effects of watershed restoration activities, performed in compliance with this permit, can be assessed. The minimum criteria for chemical, biological, and physical monitoring are as follows:

      i. Chemical Monitoring:

      - Twelve (12) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;
      - Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;
      - At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136, and event mean concentrations (EMCs) shall be calculated for the following parameters:

Biochemical Oxygen Demand BOD_5	Total Lead
Total Kjeldahl Nitrogen (TKN)	Total Copper
Nitrate plus Nitrite	Total Zinc
Total Suspended Solids	Total Phosphorus
Total Petroleum Hydrocarbons (TPH)	Hardness
E. coli or enterococcus	

- Continuous flow measurements shall be recorded at the in-stream monitoring station or other practical locations based on the approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models.

ii. Biological Monitoring:

- Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and in-stream stations or other practical locations based on an MDE approved study design; and
- The County/City/Agency shall use the Maryland Biological Stream Survey (MBSS) protocols.

iii. Physical Monitoring:

- A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on the approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;
- A stream habitat assessment shall be conducted using techniques defined by MBSS; and
- A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

iv. Annual Data Submittal: The County/City/Agency shall describe in detail its monitoring activities for the previous year and include the following:

- EMCs submitted on MDE's long-term monitoring MS4 Geodatabase as specified in PART V below;
- Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations; and
- Any requests and accompanying justifications for proposed modifications to the monitoring program.

2. Jurisdiction-Wide Trend Monitoring

By April 5, 2019, the County/City/Agency shall notify MDE which option it chooses for jurisdiction-wide trend monitoring. The two options are as follows:

a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by the Trust for determining appropriate jurisdiction-wide trend monitoring. To implement the required monitoring, the County/City/Agency shall pay annually (*$25,000for Phase Large MS4s and $15,000 for Phase I Medium MS4s*), into a pooled monitoring Trust fund by July 1 of each year (See *Appendix B – Chesapeake Bay Trust Pooled Monitoring Program)*. Enrollment in the program shall be demonstrated through an MOU between the County/City/Agency and the Trust. The County/City/Agency shall remain in the program for the duration of this permit term; or

b. The County/City/Agency shall submit a comprehensive plan for jurisdiction-wide trend monitoring for biological, bacteria, and chloride impairments for MDE's review and approval by April 5, 2019, according to the following guidelines:

i. Biological and habitat assessment monitoring of XX (*need more information to set scientifically valid number of sites*) randomly selected stream sites using MBSS protocols;
ii. Bacteria, i.e., E. coli, enterococcus, or fecal coliform, monitoring according to MDE guidance (see Appendix C). Samples shall be collected at regular intervals once per month, and shall be characterized as storm or base flow; and
iii. Chloride assessments through hourly conductivity monitoring at two locations for Large Phase I jurisdictions and one location for Medium Phase I jurisdictions (see Appendix D).

G. Program Funding

1. Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted by XXXXX County/City/Agency as required in PART V below.

2. Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. Annual Reporting

1. Annual progress reports, required under 40 CFR 122.42(c), will facilitate the long-term assessment of XXXXX County/City/Agency's NPDES stormwater program. The County/City/Agency shall submit annual reports on or before the anniversary date of this permit and post these reports on the County/City/Agency's website. All information, data, and analyses shall be based on the State's fiscal year and include:

   a. An executive summary on the status of implementing the County/City/Agency's MS4 programs that are established as permit conditions including:

      i. Permit Administration;
      ii. Legal Authority;
      iii. Source Identification;
      iv. Stormwater Management;
      v. Erosion and Sediment Control;
      vi. Illicit Discharge Detection and Elimination;
      vii. Litter and Floatables;
      viii. Property Management and Maintenance;
      ix. Public Education;
      x. Watershed Assessments;
      xi. Impervious Surface Area and Chesapeake Bay Restoration Plans;
      xii. TMDL and Stormwater WLA Compliance;
      xiii. Assessment of Controls; and
      xiv. Program Funding.

   b. A narrative summary describing the results and analyses of data, including monitoring data that is accumulated throughout the reporting year;

   c. Expenditures for the reporting period and the proposed budget for the upcoming year;

   d. A summary describing the number and nature of enforcement actions, inspections, and public education programs;

   e. The identification of water quality improvements and documentation of attainment and/or progress toward attainment of schedules, benchmarks, deadlines, and applicable stormwater WLAs developed under EPA approved TMDLs; and

   f. The identification of any proposed changes to the County/City/Agency's program when stormwater WLAs are not being met.

2. All annual reporting specified in PARTs IV.C, D, E, F, and G, or required anywhere within this permit shall be made using the most recent version of MDE's MS4 Geodatabase. A corresponding User's Guide provides guidance for data requirements and entry into the MS4 Geodatabase. The geodatabase establishes a consistent reporting structure for Maryland's MS4 community for submitting program data and enables MDE a fair way to efficiently evaluate the effectiveness of implementation and compliance with permit requirements.

3. Because this permit uses an iterative approach to implementation, the County/City/Agency must evaluate the ~~effectiveness~~ progression of its programs toward meeting the permit goals in each annual report. The County/City/Agency shall show through narrative and/or numerical documentation the progression towards meeting stormwater WLAs developed under EPA approved TMDLs. This evaluation will coincide with the BMP Effectiveness Monitoring reporting outlined in Part IV. ~~BMP and program modifications shall be made within 12 months if the County/City/Agency's annual report does not demonstrate compliance with this permit and show progress toward meeting stormwater WLAs developed under EPA approved TMDLs.~~

B. Program Review

In order to assess the effectiveness of XXXXX County/City/Agency's NPDES stormwater program for reducing the discharge of pollutants to the MEP and working toward meeting water quality standards, MDE will review annual reports, conduct field inspections, and periodically make requests for additional data to determine permit compliance. Procedures for the review of local erosion and sediment control and stormwater management programs exist in Maryland State law and regulations. Additional evaluations and field inspections shall be conducted for IDDE, public property management, assessment of controls, and impervious surface area and Chesapeake Bay restoration to determine compliance with permit conditions.

C. Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than 5 years unless administratively continued by MDE. Continuation or reissuance of this permit beyond this permit term will require XXXXX County/City/Agency to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. Failure to reapply for coverage constitutes a violation of this permit.

As part of this application process, the County/City/Agency shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how each County/City/Agency watershed has been thoroughly evaluated, and the status of implementing water quality improvement projects and all schedules, benchmarks, and deadlines toward meeting stormwater WLAs. This application shall be used to gauge the effectiveness of the County/City/Agency's NPDES stormwater

program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

1. The County/City/Agency's NPDES stormwater program goals;

2. Program summaries for the permit term regarding:

   a. Illicit discharge detection and elimination results;

   b. Impervious Surface and Chesapeake Bay Restoration status including County/City/Agency totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting stormwater WLAs developed under EPA approved TMDLs;

   c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved;

   d. Other relevant data and information for describing County/City/Agency programs;

3. Program operation and capital improvement costs for the permit term; and

4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the County/City/Agency's efforts to comply with the conditions of this permit.

PART VI. SPECIAL PROGRAMMATIC CONDITIONS

A. Maryland's baseline programs, including the 1991 Forest Conservation Act, 1997 Priority Funding Areas Act, 2007 Stormwater Management Act, 2009 Smart, Green & Growing Planning Legislation, 2010 Sustainable Communities Act, 2011 Best Available Technology Regulation, and the 2012 Sustainable Growth & Agricultural Preservation Act effectively mitigate the majority of the impacts from new development. Any additional loads will be offset through Maryland's alignment for growth policies and procedures as articulated through Chesapeake Bay milestone achievement. The overriding goal shall be no net growth in loads and XXXXX County/City/Agency shall reflect these policies, programs, and implementation as part of its net WLA accounting as stipulated in Part IV.E.4.b.ii of this permit.

PART VII. ENFORCEMENT AND PENALTIES

A. Discharge Prohibitions and Receiving Water Limitations

XXXXX County/City/Agency shall prohibit non-stormwater discharges through

its MS4. NPDES permitted non-stormwater discharges are exempt from this prohibition. Discharges from the following will not be considered a source of pollutants when properly managed: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration to separate storm sewers; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation waters; springs; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; de-chlorinated swimming pool discharges (not including filter backwash); street wash water; and fire fighting activities.

Consistent with §402(p)(3)(B)(iii) of the CWA, the County/City/Agency shall take all reasonable steps to minimize or prevent the contamination or other alteration of the physical, chemical, or biological properties of any waters of the State, including a change in temperature, taste, color, turbidity, or odor of the waters or the discharge or deposit of any organic matter, harmful organism, or liquid, gaseous, solid, radioactive, or other substance into any waters of the State, that will render the waters harmful to:

1. Public health, safety, or welfare;

2. Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial use;

3. Livestock, wild animals, cats or birds; and

4. Fish or other aquatic life.

B. Duty to Mitigate

XXXXX County/City/Agency shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

C. Duty to Comply

XXXXX County/City/Agency shall be responsible for complying with all conditions of this permit. Other entities may be used to meet various permit obligations provided that both the County/City/Agency and the other entity agree contractually. Regardless of any arrangement entered into however, the County/City/Agency remains responsible for permit compliance. In no case may this responsibility or permit compliance liability be transferred to another entity.

Failure to comply with a permit provision constitutes a violation of the CWA and is grounds for enforcement action; permit termination, revocation, or modification; or denial of a permit renewal application. The County/City/Agency shall comply at all times with the provisions of the Environment Article, Title 4, Subtitles 1, 2, and 4;

Title 7, Subtitle 2; and Title 9, Subtitle 3 of the Annotated Code of Maryland.

The County/City/Agency shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the County/City/Agency to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the County/City/Agency only when the operation is necessary to achieve compliance with the conditions of the permit.

D. Sanctions

1. Penalties Under the CWA - Civil and Criminal

Section 309(g)(2) of the CWA, 33 USC §1319(g)(2) provides that any person who violates any permit condition is subject to a civil penalty not to exceed $10,000 per day for each violation, not to exceed $125,000. Pursuant to the Civil Monetary Penalty Inflation Adjustment Rule, 40 CFR Part 19, any person who violates any NPDES permit condition or limitation is liable for an administrative penalty not to exceed $16,000 per day for each such violation, up to a total penalty of $177,500. Pursuant to Section 309(c) of the CWA, 33 USC §1319(c), any person who negligently violates any permit condition is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. Any person who knowingly violates any permit condition is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both.

2. Penalties Under the State's Environment Article - Civil and Criminal

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the County/City/Agency from civil or criminal responsibilities and/or penalties for a violation of Title 4, Title 7, and Title 9 of the Environment Article, Annotated Code of Maryland, or any federal, local, or other State law or regulation. Section 9-342 of the Environment Article provides that a person who violates any condition of this permit is liable to a civil penalty of up to $10,000 per violation, to be collected in a civil action brought by MDE, and with each day a violation continues being a separate violation. Section 9-342 further authorizes the MDE to impose upon any person who violates a permit condition, administrative civil penalties of up to $5,000 per violation, up to $50,000.

Section 9-343 of the Environment Article provides that any person who violates a permit condition is subject to a criminal penalty not exceeding $25,000 or imprisonment not exceeding 1 year, or both for a first offense. For

a second offense, Section 9-343 provides for a fine not exceeding $50,000 and up to 2 years imprisonment.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who knowingly makes any false statement, representation, or certification in any records or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

E. Permit Revocation and Modification

1. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause.

The filing of a request by XXXXX County/City/Agency for a permit modification or a notification of planned changes or anticipated noncompliance does not stay any permit condition. A permit may be modified by MDE upon written request by the County/City/Agency and after notice and opportunity for a public hearing in accordance with and for the reasons set forth in COMAR 26.08.04.10.

A permit may be modified, suspended or revoked and reissued in whole or in part during this permit term by MDE a~~A~~fter notice and opportunity for a hearing and in accordance with COMAR 26.08.04.10, ~~MDE may modify, suspend, or revoke and reissue this permit in whole or in part during its term~~ for causes including, but not limited to the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. A change in any condition that requires either a temporary reduction or elimination of the authorized discharge;

d. A determination that the permitted discharge poses an immediate threat to human health or welfare or to the environment and can only

be regulated to acceptable levels by permit termination or modification ~~or termination~~to incorporate additional controls that are necessary to ensure human health and safety are not impacted by the permitted effluent.~~;~~

~~e. To incorporate additional controls that are necessary to ensure that the permit effluent limit requirements are consistent with any applicable TMDL WLA allocated to the discharge of pollutants from the MS4; or~~

f. As specified in 40 CFR §§122.62, 122.63, 122.64, and 124.5.

2. Duty to Provide Information

The County/City/Agency shall furnish to MDE, within a reasonable time, any information that MDE may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit. The County/City/Agency shall also furnish to MDE, upon request, copies of records required to be kept by this permit.

F. Inspection and Entry

XXXXX County/City/Agency shall allow an authorized representative of the State or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulatory activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and obtain copies at reasonable times of any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times, without prior notice, any construction site, facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

G. Monitoring and Recordkeeping

Unless otherwise specified by this permit, all monitoring and records of monitoring shall be in accordance with 40 CFR Part 122.41(j).

H. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State or local law or regulations.

I. Severability

The provisions of this permit are severable. If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect. If the application of any provision of this permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

J. Signature of Authorized Administrator and Jurisdiction

Each application, report, or other information required under this permit to be submitted to MDE shall be signed as required by COMAR 16.08.04.01-1. Signatories shall be a principal executive officer, ranking elected official, or other duly authorized employee.

_____ _____

Lee Currey, Director **Date**
Water and Science Administration

Appendix A

TMDLs and Local Stormwater WLAs

(will be unique to each jurisdiction)

Appendix B

Chesapeake Bay Trust Pooled Monitoring Program (PMP)

introduction

The Pooled Monitoring Program (PMP) will focus on answering key questions pertaining to the cumulative impacts of watershed restoration activities (status and trends) and the effectiveness of specific restoration practices (effectiveness studies) posed by the regulatory, regulated, scientific, and practitioner communities using robust and rigorous methods.

Two tenets of the Pooled Monitoring Program are as follows:

1) All data are collected with a specific question or hypothesis in mind
2) Research products identify a clear path to integrate the new information into the regulatory process and make it accessible to regulators.

PROCESS

1) There is a Pooled Monitoring Advisory Committee (PMAC) that includes:
    a. Six members from the regulatory community (USACE, EPA, FWS, NOAA, MDE, DNR)
    b. 1 member from the practitioner community
    c. At least 3 members from the MS4 Phase I permittee community. Any MS4 permittee who contributes funds would be a member.
    d. 1 member from the environmental community
    e. 2 non-voting members of the scientific community who are experts in experimental design and restoration evaluation.

2) MS4 Permittees who opt into the Pooled Monitoring Program agree with MDE on level of opt-in funding commitment and generate MOUs with the Chesapeake Bay Trust, which manages the Pooled Monitoring Program.

3) The Chesapeake Bay Trust and PMAC members maintain a list of key questions about certain kinds of restoration projects as well as a minimum research protocol.

4) The PMAC meets in the fall of each year to review and prioritize key questions.

5) Questions are compiled into an RFP that lists the prioritized questions and minimum/preferred methodology. The RFP includes an outreach/dissemination requirement in the scope of work. The RFP is bid out to any type of entity that can address one or more questions, and can include bids to conduct new research or to analyze existing data. Bidding entities could include, but are not limited to, academic institutions, consulting firms, scientifically capable watershed organizations. Existing research/monitoring programs would be eligible to bid. As part of the RFP, resources, such as lists of completed restoration projects or permitted projects not yet constructed, would be made available. Bidders would be allowed to use these projects in their research.

6) Bids/proposals must identify:

- The question being addressed/answered
- The methodology being used to address (including sample size, location, timing, etc.)
- The analysis proposed
- The final product
- The interpretation of the results/dissemination plan, i.e. presentation of the results into a form usable by regulatory and practitioner communities.

7) The Trust, under guidance of PMAC, composes a Technical Review Committee (TRC) that evaluates proposals and recommends projects for funding. The TRC is composed of external technical peer reviewers who have expertise in the topics of the proposals submitted and are not involved in any proposals submitted. The TRC will evaluate proposals using criteria to include:

    a. Relevance of the project and question posed
    b. Quality of the methods and anlysis proposed
    c. Qualifications of leads and of the organization
    d. Communication/dissemination plan

8) PMAC may recommend that Advisory Groups are established to oversee certain projects.

9) The research is undertaken and completed; reports are sent to PMAC for review. A subset of projects may be sent for external peer review prior to acceptance of final product or dissemination to the public/community.

10) Results are disseminated to the practitioner community through, at a minimum:

    a. An annual forum to which regulatory audiences are invited/required by their agencies to attend
    b. Other forums as appropriate

11) Results are interpreted for the regulatory audiences, and recommendations are prepared for how regulators can integrate the new information into their processes and policies. Some program funds may be used to develop key tools that facilitate use of the results.

12) The Trust archives reports, synthesized data, and raw data for public use.

Appendix C

Bacteria Trend Monitoring

The County/City/Agency shall establish trend monitoring stations for bacteria (E. Coli,

enterococcus, or fecal coliform) in all applicable bacteria TMDL watersheds. These stations shall be established at the same locations as those used to develop the TMDL. The County/City/Agency should consult with MDE in regards to where these stations should be established. Samples collected at the stations shall be analyzed for the same indicator bacteria used in the TMDL. The monitoring data from these stations will provide a long-term record of data, which will be used to adaptively manage implementation efforts in bacteria TMDL watersheds. The data will allow the State to determine if the current suite of implementation practices is having any effect on in-stream bacteria concentrations.

Samples shall be collected on the same day of every month (e.g., the first Thursday of every month), regardless of weather conditions. Using sterile containers, samples shall be collected and kept in a cooler with ice until analyzed. ~~Samples shall then be sent to an accredited lab for analysis.~~ Results shall be reported in Most Probable Number (MPN), a statistically determined estimate of organisms present per sample. Dilutions shall be done on samples that are taken during or after heavy rains, or at sites with chronically high levels of bacteria, so that the sample readings are within the limit of detection for the analysis.

Commented [KB3]: From Rob Hirsch: Baltimore County staff do bacteria analysis in house, with well trained staff and appropriate procedures and equipment. However our staff and facilities are not accredited. To get accredited or to send the samples out to an accredited lab would be very costly, and doesn't seem necessary. Note that County staff run analysis on around 500 samples per year.

While not a requirement, MDE encourages jurisdictions to use quantitative polymerase chain reaction (qPCR) based source tracking methods for identifying trends in human and domestic source bacteria. This method would be in place of an MPN based method. The premise of PCR source tracking is that microorganisms found in the gut of different host animals will have distinct genotypic and phenotypic properties that can be measured, compared, and used to identify the host species of origin. PCR source tracking uses unique DNA probes or genetic sequences that match to genes found in the DNA of fecal bacteria (e.g. Bacteroides spp.) originating from a specific source. Several such probes, each targeting a different source (i.e. human, dog, cow, goose, poultry, etc.), have been identified and described in literature.

In PCR source tracking, bacterial DNA is extracted from filtered water samples and combined with source specific probes. This reaction mix is then subjected to qPCR procedures, which will result in a determination of the number of copies of the gene of interest present in the original water sample. qPCR methods represent a valid and potentially robust means for describing trends in human and domestic source bacteria. Using qPCR methods would align with MDE guidance for Bacteria TMDL implementation, which suggests that jurisdictions focus on reducing human source components of SW-WLAs first, then domestic animals. While MDE encourages the use of qPCR, the Department recognizes that its use may be impractical for some jurisdictions due to the additional cost compared to standard most probable number bacteria lab analysis.

Commented [KB4]: From Rob Hirsch: It is indeed a very expensive analysis. Could qPCR analysis be part of the pooled monitoring program? Does MDE know of any other funding available that could help pay for qPCR?

Whether using MPN or qPCR, A high/low flow determination shall be made for each bacteria sample. Classification of flow regime allows for 1) trend analysis of not only individual isolate samples but also the geometric mean concentration over standard time intervals, and 2) comparison of low flow trends only (the critical period when water contact recreation is expected). Cutoff flow rates shall be determined by the jurisdiction using the methodologies applied in the TMDL. Each sampling location has been assigned a USGS stream gage in the applicable Bacteria TMDL analysis (assignment of gage station based on geographic proximity to sampling location). Using the data from this gage station for the sample date/time and the

cutoff flow rates, each sample shall be classified as high or low flow.

For each sample, jurisdictions shall report the observed concentration and flow regime for the sample date/time in its annual report. Jurisdictions that need further instruction on how to conduct their bacteria monitoring should contact MDE.

Appendix D

Chloride Monitoring

There is a direct, positive correlation between in-stream conductivity and chloride concentration during precipitation events where road salt is applied. Since it is less expensive and potentially

more accurate to monitor continuously, conductivity will be used as a surrogate for measuring in-stream chloride concentration.

The County/City/Agency shall conduct hourly, in-stream conductivity monitoring. This monitoring will be done on an annual basis during winter months, defined as November 1st through March 31st. Selection of monitoring locations will be submitted to MDE for approval. If possible monitoring locations should be located at a current chemical monitoring station in a watershed that:

- was identified as impaired by chloride on Maryland's Integrated Report of Surface Water Quality
- contains a significant mileage of county serviced roads
- is moderately to highly urbanized

Large MS4 jurisdictions are required to monitor 2 locations, one in a 1st-order headwater stream of the selected watershed, and one in the 3rd-order, or higher, mainstem of the watershed system. Medium MS4 jurisdictions are only required to monitor one location in the 3rd-order, or higher, mainstem of the impaired watershed. Stream order is determined using the Shreve stream order method with National Hydrography Dataset High Resolution (1:24,000 scale) stream features.

The monitoring data from these stations will provide a long-term record of data, which will be used to adaptively manage implementation efforts in watersheds impaired by chloride. At a statewide scale, the data will allow the State to determine if the current suite of implementation practices is having any effect on in-stream chloride concentrations.

Jurisdictions shall report daily maximum conductivity values as well as the mean, median, 75th-percentile, 90th-percentile and maximum conductivity values collected each winter. As a rule of thumb during frozen precipitation events, a factor of 0.3 can be used for winter in-stream conductivity values, measured in microsiemens per centimeter, to estimate milligrams of chloride per liter.

Jurisdictions that need further instruction on how to measure and report hourly, in-stream conductivity levels should contact MDE.

Commented [KB5]: From Rob Hirsch: Please specify how stream order should be determined. This is a suggested stream order method. I freely admit that this suggestion is based by and large on convenience for Baltimore County: the County has been doing continuous conductivity monitoring at Scotts Level since 2016 and it would be useful to continue monitoring there. Using Shreve stream order with NHD data, the monitoring location is on a 3rd order stream, just upstream from the confluence with the Gwynns Falls. I would be happy with any other stream order method (or revisions to the stream order levels) that allows us to continue to use our existing continuous conductivity monitoring at Scotts Level.

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

April 27, 2018

The Honorable Roger P. Manno
Senate Chair, Joint Committee on
Administrative, Executive, and Legislative Review
James Senate Office Building
11 Bladen Street, Room 102
Annapolis, Maryland 21401

The Honorable Samuel I. Rosenberg
House Chair, Joint Committee on
Administrative, Executive, and Legislative Review
365 House Office Building
6 Bladen Street
Annapolis, Maryland 21401

RE: Maryland Water Quality Trading Program Proposed Regulations

Dear Chairmen Manno & Rosenberg:

Attached please find the Department's responses to comments received on the proposed Water Quality Trading Program regulations. There are three documents responding to all the comments and a fourth document specific to those received from the Maryland Clean Agriculture Coalition, in which the Department commented in the margins of Mr. Hall's letter.

As my February 6, 2018 letter to you explained, these regulations are the product of a highly collaborative process over a two-year period, reconciling numerous differences of opinion and representing considerable effort to strike a balance among disparate interest groups. Many of the comments received requested clarification of the regulatory language, which the Department has provided, either by amending the language, eliminating it, or explaining why a change was not made. We believe the enclosed documents are responsive to the Committee's request and to comments offered by interested parties.

If you have any additional comments or questions, please contact me or Assistant Secretary Lynn Buhl by telephone at 410-537-3084 or by email at lynn.buhl@maryland.gov.

Sincerely,

Ben Grumbles
Secretary

Attachments (4)

cc: Crystal Lemieux, Department of Legislative Services
Heather Barthel, MDE, Water & Science Administration
Jeffrey Fretwell, MDE, Legislative Assistant
Lee Currey, Director, MDE, Water and Science Administration
Ridgeway M. Hall, Jr., Maryland Clean Agriculture Coalition

Title 26
DEPARTMENT OF THE ENVIRONMENT
Subtitle 08 WATER POLLUTION
26.08.11 Maryland Water Quality Trading Program

Authority: Agriculture Article, §§8-901 and 8-904; Environment Article, §§9-313, 9-315, 9-319, and 9-325; Annotated Code of Maryland

.01 Purpose.

A. The purpose of this chapter is to establish a Water Quality Trading Program between the agricultural, stormwater, wastewater, and on-site sewage disposal sectors that attracts public and private participation and enhances Maryland's effort to protect and restore not only the water resources of the Chesapeake Bay and its tributaries, but also local waters. Trading may supplement the more traditional governmental approaches for improving water quality and has the potential to achieve results faster and at a lower cost, accelerating efforts to restore and improve water quality. The Program expands opportunities for point sources and nonpoint sources by creating a water quality marketplace that allows them to meet and maintain pollutant load limits through the acquisition of credits generated by pollutant load reductions elsewhere in Maryland's portion of the Chesapeake Bay watershed as long as the trade does not cause or contribute to a violation of State water quality standards.

B. General Structure of Program.

(1) The Program is voluntary and relies on a market-based approach to offer economic incentives for pollutant reductions from point and nonpoint sources.

(2) The State provides the infrastructure to support trading through an online suite of tools that includes:

(a) The Maryland Nutrient Tracking Tool used by agricultural credit generators;

(b) The central Registry; and

(c) The optional Marketplace.

(3) The price of each credit is negotiated between the credit seller and the credit buyer.

.02 Scope.

This chapter establishes Maryland's Water Quality Trading Program and sets forth the criteria under which the Program will operate, including:

A. Purpose;

B. Definitions;

C. Program framework;

D. Baseline requirements;

E. Calculation of credits;

F. Procedure for certification;

G. Trading requirements;

H. Usage of credits by point sources;

I. Registration of trades;

J. Verification and reporting requirements;

K. Public participation;

L. Enforcement; and

M. Appeal process.

.03 Definitions.

A. In this chapter, the following terms have the meanings indicated.

B. Terms Defined.

(1) "303(d) list" means the list of impaired waters maintained by the State pursuant to 33 U.S.C. §1313(d).

(2) "Aggregator" means a person that funds, generates, owns, or assembles credits resulting from a number of point or nonpoint sources to resell them.

(3) "Agricultural land" has the meaning stated in COMAR 15.20.12.02.

(4) "Agricultural nonpoint source" means a nonpoint source that is an agricultural operation.

(5) "Agricultural operation" has the meaning stated in COMAR 15.20.12.02.

(6) "Allocation" means the share of the total amount of pollutants that impaired waters can receive from a specific source discharger.

(7) "Baseline" means the practices, actions, or levels of nitrogen, phosphorus, or sediment reductions that must be achieved before a credit seller becomes eligible to generate credits, enter the trading market, and trade credits.

(8) "Bay Restoration Fund (BRF)" means the fund established by Environment Article, §9-1605.2, Annotated Code of Maryland.

(9) Best Management Practice (BMP).

(a) "Best management practice (BMP)" means a practice, or combination of practices, that is determined by the Chesapeake Bay Program to be an effective and practicable method of preventing or reducing pollutants generated by point or nonpoint sources so as to minimize the movement of those pollutants into or remove those pollutants from waters of the State, or mitigate flooding.

(b) "Best management practice (BMP)" includes: ~~agricultural and urban~~ structural and nonstructural pollution controls, operations, and maintenance procedures and practices that prevent or reduce pollutants.

(10) "Broker" means a person that connects a credit seller and a credit buyer and helps to negotiate a trade between them.

(11) "Cap" means a legally enforceable aggregate mass load limit contained in a discharge permit.

(12) "Certification" means the process in which credits are quantified by the Department or the Department of Agriculture and placed on the Registry, or the result of this process.

(13) "Chesapeake Bay Program (CBP)" means the regional partnership of federal and ~~State~~ state agencies, local governments, nonprofit organizations, and academic institutions that leads and directs Chesapeake Bay restoration and protection.

(14) "Chesapeake Bay Watershed Model (CBWM)" means the latest model adopted by the Chesapeake Bay Program used to simulate loading and transport of nitrogen, phosphorus, and sediment from pollutant sources throughout the Chesapeake Bay watershed and provide estimates of watershed nitrogen, phosphorus, and sediment loads resulting from various management scenarios.

(15) "Credit" means a unit of load ~~pollution~~ reduction below baseline of one pound of nitrogen, phosphorus, or sediment.

(16) "Department" means the Maryland Department of the Environment.

(17) "Edge of tide (EoT) factor" means a numeric adjustment that reflects the rate at which pollutants are reduced through natural processes, such as hydrolysis, oxidation, and biodegradation, and manmade structures, such as dams, on their way through nontidal tributaries to the tidal waters of the Chesapeake Bay or its tidal tributaries.

(18) "Edge of tide (EoT) ratio" means a numeric adjustment applied to a trade to compensate for different EoT factors in the segmentshed where the credit is generated and the segmentshed where the credit is used.

(19) "Enhanced nutrient removal (ENR)" ~~*means a wastewater treatment technology that reduces the nitrogen and phosphorus concentrations in wastewater effluent to achieve permit limits equivalent to concentrations of no more than 4 milligrams per liter nitrogen and 0.3 milligrams per liter phosphorus, as calculated on an annually averaged basis*~~ *has the meaning stated in Environment Article, §9-1601, Annotated Code of Maryland.*

(20) "Floating cap" means a permitted effluent limitation applicable to an ENR facility, funded by the Bay Restoration Fund, which is calculated at the end of each calendar year using the end of the calendar year annual cumulative flow for the facility, multiplied by the applicable nitrogen or phosphorus concentration, and then converted to units of pounds per year.

(21) "Generator" means the original source of pollution reductions embodied in a credit, regardless of subsequent buyers and sellers of the credit.

(22) "Impaired waters" means waters included on the 303(d) list for nitrogen, phosphorus, or sediment.

~~*(23) "Industrial waste" has the meaning stated in COMAR 26.08.01.01.*~~

(~~*24*~~*23) Load.*

(a) "Load" means a pound or pounds of nitrogen or phosphorus or a pound, pounds, ton, or tons of sediment discharged by a point or nonpoint source per unit of time.

(b) "Load" is calculated or estimated using pollutant concentrations and flow and converting them to pounds or tons.

(~~*25*~~*24) "Load allocation (LA)" means the portion of a receiving water's loading capacity that is attributed to one of either its existing or future nonpoint sources.*

(~~*26*~~*25) "Local water quality impairment" means conditions in a nontidal river, stream or impoundment that would cause the nontidal river, stream or impoundment to be listed on the 303(d) list for nitrogen, phosphorus, or sediment.*

(~~*27*~~*26) "Marketplace" means an online system where information is exchanged between credit owners or their representatives and credit buyers.*

(~~*28*~~*27) "Maryland Nutrient Tracking Tool (MNTT)" means an online performance-based calculation system that enables users to analyze agricultural parcels and their management to determine eligibility and credit generation potential for participation in the Maryland Water Quality Trading Program.*

(~~*29*~~*28) "Maryland Water Quality Trading Program (Program)" means the Program under this chapter that establishes the policies and procedures to support market-based trading activities to enhance water quality and to certify, verify, and register nonagricultural point and nonpoint source nitrogen, phosphorus, and sediment credits.*

(~~*30*~~*29) "MS4 Permittee" means a person that has been issued a Phase I MS4 permit or a Phase II MS4 permit as defined in 40 CFR §122.26.*

(~~31~~30) "Municipal Separate Storm Sewer System (MS4)" has the meaning stated in 40 CFR §122.26.

(~~32~~31) "National Pollutant Discharge Elimination System (NPDES) permit program" means the national system for issuing permits as designated by 33 U.S.C. §1251 et seq., its amendments, and all regulations and rules adopted under the federal Clean Water Act and State law.

(~~33~~32) "Nonregulated source" means a point source or nonpoint source that ~~is not regulated under~~ the Department has determined is not required to obtain an NPDES or State discharge permit and that is not an agricultural operation.

(~~34~~33) "Nonpoint source" means a source of pollution that is not from a discernible, confined, and discrete conveyance, or other point source, as point source is defined in 33 U.S.C. §1362.

(~~35~~34) "On-site sewage disposal system" means a sewage system that discharges treated effluent into the ground, such as a septic system.

(~~36~~35) "Performance-based benchmark" means a wastewater point source annual effluent load which is calculated at the end of each calendar year using the end of the calendar year annual cumulative flow for the facility, multiplied by the applicable assigned nitrogen or phosphorus performance concentration converted to units of pounds per year, where ~~the assigned annual average effluent performance concentration basis is~~:

(a) A sewage treatment facility with a design capacity greater than or equal to 0.5 million gallons per day has an assigned performance concentration:

(i) Equal to or less than 3.0 mg/l for nitrogen or .3 mg/l for phosphorus; and

(~~b~~ii) If applicable, equal to or less than the concentration basis of the permit's required floating cap; and

(b) All other wastewater point sources have an assigned performance concentration established on a case by case basis, with the resulting benchmark at least as stringent as the baseline required under Regulation .05 of this chapter.

(~~37~~36) "Person" has the meaning stated in COMAR 26.08.01.01.

(~~38~~37) "Point source" has the meaning stated in 33 U.S.C. §1362.

~~(39) "Pollutant reduction" means the difference between the baseline load established for each point or nonpoint source and the load discharged to either ground or surface water after installation of the BMP.~~

(~~40~~38) "Public funding" means federal or State grant funding.

(~~41~~39) "Registration" means the recordation of a credit or trade in the Registry.

(~~42~~40) "Registry" means a publicly accessible online database system used by the Department and the Department of Agriculture to administer the Maryland Water Quality Trading Program by tracking credit-generating BMPs, verification activities, credits, trades, and credit usage records.

(~~43~~41) "Reserve pool" means a pool of certified credits created by the application of the reserve ratio that can be used by the State as stated in Regulation .08 of this chapter.

(~~44~~42) "Reserve ratio" means a 5 percent reduction in the total number of generated credits, the result rounded down to the next whole number, placed in the reserve pool at the time of certification.

(~~45~~43) "Sector" means each of the following groups of persons:

(a) Agricultural dischargers;

(b) Stormwater dischargers;

(c) Sewage treatment and industrial waste dischargers; and

(d) Persons having on-site sewage disposal systems; and

(e) Forests.

(4644) "Segmentshed" means a discrete land area that drains into one of the Chesapeake Bay Program tidal segments for which a TMDL is established in the Chesapeake Bay TMDL.

(4745) "Source discharger" means a:

(a) Point source regulated under an NPDES or State discharge permit that has received an individual or aggregate wasteload allocation; or

(b) Nonpoint source that is assigned a share of the aggregate load allocation for an entire sector.

(4846) "Stormwater" has the meaning stated in COMAR 26.17.02.02.

(4947) "Stormwater point source" means a regulated stormwater discharger such as a MS4 permittee, or a an NPDES Industrial stormwater permittee.

(5048) "Technology-based effluent limitation (TBEL)" means a permit limit for a pollutant that is based on the capability of a treatment method to reduce the pollutant to a certain concentration or loading.

(5149) "Total maximum daily load (TMDL)" means a calculation for an impaired water body of the maximum amount of a pollutant the water body can receive and still meet applicable water quality standards in accordance with federal Clean Water Act requirements.

(5250) "Trade" or "trading" means a transaction, sale, or other exchange of credit through a contractual agreement between a credit generator or owner and a credit buyer.

(5351) "Uncertainty ratio" means a numeric adjustment to a trade to compensate for possible discrepancies in estimated pollutant reductions resulting from inaccuracy in credit estimation methodology or variability in project performance, or to provide a margin of safety in the achievement of water quality goals.

(5452) "Wasteload allocation (WLA)" has the meaning stated in COMAR 26.08.01.01.

(53) "Wastewater" has the meaning stated in COMAR 26.08.01.01.

(5554) Wastewater point source.

(a) "Wastewater point source" means a sewage treatment plant or discharger, an industrial wastewater discharger, or any other point source that has applied for and received a wastewater an NPDES or other wastewater State discharge permit issued pursuant to COMAR 26.08.04.

(b) "Wastewater point source" does not include stormwater point sources.

(5655) "Watershed" means an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel.

.04 Maryland Water Quality Trading Program Framework.

A. Pollutants Eligible for Trading. Nitrogen, phosphorus, and sediment are the only pollutants eligible for credit trading and may be traded independently or in any combination.

B. Maryland Trading Regions.

(1) Any trade shall occur within the same trading region.

(2) The Department has established the following trading regions:

(a) Potomac River Basin;

(b) Patuxent River Basin; and

(c) Eastern Shore and Western Shore River Basins, including the Maryland portion of the Susquehanna Basin.

C. Program Participation.

(1) A person may only use credits generated and sold within the State to:

(a) Comply with the applicable nitrogen, phosphorus, and sediment load or wasteload allocations of the Maryland portion of the Chesapeake Bay TMDL, local TMDLs, or NPDES permit requirements; or

(b) Improve water quality.

(2) Other than persons generating credits under the provisions of COMAR 15.20.12, a person generating credits under the Maryland Water Quality Trading Program shall:

(a) Meet appropriate baseline requirements in accordance with Regulation .05 of this chapter;

(b) ~~Install~~ Implement a BMP approved by the Chesapeake Bay Program that is acceptable to the Department;

(c) Demonstrate a load reduction below the baseline requirements that is acceptable to the Department and calculate credits in accordance with Regulation .06 of this chapter; and

(d) Submit a Certification and Registration form to the Department for credit certification in accordance with Regulation .07 of this chapter.

(3) A person's ability to generate credits is based on the performance of each individual facility or best management practice and their ability to comply with Regulation .07 of this chapter.

D. Limitations.

(1) This chapter does not apply to wastewater point source to wastewater point source trading.

(2) No credit shall be offered for trade except in compliance with the provisions of this chapter.

(3) Except those BMPs implemented in conformance with Special Conditions III.A.1.f of General Permit No. 12SW, Stormwater Associated with Industrial Activities, any BMP implemented to satisfy regulatory requirements, including those related to new development and redevelopment, prior to the effective date of this chapter, may not be used to generate a credit.

(4) Credits may be traded only after they have been certified, verified, and registered in accordance with this chapter or, for agricultural credits, in accordance with COMAR 15.20.12.

(5) For the purposes of this chapter, public funding may not be used to generate a credit, except:

(a) A wastewater treatment plant upgraded to ENR that accepts BRF grant funding for operation and maintenance to achieve a nitrogen discharge of 3mg/l and a phosphorus discharge of 0.3 mg/l may generate credits for performance below 3mg/l of nitrogen and below 0.3mg/l of phosphorus; or

(b) Unless otherwise prohibited by the terms and conditions of the public funding, the credits generated by any other nonagricultural BMP funded in part by public funding shall be prorated based on the ratio of nonpublic funding used to generate the credit to the total cost incurred to generate the credit.

(6) The Department is not responsible or liable for the performance of a credit-generating project certified pursuant to the requirements of this chapter.

(7) The acquisition of credits for compliance purposes does not eliminate any requirement to comply with local water quality standards, permits, or other legal requirements.

E. Water Quality Trading Program Registry.

(1) The Department, in consultation with the Maryland Department of Agriculture, shall establish and maintain the Registry.

(2) Pursuant to this chapter and COMAR 15.20.12, all certified credits shall be posted on the Registry.

(3) The inclusion of credits on the Registry or the Marketplace is not a representation by the Department or the credit seller that the credits will satisfy the specific regulatory requirements of the credit buyer.

.05 Baseline Requirements.

A. General policies.

(1) All baselines shall be consistent with the 2010 Chesapeake Bay TMDL ~~and any local TMDL~~, as may be amended from time to time, or, if more restrictive, a local TMDL that may be reflected in an NPDES or State discharge permit.

(2) In the event of an amendment to the Chesapeake Bay TMDL, the:

(a) Baseline established in a permit remains in effect until a new permit or a permit modification is issued by the Department; and

(b) Credits calculated with a baseline established under the previous Chesapeake Bay TMDL and approved by the Department prior to the effective date of the amendment shall remain available for sale until the certification period ends for that credit.

B. The baseline for an agricultural nonpoint source shall be determined by the Department of Agriculture in accordance with COMAR 15.20.12.

C. The baseline for a wastewater point source shall be determined by the Department based on an annual loading limit wasteload allocation established in the wastewater point source's NPDES discharge permit.

D. The baseline for a stormwater point source is the restoration requirement of the stormwater point source's current NPDES discharge permit.

E. Except as may be revised ~~by~~ pursuant to subsequent versions of the Chesapeake Bay Watershed Model, the baseline for a nonregulated source shall be the pollutant load generated under the conditions that existed prior to installation of the BMP, as calculated using assessment tools consistent with the Chesapeake Bay Program modeling tools and accepted by the Department.

F. Except as may be revised ~~by~~ pursuant to subsequent versions of the Chesapeake Bay Watershed Model, the baseline load per equivalent dwelling unit for an on-site sewage disposal system is:

(1) 18.56 pounds of nitrogen per year for a system located in the Critical Area for the Chesapeake and Atlantic Coastal Bays;

(2) 11.60 pounds of nitrogen per year for a system located within 1,000 feet of surface water; and

(3) 6.96 pounds of nitrogen per year for all other systems.

.06 Calculation of Credits.

A. Wastewater Point Sources. Credits generated by a wastewater point source shall be based on that wastewater point source's performance as follows:

(1) Credits shall be calculated and reported under the terms of the required wastewater discharge permit at the end of each calendar year as the load remaining after subtracting actual annual effluent nutrient load from the performance-based benchmark load; and

(2) The annual effluent nutrient load shall be calculated using the end of the calendar year annual cumulative flow for the facility, multiplied by the actual effluent nitrogen, ~~or~~ phosphorus, or sediment concentration converted to units of pounds per year.

B. Stormwater Point Sources and Nonregulated Sources. Stormwater point source and nonregulated source credits shall be calculated using assessment tools consistent with the Chesapeake Bay Program modeling tools and accepted by the Department.

C. Agricultural Nonpoint Sources. Nonpoint source credits generated on agricultural land shall be calculated using the Maryland Nutrient Tracking Tool in accordance with COMAR 15.20.12.

D. On-site Sewage Disposal Systems. Nitrogen credit for an on-site sewage disposal system upgraded with nutrient removal technology is calculated by subtracting the load remaining after upgrade of the system from the system's baseline load established in accordance with Regulation .05 of this chapter.

.07 Procedure for Certification.

A. Credits are not valid or tradable until placed on the Registry after certification as follows:

(1) Agricultural credits are certified by the Maryland Department of Agriculture in accordance with COMAR 15.20.12.~~07~~;

(2) Wastewater point source credits are certified by the Department through issuance of an NPDES or State discharge permit or permit modification; and

(3) All other credits are certified by the Department according to §B of this regulation.

B. A person who applies to the Department for certification of a credit shall complete and sign a Certification and Registration Form provided by the Department, including:

(1) Identification of the location and segmentshed where the BMP ~~was~~ is being implemented and a map identifying the location and boundaries of the BMP;

(2) Documentation that the generator either owns the property or has the permission of the landowner to install, access, and maintain the BMP and to apply for certification of credits;

(3) A description of the BMP, including:

(a) A description of ~~the~~ any permits required for its installation and evidence establishing that it was installed in accordance with the laws, regulations, and programs of applicable local, state, and federal authorities;

(b) Verification in accordance with Regulation .11 of this chapter; and

(c) A ~~n annual~~ maintenance plan for ~~maintaining~~ the BMP that will be put into operation during the lifespan of the credit;

(4) Supporting documentation that explains:

(a) Which tool was selected to determine the requested number of credits;

(b) How the project satisfies the baseline requirements in Regulation .05 of this chapter; and

(c) How the credits were calculated to meet the nitrogen, phosphorus, and sediment reduction amounts claimed in the application; and

(5) Any other information the Department deems necessary to review the Certification and Registration Form, and certify the credits.

C. As a condition of the Department's certification of a credit, the applicant and landowner shall agree in writing to provide the Department, verifier, and their agents with access to the BMP at all reasonable times during the lifespan of the credit.

D. Upon review and approval of the information submitted in the Certification and Registration Form, the Department shall assign each credit or block of credits a unique registration number and place the certified credits on the Registry.

E. If the Department denies the Certification and Registration Form, the Department shall provide the basis for the denial to the applicant.

F. The credit owner shall update the credit registration, in writing within 30 days, to the Department and the credit buyer, if applicable, if there is a change in:

(1) The BMP used to generate the credit that could reasonably be expected to affect its certification; or

(2) The ownership of the property where the BMP is located.

G. The BMP generates credits once it is certified.

H. Credit generators may create listings linked to their Marketplace accounts to display certified credits they have for sale and initiate trades with potential credit buyers.

I. Credit buyers may post credit needs or solicit offers using the Marketplace.

.08 Trading Requirements.

A. Credit trades may occur with or without the participation of an aggregator or broker.

B. In the event of a default in a trade contract, expiration of a credit, or suspension or revocation of a credit, the buyer using the credit remains responsible for complying with any NPDES and State discharge permit or other regulatory requirement that the credit was intended to satisfy.

C. Ratios Applicable to All Trades.

(1) Uncertainty Ratio.

(a) An uncertainty ratio of 1:1 shall be applied to trades involving credits generated by nonpoint sources and acquired by stormwater point sources or other nonregulated sources.

(b) An uncertainty ratio of 1:1 shall be applied to trades involving implementation of BMPs for land conservation that includes protection through an irrevocable conservation easement or other instrument attached to the property deed and recorded with the local circuit court.

(c) An uncertainty ratio of 2:1 shall be applied to trades involving credits generated by nonpoint sources and acquired by wastewater point sources, unless the generator, seller, or buyer of the credit is able to demonstrate to the Department that ~~the~~ a lower ratio is justified and protective of water quality standards.

(2) Edge of Tide Ratio.

~~*(a) No EoT numeric adjustment factor shall be applied when a credit is generated in the same segmentshed in which the credit buyer uses it.*~~

(a~~b~~) An EoT numeric adjustment factor shall be applied to all applicable credits to normalize loads based on delivery to the mainstem of the Chesapeake Bay. ~~when a credit seller and credit buyer are located in different segmentsheds of a Maryland watershed that have~~

~~*different EoT factors.*~~ *The appropriate factor shall be calculated using assessment tools consistent with the Chesapeake Bay Program modeling tools and accepted by the Department.*

(~~c~~b) EoT adjustment factors for credits from wastewater point sources shall be determined by the Department based on the latest Chesapeake Bay Model used by the Department in issuing permits with trades.

(3) Reserve Ratio. A reserve ratio shall be applied to each credit when it is certified to create a reserve pool of credits that may be used by the Department to:

(a) Cover the loss of certified credits from a BMP damaged by events arising from sudden and reasonably unforeseeable events beyond the control of the person responsible for the maintenance of the BMP, including acts of God;

(b) Replace purchased credits that become unavailable due to the failure or underperformance of a BMP;

(c) Address a lack of readily available credits; or

(d) Improve the overall water quality during a year when the credits in the reserve pool are not used to support other purposes detailed in this chapter.

D. Lifespan of Certified Credits.

(1) A BMP may only generate credits when it is installed and placed into operation and all operational and maintenance guidelines are followed.

(2) Credits may be certified for more than 1 year but shall be applied annually.

(3) The Department shall include the number of years a credit is generated as part of the credit certification.

E. Local Water Quality.

(1) The use of a credit may not cause nor contribute to local water quality impairments or prevent the attainment of local water quality standards.

(2) Credits used within any impaired waters must be generated within such impaired waters or upstream of the credit user's discharge.

F. Prohibitions. At its discretion, the Department may prohibit the following persons from generating credits:

(1) A permittee in noncompliance with permit terms;

(2) A nonregulated source or owner of an on-site sewage disposal system that is not in compliance with COMAR 26.04.03, 26.17.01, 26.17.02, 26.17.04, 26.23, or 26.24, if applicable;

(3) An agricultural operation that is not in compliance with COMAR 15.20.12; or

(4) A person who has previously violated any provision of the Environment Article or any regulation adopted under the Environment Article.

.09 Usage of Credits by Point Sources.

A. In order to use traded credits to fulfill permit requirements, a credit buyer shall select credits that meet the limitations in this chapter, including limitations relating to credit lifespan, trading, trading regions, and local water quality standards and requirements.

B. The use of a credit shall be consistent with the credit's certification.

C. The Department shall prorate the amount of certified credits generated from any BMP for use in the year the credits are certified, while the total amount of certified credits generated from any BMP are not valid for use until the following year starting January 1.

D. Credits may not be used for the purpose of complying with technology-based effluent limitations.

E. The use of certified credits by a point source shall be subject to the terms and conditions of the permit to which the certified credits apply.

F. Permits may contain conditions on the use of certified credits, including:

(1) The extent to which the requirement of the permit may be satisfied with certified credits; and

(2) When, and from what source, certified credits may be acquired by the permittee.

.10 Registration of Trades.

A. A credit buyer shall notify the Department about each trade by filing a form provided by the Department within 15 days after the trade.

B. Within 15 days after receipt of the notification form required by §A of this regulation, the Department shall update the Registry, including the registration number for the credit, its location, duration, and the intended use of the credit.

C. The Department shall update the Registry within 30 days after receiving notice from the credit buyer of a change in the intended use of the credit.

.11 Verification and Reporting Requirements.

A. In its certification of a credit, the Department shall state the frequency at which the credits shall be verified, which shall be in accordance with local, State, and federal law and permit requirements, but shall be no less frequently than every three years.

B. Verification Requirements.

(1) Verification of credits generated by a wastewater point source shall include a report submitted to the Department annually for approval which includes certified discharge monitoring reports, appropriate annual reports, inspections, and any other reporting terms specified within the wastewater point source permit or required by the Department.

(2) Verification of credits generated by any other source shall be performed by a:

(a) ~~A~~ State or county inspector;

(b) ~~A professional~~Professional engineer registered in Maryland; or

(c) ~~A~~ Department-approved verifier ~~that:~~.

(3) Before performing any verification under §B(2) of this regulation, the inspector, engineer, or verifier shall demonstrate to the Department that the inspector, engineer, or verifier:

(a)~~(i)~~ Has the appropriate education, expertise, and training to perform the verification;

(b)~~(ii)~~ Does not hold an interest in the operation or entity generating the credit; and

(c)~~(iii)~~ Was not involved in the original application or qualification of the credits.

C. Each report prepared by an inspector, engineer, or verifier in accordance with §B(2) of this regulation shall include:

(1) Documentation that the BMP implemented continues to meet baseline compliance and that the credit generating BMP continues to be operated and maintained in accordance with the terms of the trading contract and the requirements of this chapter; and

(2) Confirmation that no deficiencies exist and no corrective measures are needed, or a detailed description of deficiencies and required corrective actions.

D. Based on the information obtained in the verification reports, the Department shall update the Registry as necessary.

.12 Public Participation.

A. The Department shall provide notice, and an opportunity for comment and a hearing, if requested, for NPDES and State discharge permits that propose to allow trading under this chapter in accordance with the federal Clean Water Act and ~~Code of Federal Regulations~~the Environment Article, Annotated Code of Maryland for new permits or modification of existing permits, as applicable.

B. The Department shall report all credit trades by a stormwater point source permittee annually, and make the report available to the public on the Registry.

.13 Enforcement.

A. If a BMP is not performing in conformance with its certification the Department may order:

(1) Repairs or other remedies to address or eliminate any deficiencies, within a time period determined by the Department;

(2) Additional inspections; and

(3) Written substantiations that corrective measures have been taken.

B. The Department may suspend or revoke certification of a credit if:

(1) There are any violations of this chapter;

(2) A BMP is not performing in conformance with its certification;

(3) The Department determines that misleading, false, or fraudulent information was provided in the application for certification of such credit or any other submission related to such credit; or

(4) Any other action or inaction by a credit seller or credit buyer that the Department determines provides good cause to suspend or revoke such certification.

C. Within 30 days of a determination to suspend or revoke a certification, the Department shall:

(1) Issue a notice of the suspension or revocation of credit certification, including an effective date thereof, to the credit seller ~~or~~ and the credit buyer; and

(2) Update the Registry to reflect the suspension or revocation.

D. A corrective action order does not preclude the Department from exercising its enforcement authority. Suspension or revocation of credit certification does not preclude any other legal action that may be taken by the Department or another public or private entity.

.14 Appeal Process.

Any person aggrieved by the suspension or revocation of a credit taken in accordance with this chapter shall have the right to review in accordance with the provisions of the Administrative Procedure Act, State Government Article, Title 10, Subtitle 2, Annotated Code of Maryland.

Maryland Department of the Environment
Water Quality Trading Regulations
Summary

In October 2015, Governor Hogan issued the Maryland Water Quality Nutrient Trading Policy Statement. This Policy acknowledged efforts by the Maryland Department of Agriculture (MDA) to initiate a program that attracted farmer participation while prompting the Maryland Department of the Environment (Department or MDE) to develop a program that attracted attention from other sectors and created a marketplace for the trading of credits.

Nutrient trading has emerged as a promising strategy for introducing cost-effectiveness and market-driven efficiency to the realization of reductions of nitrogen, phosphorus and sediment loads to the Chesapeake Bay. MDE's goals in advancing the program include:

- Stimulate activity in sectors where there is no regulatory driver;
- Expand compliance options for permitted entities;
- Encourage development of low-cost technologies and/or Best Management Practices (BMPs); and
- Attract private sector ingenuity and innovation by creating a market where Buyers can purchase nutrient reductions at a lower cost than traditional approaches.

Traditional regulatory efforts have resulted in significant progress in wastewater treatment plant upgrades and to a lesser extent in urban stormwater management. Costs are daunting and capacity to actually construct BMPs has limited progress.

The Department initiated the process of developing regulations by soliciting input from a significant number of stakeholders throughout the last two years, beginning with the formation of the Water Quality Trading Advisory Committee (WQTAC). As with any new program, there are concerns about whether it has the appropriate level of safeguards, in this case to ensure that the traded credits represent real reductions in nutrient loads. The Department is confident that, working with the WQTAC, the regulations not only provide those safeguards, but also provide the basis for a viable trading program that will enhance Maryland's efforts to protect and restore the water resources of the Chesapeake Bay and its tributaries. Additionally, the program developed by MDE is <u>not</u> a compulsory "command and control" approach, but a voluntary program that has to be simple enough to attract participation by individuals and small business, who are interested in getting a return on a comparatively modest investment. MDE needs to ensure it attracts participation in order for it to be successful.

The Department has sought the support of those entities whom we regulate, public and private sector alike, as well as interested environmental groups. Accordingly, details about how a trading program should work haven been discussed extensively. There is agreement that a successful program needs to:

1) Establish baseline conditions;
2) Only utilize BMPs approved by the Chesapeake Bay Program;

3) Verify that a BMP is implemented properly, is properly maintained and generates credits that are calculated correctly; and
4) Have credits certified by the Department in a transparent manner.

The Department believes the proposed regulations create an adequate framework for these steps. Experience may teach us that some aspect needs to be fine-tuned, but MDE believes this is an excellent start. Those who would like more details often overlook the role of permits in this program. Through individual permit language, MDE can and will control whether or how a permitted entity can generate credits AND the degree to which a permittee can utilize purchased credits as a substitute for the underlying control measures required by the five-year permit.

Major areas of controversy have been:

- Interstate trading;
- Wastewater treatment plant baselines;
- Wastewater treatment plant capacity credits;
- Protection of local water quality and trading regions;
- Trading ratios; and
- Transparency.

The Department's original proposal has continued to evolve and every one of these issues has been addressed in response to comments from stakeholders. MDE believes these regulations represent a thoughtful balance, with no stakeholder getting 100 percent of what it wants, but each commenting party prevailing on some detail(s).

Interstate Trading. The only credits that can be purchased or used in Maryland are those generated in Maryland. MDE proposed language that allowed the purchase of credits from other states if their calculation was based on Maryland's program and not on the other state's program. A number of stakeholders objected. MDE foresees examples of viable trades in the Potomac watershed (especially since Maryland owns the Potomac River), but acknowledges the concerns of the opponents and agrees that interstate trading will be developed incrementally as experience is gained from a Maryland-only trading program.

Wastewater treatment plant baselines. The Department's early drafts of the regulations established the baseline for wastewater treatment plant credit generation as 4 milligrams/liter (mg/l) nitrogen, the permit limit for most facilities upgraded with enhanced nutrient removal (ENR) technologies. A number of parties objected, arguing that the baseline should be set at 3 mg/l, the design basis for a plant funded through the Bay Restoration Fund (BRF). As information became available about the terms of the funding agreements for BRF upgrades and plant operations in calendar year 2016 where BRF funds supplemented operational costs, MDE agreed that 3 mg/l nitrogen was the appropriate trading benchmark. Wastewater treatment plant operators remain opposed to this compromise.

Wastewater treatment plant capacity credits. The Department opened the door to trading and offsets within the point source sector under the auspices of the "Policy for Nutrient Cap Management and Trading in Maryland's Chesapeake Bay Watershed" adopted in 2008.

Wastewater point source "trading" since 2008 has been a process *primarily* involving transfers of wasteload allocations or "capacity" solely between plants within the wastewater sector. The level of wastewater point to point trading thus far is insignificant with regard to the overall potential market volume, but has been a timely solution for unexpected operational challenges or offsetting new wastewater sector loads. All transfers of allocation are approved through a permit modification that is subject to public comment. The trading of capacity credits is prohibited in cross-sector trading and thus is excluded from these regulations.

Geographic limitation on trading: protection of local water quality and trading regions. An important goal of the Water Quality Trading Program is to ensure that local water quality is not compromised; the challenge has been to protect local water quality while maintaining a viable trading program. MDE believes the current language achieves that goal by referring to and defining local water quality impairments, as well as "impaired waters".

The term "impaired waters" is defined in the proposed regulations as "waters included on the 303(d) list for nitrogen, phosphorus, or sediment." The 303(d) listings for nutrient and sediment impairments are typically managed at either the Maryland (MD) 8-digit watershed scale for nontidal impairments or at the Chesapeake Bay segment scale for tidal impairments. MDE will be utilizing the MD 8-digit watershed or segment scale when evaluating whether the location of a credit generating BMP protects local water quality in relation to where it is used.

The fundamental concept is that in order to prevent the creation of hot spots and worsening of a local water quality impairment, credits must be generated within the same impaired waterbody or upstream of where the credit will be used, so that there is no stretch of impaired water that continues to be unaddressed until the flow reaches the location of the credit-generating BMP. In other words, a credit can potentially be generated at multiple locations within the watershed of an impairment and draining to that impaired waterbody, as long as it is not downstream.

If the local waterbody to which a discharge is directed is not impaired for the nutrient of concern, then the purchase of any credits for use by that discharger is only limited by the more stringent of 1) the watershed draining to the nearest downstream impaired segment or 2) the three trading regions.

Trading Ratios. The regulations utilize three trading ratios: Edge of Tide, Reserve and Uncertainty. There has been no dispute regarding the Edge of Tide ratio, which factors in how far a discharge point is from Chesapeake Bay tidal waters.

The 5% reserve ratio is a compromise between those stakeholders who believe an automatic 10% retirement ratio should apply "for the good of the Bay" and those who believe that there should be no such ratio at all, as it fundamentally represents a tax on a voluntary effort to improve water quality. Those credits held in reserve may be used in the near term to replace credits based on a BMP that fails or to offset a natural disaster; if there is no demand, those credits will essentially be retired "for the good of the Bay."

A number of stakeholders argue that an uncertainty ratio should always be 2:1, simply to address the uncertainty involved in any credit calculation, since so much of the Chesapeake Bay assessment is based on modeling. MDE consulted extensively with the U.S. Environmental Protection Agency (EPA) on this detail, as opponents allege MDE's approach was inconsistent with EPA Technical Memoranda. By letter dated January 23, 2018, EPA clarified its position regarding the use of an uncertainty ratio of 1:1 "applied to trades involving credits generated by nonpoint sources and acquired by stormwater point sources or other nonregulated sources". EPA states in that letter: "EPA agrees with MDE's application of the 1:1 ratio and not a 2:1 ratio. The uncertainty ratio of 2:1 recommended in EPA's technical memorandum dated February 12, 2014 and titled "Accounting for Uncertainty in Offset and Trading Programs" was primarily designed to address the difference between monitored and modeled loads. As loads from both Municipal Separate Storm Sewer System (MS4) permittees and non-point sources are both modeled loads, it would be inappropriate to apply this technical memorandum to MS4 trading. Given the nature of loads for both classes of sources, the approach that MDE has proposed is not unreasonable." MDE agrees that a 2:1 ratio is appropriate when a point source (with monitored discharges) purchases credits from a nonpoint source (with modeled discharges).

Transparency. Some stakeholders believe that every proposed trade should be subject to a public comment period. MDE rejects this as unnecessarily burdening government resources and impairing the free market. Instead, MDE will work cooperatively with the MDA to maintain a Trading Registry that will be publicly accessible and will contain information about all trading under these and MDA's regulations. The source of the credits will be identified, as well as their use. The Registry will have links to any applicable MDE permits, where language will allow and also possibly limit the use of credits to achieve compliance with the permit terms.

In conclusion, these regulations are the result of extended discussion and represent reasonable compromise.

MARYLAND DEPARTMENT OF THE ENVIRONMENT

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

PART I. IDENTIFICATION

A. Permit Number: XX-XX-XXXX XXXXXXXXX

B. Permit Area

This permit covers all stormwater discharges from the municipal separate storm sewer system (MS4) owned or operated jurisdiction-wide by XXXXX County/City/Agency, Maryland.

C. Effective Date: To be determined (TBD)

D. Expiration Date: TBD

PART II. DEFINITIONS

Terms used in this permit are defined in relevant chapters of Title 40 of the Code of Federal Regulations (CFR) Parts 122 - 124 or the Code of Maryland Regulations (COMAR) 26.08.01, 26.17.01, and 26.17.02. Terms not defined in CFR or COMAR shall have the meanings attributed by common use.

PART III. WATER QUALITY

XXXXX County/City/Agency must manage, implement, and enforce stormwater management programs in accordance with the Clean Water Act (CWA) and corresponding stormwater National Pollutant Discharge Elimination System (NPDES) regulations, 40 CFR Part 122, to meet the following requirements:

1. Effectively prohibit pollutants in stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with Maryland's receiving water quality standards;

2. Attain applicable stormwater wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with Title 33 of the U.S. Code (USC) §1342(p)(3)(B)(iii); 40 CFR §122.44(k)(2) and (3); and

3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with all the conditions contained in PARTs IV through VII of this permit shall constitute compliance with §402(p)(3)(B)(iii) of the CWA and adequate progress toward compliance with Maryland's receiving water quality standards and any EPA approved stormwater WLAs for this permit term.

PART IV. STANDARD PERMIT CONDITIONS

A. Permit Administration

XXXXX County/City/Agency shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County/City/Agency shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County/City/Agency shall submit in its annual reports to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

B. Legal Authority

XXXXX County/City/Agency shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County/City/Agency shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County/City/Agency's annual report.

C. Source Identification

Sources of pollutants in stormwater runoff jurisdiction-wide shall be identified by XXXXX County/City/Agency and linked to specific water quality impacts on a watershed basis. A georeferenced database shall be submitted annually in accordance with *Maryland Department of the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017),* hereafter (MS4 Geodatabase) that includes information on the following:

1. Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;

2. Industrial and commercial sources: industrial and commercial land uses and sites that the County/City/Agency has determined have the potential to contribute significant pollutants;

3. Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;

4. Impervious surfaces: public and private land cover delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;

5. Monitoring locations: locations established by the County/City/Agency for chemical, biological, and physical monitoring of watershed restoration efforts and the *2000 Maryland Stormwater Design Manual,* or as part a pooled monitoring approach as described in Part IV.F; and

6. Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.

D. Management Programs

The following management programs shall be implemented jurisdiction-wide by XXXXX County/City/Agency. These management programs are designed to control stormwater discharges and reduce associated pollutant loadings to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. Annual Reports for the County's/City's/Agency's management programs shall be in accordance with Part V.A of this permit and the MS4 Geodatabase.

1. Stormwater Management

An acceptable stormwater management program shall be maintained by the County/City/Agency in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the *2000 Maryland Stormwater Design Manual*. This includes:

   i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;
   ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and
   iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.

b. Maintaining programmatic and implementation information including, but not limited to:

i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;
ii. Number of redevelopment projects received;
iii. Number of stormwater exemptions issued; and
iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by the County/City/Agency.

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County/City/Agency's annual reports.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall be maintained by the County/City/Agency and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the County/City/Agency's erosion and sediment control enforcement authority;

b. Ensure that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE; and

c. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

3. Illicit Discharge Detection and Elimination

The County/City/Agency shall implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:

a. Field screening at least 150 outfalls annually (*100 outfalls for Phase I Medium Jurisdictions*). Each outfall having a discharge shall be sampled using a chemical test kit. An alternative program may be submitted by the County/City/Agency for MDE approval that methodically identifies, investigates, and eliminates illegal discharges to the County/City/Agency's MS4;

b. Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;

c. Maintaining a program to address, and if necessary, respond to illegal discharges, dumping, and spills; and

d. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting.

4. Litter and Floatables

a. The County/City/Agency shall evaluate current litter control problems associated with discharges from portions of its MS4 that are not already addressed under a TMDL for trash (litter and floatables). Actions to address documented liter control problems shall be submitted to MDE and updated annually.

b. As part of the County/City/Agency watershed assessments under PART IV.E.1 of this permit, the County/City/Agency shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.

5. Property Management and Maintenance

a. The County/City/Agency shall ensure that a Notice of Intent (NOI) has been submitted to MDE and a pollution prevention plan developed for each County/City/Agency owned industrial facility requiring coverage under Maryland's NPDES General Permit for Discharges from Stormwater Associated with Industrial Activity (SW Industrial GP):

   i. An NOI for industrial activity is typically required where the following activities are performed: maintenance or storage of vehicles or equipment; use, handling, transport, or storage of fertilizers, pesticides, landscaping materials, hazardous materials, or other materials that could pollute stormwater runoff; and
   ii. A list of County/City/Agency properties requiring industrial stormwater permitting shall be updated and submitted to MDE annually.

b. The County/City/Agency shall develop, implement, and maintain a good housekeeping plan (GHP) for County/City/Agency owned properties not required to be covered under Maryland's SW Industrial GP. A standard GHP may be developed for all County owned property or separate GHPs may be developed for properties with similar use, e.g., recreation and parks property, school property. The GHP shall include, but not be limited to:

   i. A description of property management activities;
   ii. A map of the locations of properties covered by the GHP;
   iii. A list of potential pollutants and their sources that result from activities conducted at the facility or group of like facilities;
   iv. Written GHP procedures designed to reduce the potential for stormwater pollution from the property activity, including illegal discharges, dumping, and spills; and
   v. Procedures for assessing County/City/Agency properties in order to prevent the discharge of pollutants, spills, and leaks into its municipal separate storm sewer system.
   vi. Training for all appropriate County/City/Agency staff and contractors regarding best practices for preventing, reducing, and eliminating the discharge of pollutants during municipal operations.

c. The County/City/Agency shall continue to implement a program to reduce pollutants associated with the maintenance of jurisdiction-wide

properties including local roads and parks. The maintenance program shall include the following activities where applicable:

i. Street sweeping;
ii. Inlet inspection and cleaning;
iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management;
iv. Litter removal; and
v. Pet waste removal.

d. The County/City/Agency shall reduce the use of winter weather deicing and anti-icing materials by developing a County/City/Agency Salt Management Plan (SMP) to be submitted to MDE in its third year annual report. The SMP shall be based on the guidance provided on best road salt management practices described in *the Maryland Department of Transportation, State Highway Administration's Maryland Statewide Salt Management Plan, October 2017*. The County/City/Agency's SMP shall include, but not be limited to:

i. An anticipated schedule of equipment replacement that provides for technological improvements that limit salt application rates;
ii. Training and outreach:
- Creating a local "Salt Academy" that annually provides County/City/Agency personnel and contractors with the latest training in salt management, or the participation of County/City/Agency personnel and contractors in a "Salt Academy" administered by another MS4 jurisdiction or State agency; and
- Developing best salt management practices outreach for educating homeowners within the County/City/Agency; and

iii. Tracking and reporting:
- Starting with the fourth annual report, during storm events where deicing or anti-icing materials are applied to County/City/Agency roads, track and record the amount of materials used and snowfall per event; and
- Report the salt application by event or date, and the monthly and annual salt tonnage usage per lane mile per inch of snow.

e. The County/City/Agency shall report annually on the changes in its Property Management and Maintenance programs and the overall pollutant reductions resulting from these programs.

6. Public Education

The County/City/Agency shall continue to implement a public education and

outreach program to reduce stormwater pollutants. Education and outreach efforts may be integrated with other aspects of the County/City/Agency's activities. These efforts are to be documented and summarized in each annual report, with details on resources (e.g., personnel and financial) expended and method of delivery for education and outreach. The County/City/Agency shall implement a public outreach and education campaign with specific performance goals and deadlines including, but not limited to:

a. Maintaining a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

b. Providing information to inform the general public about the benefits of:

i. Increasing water conservation;
ii. Residential and community stormwater management implementation and facility maintenance;
iii. Proper erosion and sediment control practices;
iv. Increasing proper disposal of household hazardous waste;
v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal);
vi. Residential car care and washing;
vii. Litter reduction;
viii. Reducing, reusing, and recycling solid waste; and
ix. Proper pet waste management.

E. Restoration for Total Maximum Daily Loads and Chesapeake Bay

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable stormwater WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Appendix A). Additionally, the nutrient reductions from the restoration requirements described below are consistent with Maryland's Phase III Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL, contributing to the State's efforts to meet its 2025 nutrient load targets. ~~Annually,~~ XXXX County/City/Agency shall perform required restoration activities, report on implementation status, and provide opportunities for public comment for each project. These efforts shall be captured for reporting in the annual report.

1. TMDL Stormwater Implementation Plans

a. Within one year of permit issuance, the County/City/Agency shall propose a TMDL stormwater implementation plan for meeting each EPA approved local

and Chesapeake Bay stormwater WLA. A single plan may be developed for TMDLs targeting the same pollutant of concern, or a comprehensive plan may be developed to address all of the pollutants of concern. ~~Each~~ The TMDL stormwater implementation plan shall include estimated ~~interim and~~ final benchmarks for implementing stormwater BMPs, programmatic initiatives, and alternative control practices ~~for meeting~~consistent with the stormwater WLA within the permit term. The TMDL stormwater implementation plan shall report on the estimated continual maintenance costs of each stormwater BMP, programmatic initiative and alternative control practice and how the efforts contribute to the overall MEP towards restoration. TMDL stormwater implementation plans approved by MDE during the previous permit cycle may be used to comply with this requirement;

b. ~~Within one year of permit issuance, the County/City/Agency shall provide~~Each implementation plan shall include a ~~specific~~ list of stormwater BMPs, programmatic initiatives, and alternative control practices that will be completed during this permit term. ~~Specify~~The list shall include the estimated cost of each practice/program ~~on the list~~ and how the implementation of each will work toward meeting the local and Chesapeake Bay stormwater WLAs, impervious area restoration requirements in Part IV.E.2., and the additional Chesapeake Bay restoration requirement in Part IV.E.3. For tracking progress, the County/City/Agency shall ~~propose~~ report annually~~targets as follows~~:

i. The n~~N~~umerical stormwater BMP and alternative control practices ~~implementation benchmarks~~implemented that year;
ii. Narrative programmatic initiative milestones accomplished that year;
iii. Numerical impervious acre restoration ~~benchmarks~~achieved that year and its progress toward the final benchmark;
iv. Numerical pollutant load reduction benchmarks for TN and TP and progress toward Chesapeake Bay stormwater WLAs; and
v. Numerical (or narrative where appropriate) pollutant load reductions ~~benchmarks~~ for local stormwater WLAs.

~~MDE's approval of specific lists of stormwater BMPs, programmatic initiatives, and alternative control practices that will be completed during this permit term toward meeting established benchmarks and milestones shall be enforced.~~

c. Following submittal of TMDL stormwater implementation plan(s), XXXX County/City/Agency shall report annually on implementation progress, including any project substitutions. ~~In the event that an annual target is not met, the report on implementation progress shall include steps that XXXX County/City/Agency is taking to ensure that the missed target is met and that subsequent targets are met on schedule.~~

~~c.~~d. For any local TMDL with a stormwater WLA that is approved by EPA subsequent to the issuance of this permit, the County/City/Agency shall submit a

TMDL stormwater implementation plan within one year of that approval date to address changes from the previous local TMDL implementation plan:

i. TMDL stormwater implementation plans shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County/City/Agency water quality analysis; and

ii. Each TMDL stormwater implementation plan shall include estimated interim and final benchmarks for implementing the stormwater BMPs, programmatic initiatives, and alternative stormwater controls proposed as part of the plan.

2. Impervious Surface Restoration

a. The County/City/Agency shall commence and complete the restoration of XXXX unmanaged impervious acres (to be determined) during this permit term with stormwater BMPs, programmatic initiatives, and alternative control practices in accordance with MDE's 2019 Accounting for Stormwater Waste Load Allocations and Impervious Acres Treated (2019 MS4 Guidance). These BMPs, programmatic initiatives, and alternative practices shall be implemented to replace any nutrient and sediment credits that were acquired through the Maryland Water Quality Trading and Offset Program by the County/City/Agency under its prior permit term.

b. All nutrient and sediment credits acquired during the prior permit term shall continue to be owned by the permittee and be verified annually in accordance with the requirements of the Maryland Water Quality Trading and Offset Program, COMAR, 26.08.11, until they are replaced by local stormwater management BMPs, programmatic initiatives, and alternative practices in accordance with Maryland's 2019 MS4 Guidance.

c. The County/City/Agency shall continue to work toward impervious surface restoration beyond the XXXX impervious acres (to be determined) required under this permit term. Restoration of an additional XXXX unmanaged impervious acres (to be determined) shall be required in subsequent permit terms for making progress toward meeting all EPA approved stormwater WLAs within the County/City/Agency, including those for rivers, lakes, reservoirs, and Chesapeake Bay.

d. Additional impervious acres restored beyond the required XXXX impervious acres (to be determined) during this permit term beyond the XXXX impervious acres (to be determined) required may be credited toward future impervious surface restoration requirements in subsequent permit terms at the permittee's discretion.

3. ~~Additional Chesapeake Bay Restoration~~ Environmental Improvement Projects

The County/City/Agency shall complete X number of Environmental Improvement Projects (EIPs) over the life of the permit term aimed at providing environmental benefits beyond the impervious surface restoration (ISR) required in Part IV.E.2. These projects may add to the pollutant load reductions achieved with impervious surface restoration or they may provide benefits outside the impervious surface restoration framework. EIP projects themselves should:

a. Be proposed no later than the year 2 MS4 Annual Report for approval by MDE;

b. Provide quantifiable benefits (e.g., habitat improvement, implementation of innovative BMPs, reduction of other pollutants, such as bacteria, PCBs, etc.) that may not be captured by projects focused solely on ISR improvements. MDE will work with the County/City/Agency to jointly determine the type and level of crediting for the proposed project(s).

~~Consistent with Maryland's Phase III Chesapeake Bay WIP, the County/City/Agency shall reduce an additional XXXX lbs of total nitrogen (TN) (to be determined) and an additional XXXX lbs of total phosphorus (TP) (to be determined) by the end of this permit term. These reductions are in addition to the TN and TP reductions achieved with the impervious surface restoration required in Part IV.E.2. The County/City/Agency shall reduce these TN and TP loads through any combination of the following approved methods:~~

~~a. Implementing stormwater BMPs from the list of practices in the 2000 Maryland Stormwater Design Manual, including the 2009 supplement for ESD to the MEP, and associated TN and TP load reductions in accordance with Maryland's 2019 MS4 Guidance;~~

~~b. Using alternative BMPs, e.g., tree planting, street sweeping, stream restoration, and the associated TN and TP load reductions in accordance with Maryland's 2019 MS4 Guidance;~~

~~c. Trading for TN and TP credits in accordance with Maryland's Water Quality Trading and Offset Program regulations; and~~

~~d. Innovative practices that have been approved by MDE with monitoring data that documents TN and TP pollutant load reductions.~~

4. Adaptive Management

The County/City/Agency shall continue to implement, evaluate, and update all of its existing plans for each EPA approved stormwater WLA by:

Commented [KB1]: Among the group, there is a majority in support of, but not a unanimous consensus on the alternative "EIP" language to the "Additional Chesapeake Bay Restoration" language that MDE has proposed in this section. Dissenting jurisdictions will submit their own comments individually to MDE regarding this section.

Commented [KB2]: In addition, we would expect that these projects would produce lessons that can be shared broadly, and whose results can be used to inform the requirements of future MS4 permits.

a. Evaluating and tracking the implementation of stormwater BMPs, programmatic initiatives, and alternative control practices through monitoring or modeling to estimate the net change in pollutant load reductions or a water quality response;

b. Documenting progress toward meeting established benchmarks, milestones, and final dates for stormwater WLAs; and

c. Developing an ongoing and iterative process that continuously implements new and additional stormwater BMPs, programmatic initiatives, and alternative control practices when stormwater WLAs ~~are not being~~have not been met ~~according to established benchmarks, milestones, and~~before the approved final dates.

5. Public Participation

The County/City/Agency shall provide ~~continual~~ outreach to the public regarding the development of its TMDL stormwater implemen~~m~~tation plans. ~~Additionally, the County/City/Agency shall allow for public participation in the TMDL process, solicit input, and incorporate any relevant ideas and program improvements that can aid in achieving stormwater WLAs, TMDL water quality endpoints and water quality standards.~~The County/City/Agency shall provide a comment period to the public regarding its TMDL stormwater implementation plans that will allow for suggestions on the draft version and comments on the final version. The County/City/Agency shall provide:

a. Notice in a local newspaper and the County/City/Agency's web site outlining how the public may obtain information on the development of TMDL stormwater implementation plans and opportunities for comment;

b. Procedures for providing electronic and/or paper copies of TMDL stormwater implementation ~~restoration~~ plans to interested parties upon request;

c. A minimum 30 day comment period before finalizing TMDL stormwater implementation plans;

~~c.~~d. The County/City/Agency shall continue to provide for public comment on individual local stormwater management BMPs, programmatic initiatives, and alternative practices targeted at achieving the TMDL plan;

~~d.~~c. A summary in each ~~annual report~~implementation plan of how the County/City/Agency addressed or will address any material comment received from the public.

F. Assessment of Controls

XXXXX County/City/Agency shall conduct BMP effectiveness and jurisdiction-wide trend monitoring for tracking progress toward improving local water quality and restoring Chesapeake Bay.

1. BMP Effectiveness Monitoring

   By April 5, 2019, the County/City/Agency shall notify MDE which option it chooses for BMP effectiveness monitoring. The two options are:

   a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by the Chesapeake Bay Trust (Trust) for determining monitoring needs and selecting appropriate monitoring studies. To implement the required monitoring, the County/City/Agency shall pay a minimum of ($100,000 *for Phase I Large jurisdictions and $75,000 for Phase I Medium jurisdictions*) into a pooled monitoring Trust fund by July 1 of each year (See *Appendix B – Chesapeake Bay Trust Pooled Monitoring Program)*. Enrollment in the program shall be demonstrated through a memorandum of understanding (MOU) between the County/City/Agency and the Trust. The County/City/Agency shall remain in the program for the duration of this permit term ; or

   b. The County/City/Agency shall continue monitoring the (*said*) outfall and (*said*) in-stream station in the (*said*) watershed, or select and submit for MDE's approval a new BMP effectiveness study for monitoring by April 5, 2019. Monitoring activities shall occur where the cumulative effects of watershed restoration activities, performed in compliance with this permit, can be assessed. The minimum criteria for chemical, biological, and physical monitoring are as follows:

      i. Chemical Monitoring:

      - Twelve (12) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;
      - Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;
      - At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136, and event mean concentrations (EMCs) shall be calculated for the following parameters:

Biochemical Oxygen Demand BOD_5	Total Lead
Total Kjeldahl Nitrogen (TKN)	Total Copper
Nitrate plus Nitrite	Total Zinc
Total Suspended Solids	Total Phosphorus
Total Petroleum Hydrocarbons (TPH)	Hardness
E. coli or enterococcus	

- Continuous flow measurements shall be recorded at the in-stream monitoring station or other practical locations based on the approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models.

ii. Biological Monitoring:

- Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and in-stream stations or other practical locations based on an MDE approved study design; and
- The County/City/Agency shall use the Maryland Biological Stream Survey (MBSS) protocols.

iii. Physical Monitoring:

- A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on the approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;
- A stream habitat assessment shall be conducted using techniques defined by MBSS; and
- A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

iv. Annual Data Submittal: The County/City/Agency shall describe in detail its monitoring activities for the previous year and include the following:

- EMCs submitted on MDE's long-term monitoring MS4 Geodatabase as specified in PART V below;
- Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations; and
- Any requests and accompanying justifications for proposed modifications to the monitoring program.

2. Jurisdiction-Wide Trend Monitoring

By April 5, 2019, the County/City/Agency shall notify MDE which option it chooses for jurisdiction-wide trend monitoring. The two options are as follows:

a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by the Trust for determining appropriate jurisdiction-wide trend monitoring. To implement the required monitoring, the County/City/Agency shall pay annually (*$25,000for Phase Large MS4s and $15,000 for Phase I Medium MS4s*), into a pooled monitoring Trust fund by July 1 of each year (See *Appendix B – Chesapeake Bay Trust Pooled Monitoring Program)*. Enrollment in the program shall be demonstrated through an MOU between the County/City/Agency and the Trust. The County/City/Agency shall remain in the program for the duration of this permit term; or

b. The County/City/Agency shall submit a comprehensive plan for jurisdiction-wide trend monitoring for biological, bacteria, and chloride impairments for MDE's review and approval by April 5, 2019, according to the following guidelines:

i. Biological and habitat assessment monitoring of XX (*need more information to set scientifically valid number of sites*) randomly selected stream sites using MBSS protocols;
ii. Bacteria, i.e., E. coli, enterococcus, or fecal coliform, monitoring according to MDE guidance (see Appendix C). Samples shall be collected at regular intervals once per month, and shall be characterized as storm or base flow; and
iii. Chloride assessments through hourly conductivity monitoring at two locations for Large Phase I jurisdictions and one location for Medium Phase I jurisdictions (see Appendix D).

G. Program Funding

1. Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted by XXXXX County/City/Agency as required in PART V below.

2. Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. Annual Reporting

1. Annual progress reports, required under 40 CFR 122.42(c), will facilitate the long-term assessment of XXXXX County/City/Agency's NPDES stormwater program. The County/City/Agency shall submit annual reports on or before the anniversary date of this permit and post these reports on the County/City/Agency's website. All information, data, and analyses shall be based on the State's fiscal year and include:

   a. An executive summary on the status of implementing the County/City/Agency's MS4 programs that are established as permit conditions including:

      i. Permit Administration;
      ii. Legal Authority;
      iii. Source Identification;
      iv. Stormwater Management;
      v. Erosion and Sediment Control;
      vi. Illicit Discharge Detection and Elimination;
      vii. Litter and Floatables;
      viii. Property Management and Maintenance;
      ix. Public Education;
      x. Watershed Assessments;
      xi. Impervious Surface Area and Chesapeake Bay Restoration Plans;
      xii. TMDL and Stormwater WLA Compliance;
      xiii. Assessment of Controls; and
      xiv. Program Funding.

   b. A narrative summary describing the results and analyses of data, including monitoring data that is accumulated throughout the reporting year;

   c. Expenditures for the reporting period and the proposed budget for the upcoming year;

   d. A summary describing the number and nature of enforcement actions, inspections, and public education programs;

   e. The identification of water quality improvements and documentation of attainment and/or progress toward attainment of schedules, benchmarks, deadlines, and applicable stormwater WLAs developed under EPA approved TMDLs; and

   f. The identification of any proposed changes to the County/City/Agency's program when stormwater WLAs are not being met.

2. All annual reporting specified in PARTs IV.C, D, E, F, and G, or required anywhere within this permit shall be made using the most recent version of MDE's MS4 Geodatabase. A corresponding User's Guide provides guidance for data requirements and entry into the MS4 Geodatabase. The geodatabase establishes a consistent reporting structure for Maryland's MS4 community for submitting program data and enables MDE a fair way to efficiently evaluate the effectiveness of implementation and compliance with permit requirements.

3. Because this permit uses an iterative approach to implementation, the County/City/Agency must evaluate the ~~effectiveness~~ progression of its programs toward meeting the permit goals in each annual report. The County/City/Agency shall show through narrative and/or numerical documentation the progression towards meeting stormwater WLAs developed under EPA approved TMDLs. This evaluation will coincide with the BMP Effectiveness Monitoring reporting outlined in Part IV. ~~BMP and program modifications shall be made within 12 months if the County/City/Agency's annual report does not demonstrate compliance with this permit and show progress toward meeting stormwater WLAs developed under EPA approved TMDLs.~~

B. Program Review

In order to assess the effectiveness of XXXXX County/City/Agency's NPDES stormwater program for reducing the discharge of pollutants to the MEP and working toward meeting water quality standards, MDE will review annual reports, conduct field inspections, and periodically make requests for additional data to determine permit compliance. Procedures for the review of local erosion and sediment control and stormwater management programs exist in Maryland State law and regulations. Additional evaluations and field inspections shall be conducted for IDDE, public property management, assessment of controls, and impervious surface area and Chesapeake Bay restoration to determine compliance with permit conditions.

C. Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than 5 years unless administratively continued by MDE. Continuation or reissuance of this permit beyond this permit term will require XXXXX County/City/Agency to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. Failure to reapply for coverage constitutes a violation of this permit.

As part of this application process, the County/City/Agency shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how each County/City/Agency watershed has been thoroughly evaluated, and the status of implementing water quality improvement projects and all schedules, benchmarks, and deadlines toward meeting stormwater WLAs. This application shall be used to gauge the effectiveness of the County/City/Agency's NPDES stormwater

program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

1. The County/City/Agency's NPDES stormwater program goals;

2. Program summaries for the permit term regarding:

   a. Illicit discharge detection and elimination results;

   b. Impervious Surface and Chesapeake Bay Restoration status including County/City/Agency totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting stormwater WLAs developed under EPA approved TMDLs;

   c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved;

   d. Other relevant data and information for describing County/City/Agency programs;

3. Program operation and capital improvement costs for the permit term; and

4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the County/City/Agency's efforts to comply with the conditions of this permit.

PART VI. SPECIAL PROGRAMMATIC CONDITIONS

A. Maryland's baseline programs, including the 1991 Forest Conservation Act, 1997 Priority Funding Areas Act, 2007 Stormwater Management Act, 2009 Smart, Green & Growing Planning Legislation, 2010 Sustainable Communities Act, 2011 Best Available Technology Regulation, and the 2012 Sustainable Growth & Agricultural Preservation Act effectively mitigate the majority of the impacts from new development. Any additional loads will be offset through Maryland's alignment for growth policies and procedures as articulated through Chesapeake Bay milestone achievement. The overriding goal shall be no net growth in loads and XXXXX County/City/Agency shall reflect these policies, programs, and implementation as part of its net WLA accounting as stipulated in Part IV.E.4.b.ii of this permit.

PART VII. ENFORCEMENT AND PENALTIES

A. <u>Discharge Prohibitions and Receiving Water Limitations</u>

XXXXX County/City/Agency shall prohibit non-stormwater discharges through

its MS4. NPDES permitted non-stormwater discharges are exempt from this prohibition. Discharges from the following will not be considered a source of pollutants when properly managed: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration to separate storm sewers; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation waters; springs; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; de-chlorinated swimming pool discharges (not including filter backwash); street wash water; and fire fighting activities.

Consistent with §402(p)(3)(B)(iii) of the CWA, the County/City/Agency shall take all reasonable steps to minimize or prevent the contamination or other alteration of the physical, chemical, or biological properties of any waters of the State, including a change in temperature, taste, color, turbidity, or odor of the waters or the discharge or deposit of any organic matter, harmful organism, or liquid, gaseous, solid, radioactive, or other substance into any waters of the State, that will render the waters harmful to:

1. Public health, safety, or welfare;

2. Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial use;

3. Livestock, wild animals, cats or birds; and

4. Fish or other aquatic life.

B. Duty to Mitigate

XXXXX County/City/Agency shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

C. Duty to Comply

XXXXX County/City/Agency shall be responsible for complying with all conditions of this permit. Other entities may be used to meet various permit obligations provided that both the County/City/Agency and the other entity agree contractually. Regardless of any arrangement entered into however, the County/City/Agency remains responsible for permit compliance. In no case may this responsibility or permit compliance liability be transferred to another entity.

Failure to comply with a permit provision constitutes a violation of the CWA and is grounds for enforcement action; permit termination, revocation, or modification; or denial of a permit renewal application. The County/City/Agency shall comply at all times with the provisions of the Environment Article, Title 4, Subtitles 1, 2, and 4;

Title 7, Subtitle 2; and Title 9, Subtitle 3 of the Annotated Code of Maryland.

The County/City/Agency shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the County/City/Agency to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the County/City/Agency only when the operation is necessary to achieve compliance with the conditions of the permit.

D. Sanctions

1. Penalties Under the CWA - Civil and Criminal

Section 309(g)(2) of the CWA, 33 USC §1319(g)(2) provides that any person who violates any permit condition is subject to a civil penalty not to exceed $10,000 per day for each violation, not to exceed $125,000. Pursuant to the Civil Monetary Penalty Inflation Adjustment Rule, 40 CFR Part 19, any person who violates any NPDES permit condition or limitation is liable for an administrative penalty not to exceed $16,000 per day for each such violation, up to a total penalty of $177,500. Pursuant to Section 309(c) of the CWA, 33 USC §1319(c), any person who negligently violates any permit condition is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. Any person who knowingly violates any permit condition is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both.

2. Penalties Under the State's Environment Article - Civil and Criminal

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the County/City/Agency from civil or criminal responsibilities and/or penalties for a violation of Title 4, Title 7, and Title 9 of the Environment Article, Annotated Code of Maryland, or any federal, local, or other State law or regulation. Section 9-342 of the Environment Article provides that a person who violates any condition of this permit is liable to a civil penalty of up to $10,000 per violation, to be collected in a civil action brought by MDE, and with each day a violation continues being a separate violation. Section 9-342 further authorizes the MDE to impose upon any person who violates a permit condition, administrative civil penalties of up to $5,000 per violation, up to $50,000.

Section 9-343 of the Environment Article provides that any person who violates a permit condition is subject to a criminal penalty not exceeding $25,000 or imprisonment not exceeding 1 year, or both for a first offense. For

a second offense, Section 9-343 provides for a fine not exceeding $50,000 and up to 2 years imprisonment.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who knowingly makes any false statement, representation, or certification in any records or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

E. Permit Revocation and Modification

1. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause.

The filing of a request by XXXXX County/City/Agency for a permit modification or a notification of planned changes or anticipated noncompliance does not stay any permit condition. A permit may be modified by MDE upon written request by the County/City/Agency and after notice and opportunity for a public hearing in accordance with and for the reasons set forth in COMAR 26.08.04.10.

A permit may be modified, suspended or revoked and reissued in whole or in part during this permit term by MDE a~~A~~fter notice and opportunity for a hearing and in accordance with COMAR 26.08.04.10, ~~MDE may modify, suspend, or revoke and reissue this permit in whole or in part during its term~~ for causes including, but not limited to the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. A change in any condition that requires either a temporary reduction or elimination of the authorized discharge;

d. A determination that the permitted discharge poses an immediate threat to human health or welfare or to the environment and can only

be regulated to acceptable levels by permit termination or modification ~~or termination~~to incorporate additional controls that are necessary to ensure human health and safety are not impacted by the permitted effluent.~~;~~

~~e. To incorporate additional controls that are necessary to ensure that the permit effluent limit requirements are consistent with any applicable TMDL WLA allocated to the discharge of pollutants from the MS4; or~~

f. As specified in 40 CFR §§122.62, 122.63, 122.64, and 124.5.

2. Duty to Provide Information

The County/City/Agency shall furnish to MDE, within a reasonable time, any information that MDE may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit. The County/City/Agency shall also furnish to MDE, upon request, copies of records required to be kept by this permit.

F. Inspection and Entry

XXXXX County/City/Agency shall allow an authorized representative of the State or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulatory activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and obtain copies at reasonable times of any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times, without prior notice, any construction site, facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

G. Monitoring and Recordkeeping

Unless otherwise specified by this permit, all monitoring and records of monitoring shall be in accordance with 40 CFR Part 122.41(j).

H. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State or local law or regulations.

I. Severability

The provisions of this permit are severable. If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect. If the application of any provision of this permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

J. Signature of Authorized Administrator and Jurisdiction

Each application, report, or other information required under this permit to be submitted to MDE shall be signed as required by COMAR 16.08.04.01-1. Signatories shall be a principal executive officer, ranking elected official, or other duly authorized employee.

_____ _____

Lee Currey, Director **Date**
Water and Science Administration

Appendix A

TMDLs and Local Stormwater WLAs

(will be unique to each jurisdiction)

Appendix B

Chesapeake Bay Trust Pooled Monitoring Program (PMP)

introduction

The Pooled Monitoring Program (PMP) will focus on answering key questions pertaining to the cumulative impacts of watershed restoration activities (status and trends) and the effectiveness of specific restoration practices (effectiveness studies) posed by the regulatory, regulated, scientific, and practitioner communities using robust and rigorous methods.

Two tenets of the Pooled Monitoring Program are as follows:

1) All data are collected with a specific question or hypothesis in mind
2) Research products identify a clear path to integrate the new information into the regulatory process and make it accessible to regulators.

PROCESS

1) There is a Pooled Monitoring Advisory Committee (PMAC) that includes:
    a. Six members from the regulatory community (USACE, EPA, FWS, NOAA, MDE, DNR)
    b. 1 member from the practitioner community
    c. At least 3 members from the MS4 Phase I permittee community. Any MS4 permittee who contributes funds would be a member.
    d. 1 member from the environmental community
    e. 2 non-voting members of the scientific community who are experts in experimental design and restoration evaluation.

2) MS4 Permittees who opt into the Pooled Monitoring Program agree with MDE on level of opt-in funding commitment and generate MOUs with the Chesapeake Bay Trust, which manages the Pooled Monitoring Program.

3) The Chesapeake Bay Trust and PMAC members maintain a list of key questions about certain kinds of restoration projects as well as a minimum research protocol.

4) The PMAC meets in the fall of each year to review and prioritize key questions.

5) Questions are compiled into an RFP that lists the prioritized questions and minimum/preferred methodology. The RFP includes an outreach/dissemination requirement in the scope of work. The RFP is bid out to any type of entity that can address one or more questions, and can include bids to conduct new research or to analyze existing data. Bidding entities could include, but are not limited to, academic institutions, consulting firms, scientifically capable watershed organizations. Existing research/monitoring programs would be eligible to bid. As part of the RFP, resources, such as lists of completed restoration projects or permitted projects not yet constructed, would be made available. Bidders would be allowed to use these projects in their research.

6) Bids/proposals must identify:

- The question being addressed/answered
- The methodology being used to address (including sample size, location, timing, etc.)
- The analysis proposed
- The final product
- The interpretation of the results/dissemination plan, i.e. presentation of the results into a form usable by regulatory and practitioner communities.

7) The Trust, under guidance of PMAC, composes a Technical Review Committee (TRC) that evaluates proposals and recommends projects for funding. The TRC is composed of external technical peer reviewers who have expertise in the topics of the proposals submitted and are not involved in any proposals submitted. The TRC will evaluate proposals using criteria to include:

    a. Relevance of the project and question posed
    b. Quality of the methods and anlysis proposed
    c. Qualifications of leads and of the organization
    d. Communication/dissemination plan

8) PMAC may recommend that Advisory Groups are established to oversee certain projects.

9) The research is undertaken and completed; reports are sent to PMAC for review. A subset of projects may be sent for external peer review prior to acceptance of final product or dissemination to the public/community.

10) Results are disseminated to the practitioner community through, at a minimum:

    a. An annual forum to which regulatory audiences are invited/required by their agencies to attend
    b. Other forums as appropriate

11) Results are interpreted for the regulatory audiences, and recommendations are prepared for how regulators can integrate the new information into their processes and policies. Some program funds may be used to develop key tools that facilitate use of the results.

12) The Trust archives reports, synthesized data, and raw data for public use.

Appendix C

Bacteria Trend Monitoring

The County/City/Agency shall establish trend monitoring stations for bacteria (E. Coli,

enterococcus, or fecal coliform) in all applicable bacteria TMDL watersheds. These stations shall be established at the same locations as those used to develop the TMDL. The County/City/Agency should consult with MDE in regards to where these stations should be established. Samples collected at the stations shall be analyzed for the same indicator bacteria used in the TMDL. The monitoring data from these stations will provide a long-term record of data, which will be used to adaptively manage implementation efforts in bacteria TMDL watersheds. The data will allow the State to determine if the current suite of implementation practices is having any effect on in-stream bacteria concentrations.

Samples shall be collected on the same day of every month (e.g., the first Thursday of every month), regardless of weather conditions. Using sterile containers, samples shall be collected and kept in a cooler with ice until analyzed. ~~Samples shall then be sent to an accredited lab for analysis.~~ Results shall be reported in Most Probable Number (MPN), a statistically determined estimate of organisms present per sample. Dilutions shall be done on samples that are taken during or after heavy rains, or at sites with chronically high levels of bacteria, so that the sample readings are within the limit of detection for the analysis.

Commented [KB3]: From Rob Hirsch: Baltimore County staff do bacteria analysis in house, with well trained staff and appropriate procedures and equipment. However our staff and facilities are not accredited. To get accredited or to send the samples out to an accredited lab would be very costly, and doesn't seem necessary. Note that County staff run analysis on around 500 samples per year.

While not a requirement, MDE encourages jurisdictions to use quantitative polymerase chain reaction (qPCR) based source tracking methods for identifying trends in human and domestic source bacteria. This method would be in place of an MPN based method. The premise of PCR source tracking is that microorganisms found in the gut of different host animals will have distinct genotypic and phenotypic properties that can be measured, compared, and used to identify the host species of origin. PCR source tracking uses unique DNA probes or genetic sequences that match to genes found in the DNA of fecal bacteria (e.g. Bacteroides spp.) originating from a specific source. Several such probes, each targeting a different source (i.e. human, dog, cow, goose, poultry, etc.), have been identified and described in literature.

In PCR source tracking, bacterial DNA is extracted from filtered water samples and combined with source specific probes. This reaction mix is then subjected to qPCR procedures, which will result in a determination of the number of copies of the gene of interest present in the original water sample. qPCR methods represent a valid and potentially robust means for describing trends in human and domestic source bacteria. Using qPCR methods would align with MDE guidance for Bacteria TMDL implementation, which suggests that jurisdictions focus on reducing human source components of SW-WLAs first, then domestic animals. While MDE encourages the use of qPCR, the Department recognizes that its use may be impractical for some jurisdictions due to the additional cost compared to standard most probable number bacteria lab analysis.

Commented [KB4]: From Rob Hirsch: It is indeed a very expensive analysis. Could qPCR analysis be part of the pooled monitoring program? Does MDE know of any other funding available that could help pay for qPCR?

Whether using MPN or qPCR, A high/low flow determination shall be made for each bacteria sample. Classification of flow regime allows for 1) trend analysis of not only individual isolate samples but also the geometric mean concentration over standard time intervals, and 2) comparison of low flow trends only (the critical period when water contact recreation is expected). Cutoff flow rates shall be determined by the jurisdiction using the methodologies applied in the TMDL. Each sampling location has been assigned a USGS stream gage in the applicable Bacteria TMDL analysis (assignment of gage station based on geographic proximity to sampling location). Using the data from this gage station for the sample date/time and the

cutoff flow rates, each sample shall be classified as high or low flow.

For each sample, jurisdictions shall report the observed concentration and flow regime for the sample date/time in its annual report. Jurisdictions that need further instruction on how to conduct their bacteria monitoring should contact MDE.

Appendix D

Chloride Monitoring

There is a direct, positive correlation between in-stream conductivity and chloride concentration during precipitation events where road salt is applied. Since it is less expensive and potentially

more accurate to monitor continuously, conductivity will be used as a surrogate for measuring in-stream chloride concentration.

The County/City/Agency shall conduct hourly, in-stream conductivity monitoring. This monitoring will be done on an annual basis during winter months, defined as November 1st through March 31st. Selection of monitoring locations will be submitted to MDE for approval. If possible monitoring locations should be located at a current chemical monitoring station in a watershed that:

- was identified as impaired by chloride on Maryland's Integrated Report of Surface Water Quality
- contains a significant mileage of county serviced roads
- is moderately to highly urbanized

Large MS4 jurisdictions are required to monitor 2 locations, one in a 1st-order headwater stream of the selected watershed, and one in the 3rd-order, or higher, mainstem of the watershed system. Medium MS4 jurisdictions are only required to monitor one location in the 3rd-order, or higher, mainstem of the impaired watershed. Stream order is determined using the Shreve stream order method with National Hydrography Dataset High Resolution (1:24,000 scale) stream features.

Commented [KB5]: From Rob Hirsch: Please specify how stream order should be determined. This is a suggested stream order method. I freely admit that this suggestion is based by and large on convenience for Baltimore County: the County has been doing continuous conductivity monitoring at Scotts Level since 2016 and it would be useful to continue monitoring there. Using Shreve stream order with NHD data, the monitoring location is on a 3rd order stream, just upstream from the confluence with the Gwynns Falls. I would be happy with any other stream order method (or revisions to the stream order levels) that allows us to continue to use our existing continuous conductivity monitoring at Scotts Level.

The monitoring data from these stations will provide a long-term record of data, which will be used to adaptively manage implementation efforts in watersheds impaired by chloride. At a statewide scale, the data will allow the State to determine if the current suite of implementation practices is having any effect on in-stream chloride concentrations.

Jurisdictions shall report daily maximum conductivity values as well as the mean, median, 75th-percentile, 90th-percentile and maximum conductivity values collected each winter. As a rule of thumb during frozen precipitation events, a factor of 0.3 can be used for winter in-stream conductivity values, measured in microsiemens per centimeter, to estimate milligrams of chloride per liter.

Jurisdictions that need further instruction on how to measure and report hourly, in-stream conductivity levels should contact MDE.

Ridgway M. Hall, Jr.
Attorney at Law
3500 Ordway Street, NW
Washington, DC 20016
Tel: 202-744-8229
Email: ridgehall@gmail.com

November 17, 2017

Via Email:
lynn.buhl@maryland.gov

Ms. Lynn Buhl
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Re: Comments on Maryland Department of Environment's Subtitle 08 Chapter 11 Maryland Water Quality Nutrient and Sediment Trading and Offset Program Draft Regulations

Dear Ms. Buhl,

My colleagues with the Maryland Clean Agriculture Coalition and I appreciate the revisions that the Department made to the initial draft trading regulations. However, as I mentioned at the November 13 WQTAC meeting, we feel that there are some instances in the revised draft regulations that may be inconsistent, unclear or subject to misinterpretation. We view them as "non-substantive". At the meeting, you kindly agreed to consider suggestions to address such items. We appreciate this, and this letter is submitted in response, along with an attached "red-line" version of the draft regulations using track-changes. Several of our recommended changes merit additional explanation, which are provided below.

To be clear, my colleagues and I continue to have some substantive concerns about the draft regulations, but we are limiting our comments in this letter to only those instances we believe need clarification which can be accomplished by very minor changes.

1. Calculation of credits – Sections 03.B(36) and 06.A(1)

Comment [MDE1]: Concern has been addressed by the Department.

The "calculation of credits" section states that, for wastewater point sources, credits shall be calculated as "the load remaining after subtracting actual annual effluent nutrient load from the performance-based benchmark load" (section .06(A)(1)). Wastewater point sources include both "sewage treatment" plants and other point sources, including industrial waste dischargers (definition 55). The definition of "performance based benchmark load" is explicitly tied to Enhanced Nutrient Removal (ENR):

(36) "Performance-based benchmark" means a wastewater point source annual effluent load which is calculated at the end of each calendar year using the end of the calendar year annual cumulative flow for the facility, multiplied by the applicable assigned nitrogen or phosphorus performance concentration converted to units of pounds per year, where the assigned annual average effluent performance concentration basis is:

(a) Equal to or less than 3.0 mg/l for nitrogen or .3 mg/l for phosphorus; and

(b) If applicable, equal to or less than the concentration basis of the permit's required floating cap.[1]

As written, the regulation would apply ENR-based benchmarks for credit calculation to both sewage treatment plants and all other "wastewater point sources." We are certain that MDE did not intend this result. There are many industrial point source dischargers in Maryland with average discharge concentrations well below ENR levels. As written, the regulation would authorize these sources to claim credit for the difference between ENR levels and their actual discharge. This would of course open the door to "paper credits" that do not represent real, additional reductions in nutrient loads.

To fix this, we suggest a minor revision to the definition of "performance-based benchmark" in Section 03.B(36). See also our marginal comment on Section 06.A(1).

Comment [MDE2]: While the language offered by the Maryland Clean Agriculture Coalition (MCAC) was not incorporated into the regulations, the definition of performance-based benchmark was amended to address their concerns. See annotated regulations.

2. **Definition of ENR – Section 03.B(19)**

The definition of ENR (definition 19) currently states that the ENR nitrogen concentration is 4 mg/L. We assume that MDE intends for this to be 3 mg/L, since the definition of "performance-based benchmark" uses a nitrogen concentration of 3 mg/L (definition 36).

Comment [MDE3]: Concern has been addressed by the Department.

3. **Definition of pollutant reduction – Section 03.B(39)**

The definitions section of the rule includes a definition for "pollutant reduction." However, this term is not used in any functional way in the regulation. There is potential for confusion here because the definition suggests a method for calculating credits (the difference between actual loads and baselines) that is inconsistent with the "calculation of credits" language applicable to wastewater point sources (calculating credits as the difference between actual loads and performance-based benchmarks). Since removing the definition would have no effect on the regulation, and retaining it could create confusion, we suggest removing the definition.

Comment [MDE4]: MCAC's concern was addressed by replacing the definition of ENR in the proposed regulations with the definition in Environment Article §9-1601(n). See annotated regulations.

Comment [MDE5]: Concern has been addressed by the Department.

Comment [MDE6]: The Department struck the definition for "Pollutant reduction.".

4. **Verifiers – Section 11(B)(2)**

Section .11(B)(2) sets forth the requirements for verifiers. It creates three qualifications that we assume MDE intended to apply to any verifier: appropriate education,

Comment [MDE7]: Concern has been addressed by the Department.

[1] "Floating cap" is defined in definition (20) as "applicable to an ENR facility."

experience and training; no interest in the operation generating a credit; and no involvement in the original application or qualification of the credits (section .11(B)(2)(c)(i) – (iii)). As written, the rule only applies these qualifications to "Department-approved verifiers." Other verifiers, including "[s]tate or county inspectors" and "professional engineers," would be authorized to verify credits even if they had no relevant experience or had a financial conflict of interest. Again, we assume that MDE did not intend this result, and we urge MDE to revise this section so that the listed qualifications apply to all verifiers. In our comment on section 11.B(2) on the accompanying track changes text we suggest an easy way to accomplish this.

Comment [MDE8]: While the language offered by MCAC was not incorporated into the regulations, the Department clarified that the qualifications apply to all verifiers. See annotated regulations.

Thank you very much for the opportunity to share our concerns on these items prior to the publishing of the regulations in the Maryland Register. We believe that these suggested revisions will result in clearer and better language, and fixing them now would simplify the substantive comment process following publication. I would be happy to discuss any aspect of these points with you further if you have any questions.

Sincerely,

/s/

Ridgway Hall, on behalf of
The Maryland Clean Agriculture Coalition

Cc: Susan Payne (susan.payne@maryland.gov)
Gary Setzer (gary.setzer@maryland.gov)

Title 26

11-8-17

DEPARTMENT OF THE ENVIRONMENT

Subtitle 08 Water Pollution

Chapter 11 Maryland Water Quality Trading Program

Authority: Environment Article, §§9-313, 9-315, 9-319 and 9-325, Annotated Code of Maryland
Agriculture Article, §§8-901 and 8-904, Annotated Code of Maryland

.01 Purpose.

A. The purpose of this chapter is to establish a Water Quality Trading Program between the agricultural, stormwater, wastewater, and onsite sewage disposal sectors that attracts public and private participation and enhances Maryland's effort to protect and restore not only the water resources of the Chesapeake Bay and its tributaries, but also local waters. Trading may supplement the more traditional governmental approaches for improving water quality and has the potential to achieve results faster and at a lower cost, accelerating efforts to restore and improve water quality. The program expands opportunities for point sources and nonpoint sources by creating a water quality marketplace that allows them to meet and maintain pollutant load limits through the acquisition of credits generated by pollutant load reductions elsewhere in Maryland's portion of the Chesapeake Bay watershed as long as the trade does not cause or contribute to a violation of State water quality standards.

B. General Structure of Program.

(1) The Program is voluntary and relies on a market-based approach to offer economic incentives for pollutant reductions from point and nonpoint sources.

(2) The State provides the infrastructure to support trading through an online suite of tools that includes:

(a) The Maryland Nutrient Tracking Tool used by agricultural credit generators;

(b) The central Registry; and

(c) The optional Marketplace.

(3) The price of each credit is negotiated between the credit seller and the credit buyer.

.02 Scope.

This chapter establishes Maryland's Water Quality Trading Program and sets forth the criteria under which the program will operate, including:

A. Purpose;

B. Definitions;

C. Program Framework;

D. Baseline Requirements;

E. Calculation of Credits;

F. Procedure for Certification;

G. Trading Requirements;

H. Usage of Credits by Point Sources;

I. Registration of Trades;

J. Verification and Reporting Requirements;

K. Public Participation;

L. Enforcement; and

M. Appeal Process.

.03 Definitions.

A. In this chapter, the following terms have the meanings indicated.

B. Terms defined.

(1) "303(d) list" means the list of impaired waters maintained by the State pursuant to 33 U.S.C. §1313(d).

(2) "Aggregator" means a person that funds, generates, owns, or assembles credits resulting from a number of point or nonpoint sources to resell them.

(3) "Agricultural Land" has the meaning stated in COMAR 15.20.12.02.

(4) "Agricultural nonpoint source" means a nonpoint source that is an agricultural operation.

(5) "Agricultural operation" has the meaning stated in COMAR 15.20.12.02.

(6) "Allocation" means the share of the total amount of pollutants that impaired waters can receive from a specific source discharger.

(7) "Baseline" means the practices, actions, or levels of nitrogen, phosphorus, or sediment reductions that must be achieved under any applicable federal, state or local law before a credit seller becomes eligible to enter the trading market and trade credits.

(8) "Bay Restoration Fund (BRF)" means the fund established by Environment Article, §9-1605.2, Annotated Code of Maryland.

(9) Best Management Practice (BMP).

Comment [MDE9]: The proposed language is unnecessary because the baseline requirements in regulation .05 require consistency with: (1) the federal 2010 Chesapeake Bay TMDL or (2) any local TMDL reflected in an NPDES or State discharge permit.

The definition, however, was clarified further and now reads:

"Baseline" means the practices, actions, or levels of nitrogen, phosphorus, or sediment reductions that must be achieved before a credit seller becomes eligible to generate credits, enter the trading market, and trade credits.

(a) "Best Management Practice (BMP)" means a practice, or combination of practices, that is determined by the Chesapeake Bay Program to be an effective and practicable method of preventing or reducing pollutants generated by point or nonpoint sources so as to minimize the movement of those pollutants into waters of the State or mitigate flooding.

(b) "Best Management Practice (BMP)" includes agricultural and urban structural and nonstructural pollution controls, operations, and maintenance procedures and practices that prevent or reduce pollutants.

(10) "Broker" means a person that connects a credit seller and a credit buyer and helps to negotiate a trade between them.

(11) "Cap" means a legally enforceable aggregate mass load limit contained in a discharge permit.

(12) "Certification" means the process in which credits are quantified by the Department or the Department of Agriculture and placed on the Registry, or the result of this process.

(13) "Chesapeake Bay Program (CBP)" means the regional partnership of federal and State agencies, local governments, nonprofit organizations, and academic institutions that leads and directs Chesapeake Bay restoration and protection.

(14) "Chesapeake Bay Watershed Model (CBWM)" means the latest model adopted by the Chesapeake Bay Program used to simulate loading and transport of nitrogen, phosphorus, and sediment from pollutant sources throughout the Chesapeake Bay watershed and provide estimates of watershed nitrogen, phosphorus, and sediment loads resulting from various management scenarios.

(15) "Credit" means a unit of pollution reduction of one pound of nitrogen, phosphorus, or sediment.

(16) "Department" means the Maryland Department of the Environment.

(17) "Edge of Tide (EoT) factor" means a numeric adjustment that reflects the rate at which pollutants are reduced through natural processes, such as hydrolysis, oxidation, and biodegradation, and manmade structures such as dams, on their way through nontidal tributaries to the tidal waters of the Chesapeake Bay or its tidal tributaries.

(18) "Edge of Tide (EoT) ratio" means a numeric adjustment applied to a trade to compensate for different EoT factors in the segmentshed where the credit is generated and the segmentshed where the credit is used.

(19) "Enhanced Nutrient Removal (ENR)" means a wastewater treatment technology that reduces the nitrogen and phosphorus concentrations in wastewater effluent to achieve permit limits equivalent to concentrations of no more than ~~4~~3 milligrams per liter nitrogen and 0.3 milligrams per liter phosphorus, as calculated on an annually averaged basis.

(20) "Floating cap" means a permitted effluent limitation applicable to an ENR facility, funded by the Bay Restoration Fund, which is calculated at the end of each calendar year using the end of the

Comment [MDE10]: The Department addressed MCAC's concern about nitrogen concentrations by replacing the definition in the proposed regulations with the definition in Environment Article §9-1601(n):

"Enhanced nutrient removal" means:
(1) An enhanced nutrient removal technology that is capable of reducing the nitrogen and phosphorus concentrations in wastewater effluent to concentrations of not more than 3 milligrams per liter total nitrogen and not more than 0.3 milligrams per liter total phosphorus, as calculated on an annually averaged basis; or
(2) If the Department has determined that the concentrations under item (1) of this subsection are not practicable for a wastewater facility, the lowest average annual wastewater effluent nitrogen and phosphorus concentrations that the Department determines are practicable for that facility.

calendar year annual cumulative flow for the facility, multiplied by the applicable nitrogen or phosphorus concentration, and then converted to units of pounds per year.

(21) "Generator" means the original source of pollution reductions embodied in a credit, regardless of subsequent buyers and sellers of the credit.

(22) "Impaired waters" means waters included on the 303(d) list for nitrogen, phosphorus or sediment.

(23) "Industrial waste" has the meaning stated in COMAR 26.08.01.01.

(24) Load.

(a) "Load" means a pound or pounds of nitrogen or phosphorus or a pound, pounds, ton, or tons of sediment discharged by a point or nonpoint source per unit of time.

(b) "Load" is calculated or estimated using pollutant concentrations and flow and converting them to pounds or tons.

(25) "Load Allocation (LA)" means the portion of a receiving water's loading capacity that is attributed to one of either its existing or future nonpoint sources.

(26) "Local water quality impairment" means conditions in a non-tidal river, stream or impoundment that would cause the non-tidal river, stream or impoundment to be listed on the 303(d) list for nitrogen, phosphorus or sediment.

(27) "Marketplace" means an online system where information is exchanged between credit owners or their representatives and credit buyers.

(28) "Maryland Nutrient Tracking Tool (MNTT)" means an online performance-based calculation system that enables users to analyze agricultural parcels and their management to determine eligibility and credit generation potential for participation in the Maryland Water Quality Trading Program.

(29) "Maryland Water Quality Trading Program (Program)" means the program under this chapter that establishes the policies and procedures to support market-based trading activities to enhance water quality and to certify, verify, and register non-agricultural point and nonpoint source nitrogen, phosphorus and sediment credits.

(30) "Municipal Separate Storm Sewer System (MS4)" has the meaning stated in 40 C.F.R. §122.26.

(31) "MS4 Permittee" means a person that has been issued a Phase I MS4 permit or a Phase II MS4 permit as defined in 40 C.F.R. §122.26.

(32) "National Pollutant Discharge Elimination System (NPDES) permit program" means the national system for issuing permits as designated by 33 U.S.C. §1251 et seq., its amendments, and all regulations and rules adopted under the federal Clean Water Act and State law.

(33) "Non-regulated source" means a point source or nonpoint source that is not regulated under an NPDES or State discharge permit and that is not an agricultural operation.

(34) "Nonpoint source" means a source of pollution that is not from a discernible, confined, and discrete conveyance, or other point source, as point source is defined in 33 U.S.C. §1362.

(35) "Onsite sewage disposal system" means a sewage system that discharges treated effluent into the ground, such as a septic system.

(36) "Performance-based benchmark" means a wastewater point source annual effluent load which is calculated at the end of each calendar year using the end of the calendar year annual cumulative flow for the facility, multiplied by the applicable assigned nitrogen or phosphorus performance concentration converted to units of pounds per year, where the assigned annual average effluent performance concentration basis is:

(a) Equal to or less than 3.0 mg/l for nitrogen or .3 mg/l for phosphorus; or~~and~~

(b) If applicable, equal to or less than the concentration basis of the permit's required floating cap, or any more stringent limitation in the permit.

(37) "Person" has the meaning stated in COMAR 26.08.01.01.

(38) "Point source" has the meaning stated in 33 U.S.C. §1362.

(39) "Pollutant reduction" means the difference between the baseline load established for each point or nonpoint source and the load discharged to either ground or surface water after installation of one or more~~the~~ BMPs.

(40) "Public funding" means federal or State grant funding.

(41) "Registration" means the recordation of a credit or trade in the Registry.

(42) "Registry" means a publicly accessible online database system used by the Department and the Department of Agriculture to administer the Water Quality Trading Program by tracking credit-generating BMPs, verification activities, credits, trades and credit usage records.

(43) "Reserve ratio" means a five percent reduction in the total number of generated credits, the result rounded down to the next whole number, placed in the reserve pool at the time of certification.

(44) "Reserve pool" means a pool of certified credits created by the application of the reserve ratio that can be used by the State as stated in Regulation .08 of this chapter.

(45) "Sector" means each of the following groups of persons:

(a) Agricultural dischargers;

(b) Stormwater dischargers;

(c) Sewage treatment and industrial waste dischargers;

(d) Persons having onsite sewage disposal systems; and

(e) Forests.

Comment [RH11]: See also our comment on Section 06.A(1) at p. 9.

Comment [MDE12]: While the language offered by MCAC for the performance-based benchmark definition was not incorporated into the regulations, the definition was amended to address their concerns.

"Performance-based benchmark" means a wastewater point source annual effluent load which is calculated at the end of each calendar year using the end of the calendar year annual cumulative flow for the facility, multiplied by the applicable assigned nitrogen or phosphorus performance concentration converted to units of pounds per year, where:
(a) A sewage treatment facility with a design capacity greater than or equal to 0.5 million gallons per day has an assigned performance concentration:
(i) Equal to or less than 3.0 mg/l for nitrogen or .3 mg/l for phosphorus; and
(ii) If applicable, equal to or less than the concentration basis of the permit's required floating cap; and
(b) All other wastewater point sources have an assigned performance concentration established on a case by case basis, with the resulting benchmark at least as stringent as the baseline required under Regulation .05 of this chapter.

Comment [AR13]: Why is this definition necessary? The term is not used in a functional way in the regulation.

Comment [MDE14]: The Department struck the definition for "Pollutant reduction."

(46) "Segmentshed" means a discrete land area that drains into one of the Chesapeake Bay Program tidal segments for which a TMDL is established in the Chesapeake Bay TMDL.

(47) Source discharger.

(a) "Source discharger" means a point source regulated under an NPDES or State discharge permit that has received an individual or aggregate wasteload allocation; or

(b) A nonpoint source that is assigned a share of the aggregate load allocation for an entire sector.

(48) "Stormwater" has the meaning stated in COMAR 26.17.02.02.

(49) "Stormwater point source" means a regulated stormwater discharger such as a MS4 permittee, or a NPDES Industrial stormwater permittee.

(50) "Technology-Based Effluent Limitation (TBEL)" means a permit limit for a pollutant that is based on the capability of a treatment method to reduce the pollutant to a certain concentration or loading.

(51) "Total Maximum Daily Load (TMDL)" means a calculation for an impaired water body of the maximum amount of a pollutant the water body can receive and still meet applicable water quality standards in accordance with federal Clean Water Act requirements.

(52) "Trade" or "Trading" means a transaction, sale, or other exchange of credit through a contractual agreement between a credit generator or owner and a credit buyer.

(53) "Uncertainty ratio" means a numeric adjustment to a trade to compensate for possible discrepancies in estimated pollutant reductions resulting from inaccuracy in credit estimation methodology or variability in project performance, or to provide a margin of safety in the achievement of water quality goals.

(54) "Wasteload Allocation (WLA)" has the meaning stated in COMAR 26.08.01.01.

(55) "Wastewater point source" means a sewage treatment plant or an industrial waste discharger or any other point source that has applied for and received a NPDES or other State discharge permit issued pursuant to COMAR 26.08.04.

(56) "Watershed" means an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel.

.04 Maryland Water Quality Trading Program Framework.

A. Pollutants Eligible for Trading. Nitrogen, phosphorus, and sediment are the only pollutants eligible for credit trading and may be traded independently or in any combination.

B. Maryland Trading Regions.

(1) Any trade shall occur within the same trading region.

Comment [MDE15]: While the language offered by MCAC for the Wastewater point source" definition was not incorporated into the regulations, the definition was amended to address their concerns.

Wastewater point source.
(a) "Wastewater point source" means a sewage treatment discharger, an industrial wastewater discharger, or any other point source that has applied for and received an NPDES or State discharge permit issued pursuant to COMAR 26.08.04.
(b) "Wastewater point source" does not include stormwater point sources.

Also, as part of the Department's efforts to clarify this issue, the definition of "industrial waste" was struck from the proposed regulations and a definition for "Wastewater" was inserted into the proposed regulations.

(2) The Department has established the following trading regions:

(a) Potomac River Basin;

(b) Patuxent River Basin; and

(c) Eastern Shore and Western Shore River Basins, including the Maryland portion of the Susquehanna Basin.

C. Program Participation.

(1) A person may only use credits generated and sold within the State to:

(a) Comply with the applicable nitrogen, phosphorus, and sediment load or wasteload allocations of the Maryland portion of the Chesapeake Bay TMDL, local TMDLs, NPDES permit requirements; or

(b) Improve water quality.

(2) Other than persons generating credits under the provisions of COMAR 15.20.12, a person generating credits under the Maryland Water Quality Trading Program shall:

(a) Meet appropriate baseline requirements in accordance with Regulation .05 of this chapter;

*(b) Install one or more~~s~~ BMP*s* approved by the Chesapeake Bay Program that is or are acceptable to the Department;*

Comment [MDE16]: The Department believes that this is an unnecessary change.

(c) Demonstrate a load reduction below the baseline requirements that is acceptable to the Department and calculate credits in accordance with Regulation .06 of this chapter; and

(d) Submit a Certification and Registration form to the Department for credit certification in accordance with Regulation .07 of this chapter.

D. Limitations.

(1) This chapter does not apply to wastewater point source to wastewater point source trading.

(2) No credit shall be offered for trade except in compliance with the provisions of this chapter.

(3) Except those BMPs implemented in conformance with Special Conditions III.A.1.f of General Permit No. 12SW, Stormwater Associated with Industrial Activities, any BMP implemented to satisfy regulatory requirements, including those related to new development and redevelopment, prior to the effective date of this chapter, may not be used to generate a credit.

(4) Credits may be traded only after they have been certified, verified, and registered in accordance with this chapter or, for agricultural credits, in accordance with COMAR 15.20.12.

(5) For the purposes of this chapter, public funding may not be used to generate a credit, except:

(a) A wastewater treatment plant upgraded to ENR that accepts BRF grant funding for operation and maintenance to achieve a nitrogen discharge of 3mg/l and a phosphorus discharge of 0.3 mg/l may generate credits for performance below 3mg/l of nitrogen and below 0.3mg/l of phosphorus; or

(b) Unless otherwise prohibited by the terms and conditions of the public funding, the credits generated by any other non-agricultural BMP funded in part by public funding shall be prorated based on the ratio of non-public funding used to generate the credit to the total cost incurred to generate the credit.

(6) The Department is not responsible or liable for the performance of a credit-generating project certified pursuant to the requirements of this chapter.

(7) The acquisition of credits for compliance purposes does not eliminate any requirement to comply with local water quality standards, permits, or other legal requirements.

E. Water Quality Trading Program Registry.

(1) The Department, in consultation with the Maryland Department of Agriculture, shall establish and maintain the Registry.

(2) Pursuant to this chapter and COMAR 15.20.12, all certified credits shall be posted on the Registry.

(3) The inclusion of credits on the Registry or the Marketplace is not a representation by the Department or the credit seller that the credits will satisfy the specific regulatory requirements of the credit buyer.

.05 Baseline Requirements.

A. All baselines shall be consistent with the 2010 Chesapeake Bay TMDL and any local TMDL, as may be amended from time to time.

B. The baseline for an agricultural nonpoint source shall be determined by the Department of Agriculture in accordance with COMAR 15.20.12.

C. The baseline for a wastewater point source shall be determined by the Department based on an annual loading limit wasteload allocation established in the wastewater point source's NPDES discharge permit, and any more stringent requirement under any applicable federal, state or local law.

D. The baseline for a stormwater point source is the restoration requirement of the stormwater point source's current NPDES discharge permit, and other requirement under any applicable federal, state or local law.

E. Except as may be revised by subsequent versions of the Chesapeake Bay Watershed Model, the baseline for a non-regulated source shall be the pollutant load generated under the conditions that existed prior to installation of the BMP, as calculated using assessment tools consistent with the Chesapeake Bay Program modeling tools and accepted by the Department.

Comment [RH17]: These two are admittedly substantive, but simply reflect the law and therefore should be uncontroversial. I proposed these at the WQTAC meeting on Nov.13 and there was no objection

Comment [MDE18]: The language proposed in §.05C. and §.05D. is unnecessary because the baseline requirements in regulation .05 require consistency with: (1) the federal 2010 Chesapeake Bay TMDL or (2) any local TMDL reflected in an NPDES or State discharge permit.

F. Except as may be revised pursuant to~~by~~ subsequent versions of the Chesapeake Bay Watershed Model, the baseline load per equivalent dwelling unit for an onsite sewage disposal system is:

(1) 18.56 pounds of nitrogen per year for a system located in the Critical Area for the Chesapeake and Atlantic Coastal Bays;

(2) 11.60 pounds of nitrogen per year for a system located within 1,000 feet of surface water; and

(3) 6.96 pounds of nitrogen per year for all other systems.

.06 Calculation of Credits.

A. Wastewater Point Sources. Credits generated by a wastewater point source shall be based on that wastewater point source's performance as follows:

(1) Credits shall be calculated and reported under the terms of the required wastewater discharge permit at the end of each calendar year as the load remaining after subtracting actual annual effluent nutrient load from the performance-based benchmark load.

(2) The annual effluent nutrient load shall be calculated using the end of the calendar year annual cumulative flow for the facility, multiplied by the actual effluent nitrogen or phosphorus concentration converted to units of pounds per year.

B. Stormwater Point Sources and Non-Regulated Sources. Stormwater point source and non-regulated source credits shall be calculated using assessment tools consistent with the Chesapeake Bay Program modeling tools and accepted by the Department.

C. Agricultural Nonpoint Sources. Nonpoint source credits generated on agricultural land shall be calculated using the Maryland Nutrient Tracking Tool in accordance with COMAR 15.20.12.

D. Onsite Sewage Disposal Systems. Nitrogen credit for an onsite sewage disposal system upgraded with nutrient removal technology is calculated by subtracting:

(1) the load remaining after upgrade of the system from

(2) the system's baseline load established in accordance with Regulation .05 of this chapter.

.07 Procedure for Certification.

A. Credits are not valid or tradable until placed on the Registry, after certification as follows:

(1) Agricultural credits are certified by the Maryland Department of Agriculture in accordance with COMAR 15.20.12.07.

(2) Wastewater point source credits are certified by the Department through issuance of an NPDES permit or permit modification.

(3) All other credits are certified by the Department according to §(B) of this regulation.

Comment [MDE19]: The revised language offered by MCAC was accepted by the Department and the revised language is below.

F. Except as may be revised pursuant to subsequent versions of the Chesapeake Bay Watershed Model, the baseline load per equivalent dwelling unit for an on-site sewage disposal system is:

Comment [AR20]: This definition is only relevant to sewage WWTPs. The regulation does not define performance-based benchmark loads for non-sewage WWTP point sources. The amendment we propose to the definition of "performance-based benchmark" in section 03.B(36) fixes this by broadening the definition to include permits for other types of point sources.

Comment [MDE21]: The Department has clarified the definition of performance-based benchmark. Please see Comment MDE12R11.

Comment [MDE22]: The revised language offered by MCAC was accepted by the Department and the revised language is below.

C. Agricultural Nonpoint Sources. Nonpoint source credits generated on agricultural land shall be calculated using the Maryland Nutrient Tracking Tool in accordance with COMAR 15.20.12.

Comment [MDE23]: The revised language offered by MCAC was accepted by the Department and the revised language is below.

(2) Wastewater point source credits are certified by the Department through issuance of an NPDES or State discharge permit or permit modification;

B. A person who applies to the Department for certification of a credit shall complete and sign a Certification and Registration Form provided by the Department, including:

(1) Identification of the location and segmentshed where the BMP ~~has beenwas~~is being implemented~~, or is to be implemented,~~ and a map identifying the location and boundaries of the BMP;

(2) Documentation that the Generator either owns the property or has the permission of the landowner to install, access, and maintain the BMP and to apply for certification of credits;

(3) A description of the BMP, including:

(a) A description of any~~the~~ permits required for its installation and evidence establishing that it was installed in accordance with the laws, regulations, and programs of applicable local, state, and federal authorities;

(b) Verification in accordance with Regulation .11 of this chapter; and

(c) A plan for maintaining the BMP during the lifespan of the credit;

(4) Supporting documentation that explains:

(a) Which tool was selected to determine the requested number of credits;

(b) How the project satisfies the baseline requirements in Regulation .05 of this chapter; and

(c) How the credits were calculated to meet the nitrogen, phosphorus, and sediment reduction amounts claimed in the application; and

(5) Any other information the Department deems necessary to review the Certification and Registration Form, and certify the credits.

C. As a condition of the Department's certification of a credit, the applicant and landowner shall agree in writing to provide the Department, verifier, and their agents with access to the BMP at all reasonable times during the lifespan of the credit.

D. Upon review and approval of the information submitted in the Certification and Registration Form, the Department shall assign each credit or block of credits a unique registration number and place the certified credits on the Registry.

E. If the Department denies the Certification and Registration Form, the Department shall provide the basis for the denial to the applicant.

F. The credit owner shall update the credit registration, in writing within 30 days, to the Department and the credit buyer, if applicable, if there is a change in:

(1) The BMP used to generate the credit that could reasonably be expected to affect its certification; or

(2) The ownership of the property where the BMP is located.

Comment [MDE24]: The revised language offered by MCAC was accepted by the Department and the revised language is below.

(1) Identification of the location and segmentshed where the BMP is being implemented and a map identifying the location and boundaries of the BMP;

Comment [MDE25]: The revised language offered by MCAC was accepted by the Department and the revised language is below.

(a) A description of any permits required for its installation and evidence establishing that it was installed in accordance with the laws, regulations, and programs of applicable local, state, and federal authorities;

G. The BMP generates credits once it is certified.

H. Credit generators may create listings linked to their Marketplace accounts to display certified credits they have for sale and initiate trades with potential credit buyers.

I. Credit buyers may post credit needs or solicit offers using the Marketplace.

.08 Trading Requirements.

A. Credit trades may occur with or without the participation of an Aggregator or Broker.

B. In the event of a default in a trade contract, expiration of a credit, or suspension or revocation of a credit, the buyer using the credit remains responsible for complying with any NPDES and State discharge permit or other regulatory requirement that the credit was intended to satisfy.

C. The following ratios shall be applied to all trades:

(1) Uncertainty Ratio.

(a) An Uncertainty ratio of 1:1 shall be applied to trades involving credits generated by nonpoint sources and acquired by stormwater point sources or other non-regulated sources.

(b) An Uncertainty ratio of 1:1 shall be applied to trades involving implementation of BMPs for land conservation that includes protection through an irrevocable conservation easement or other instrument attached to the property deed and recorded with the local Circuit Court.

(c) An Uncertainty ratio of 2:1 shall be applied to trades involving credits generated by nonpoint sources and acquired by wastewater point sources, unless the generator, seller or buyer of the credit is able to demonstrate to the Department that a ~~the~~ lower ratio is justified and protective of water quality standards.

Comment [MDE26]: The revised language offered by MCAC was accepted by the Department and the revised language is below.

(c) An uncertainty ratio of 2:1 shall be applied to trades involving credits generated by nonpoint sources and acquired by wastewater point sources, unless the generator, seller, or buyer of the credit is able to demonstrate to the Department that a lower ratio is justified and protective of water quality standards.

(2) Edge of Tide Ratio.

(a) No EoT numeric adjustment factor shall be applied when a credit is generated in the same segmentshed in which the credit buyer uses it.

(b) An EoT numeric adjustment factor shall be applied to normalize loads based on delivery to the mainstem of the Chesapeake Bay when a credit seller and credit buyer are located in different segmentsheds of a Maryland watershed that have different EoT factors. The appropriate factor shall be calculated using assessment tools consistent with the Chesapeake Bay Program modeling tools and accepted by the Department.

(c) EoT adjustment factors for credits from wastewater point sources shall be determined by the Department based on the latest Chesapeake Bay Model used by the Department in issuing permits with trades.

(3) Reserve Ratio. A reserve ratio shall be applied to each credit when it is certified to create a reserve pool of credits that may be used by the Department to:

(a) Cover the loss of certified credits from a BMP damaged by events arising from sudden and reasonably unforeseeable events beyond the control of the person responsible for the maintenance of the BMP, including acts of God;

(b) Replace purchased credits that become unavailable due to the failure or underperformance of a BMP;

(c) Address a lack of readily available credits; or

(d) Improve the overall water quality during a year when the credits in the reserve pool are not used to support other purposes detailed in this chapter.

E. Lifespan of Certified Credits.

(1) A BMP may only generate credits when it is installed and placed into operation and all operational and maintenance guidelines are followed.

(2) Credits may be certified for more than one year but shall be applied annually.

(3) The Department shall include the number of years a credit is generated as part of the credit certification.

F. Local Water Quality.

(1) The use of a credit may not cause nor contribute to local water quality impairments or prevent the attainment of local water quality standards.

(2) Credits used within any impaired waters must be generated within such impaired waters and~~or~~ upstream of the credit user's discharge.

Comment [MDE27]: After considerable internal discussion, the Department did not accept the change proposed by MCAC.

G. Prohibitions. At its discretion, the Department may prohibit the following persons from generating credits if the Department determines:

(1) A permittee in noncompliance with permit terms;

(2) A non-regulated source or owner of ~~a~~an onsite sewage disposal ~~system that~~system that is not in compliance with COMAR 26.04.03, 26.17.01, 26.17.02, 26.17.04, 26.23, or 26.24, if applicable;

Comment [MDE28]: The revised language offered by MCAC was accepted by the Department and the revised language is below.

(b) A nonregulated source or owner of an on-site sewage disposal system in noncompliance with COMAR 26.04.03, 26.17.01, 26.17.02, 26.17.04, 26.23, or 26.24, if applicable;

(3) An agricultural operation that is not in compliance with COMAR 15.20.12; or

(4) A person who has previously violated any provision of the Environment Article or any regulation adopted under the Environment Article.

.09 Usage of Credits by Point Sources.

A. In order to use traded credits to fulfill permit requirements, a credit buyer shall select credits that meet the limitations in this chapter, including limitations relating to credit lifespan, trading, trading regions, and local water quality standards and requirements.

B. The use of a credit shall be consistent with the credit's certification.

C. The Department shall prorate the amount of certified credits generated from any BMP for use in the year the credits are certified, while the total amount of certified credits generated from any BMP are not valid for use until the following year starting January 1.

D. Credits may not be used for the purpose of complying with Technology-Based Effluent Limitations.

E. The use of certified credits by a point source shall be subject to the terms and conditions of the permit to which the certified credits apply.

F. Permits may contain conditions on the use of certified credits, including:

(1) The extent to which the requirement of the permit may be satisfied with certified credits; and

(2) When, and from what source, certified credits may be acquired by the permittee.

.10 Registration of Trades.

A. A credit buyer shall notify the Department about each trade by filing a form provided by the Department within 15 days after the trade.

B. Within 15 days after receipt of the notification form required by §A of this regulation, the Department shall update the Registry, including the registration number for the credit, its location, duration, and the intended use of the credit.

C. The Department shall update the Registry within 30 days after receiving notice from the credit buyer of a change in the intended use of the credit.

.11 Verification and Reporting Requirements.

A. In its certification of a credit, the Department shall state the frequency at which the credits shall be verified, which shall be in accordance with local, State, and federal law and permit requirements, but shall be no less frequently than every three years.

B. Verification of a credit shall comply with the following requirements:

(1) Verification of credits generated by a wastewater point source shall include a report submitted to the Department annually for approval which includes certified discharge monitoring reports, appropriate annual reports, inspections, and any other reporting terms specified within the wastewater point source permit or required by the Department.

(2) Verification of credits generated by any other source shall be performed by a:

(a) A State or county inspector;

(b) A professional engineer registered in Maryland, or

(c) A Department-approved verifier that:

(i) Has the appropriate education, expertise, and training to perform the verification;

Comment [RH29]: Did you intend that the qualifications set forth in the following 3 subsections should be met by all verifiers, and not just the "Department-approved verifier"? If so, you can end subsection (c) after "verifier", and add a new subsection (3) saying: "Before performing any verification under subsection (2), each verifier shall satisfy the Department that he or she meets the following requirements:" Then list the 3 you have here.

Comment [MDE30]: While the language offered by MCAC was not incorporated into the regulations, the definition was amended to address their concerns.

Verification Requirements.
(1) Verification of credits generated by a wastewater point source shall include a report submitted to the Department annually for approval which includes certified discharge monitoring reports, appropriate annual reports, inspections, and any other reporting terms specified within the wastewater point source permit or required by the Department.
(2) Verification of credits generated by any other source shall be performed by a:
(a) State or county inspector;
(b) Professional engineer registered in Maryland; or
(c) Department-approved verifier.
(3) Before performing any verification under §B(2) of this regulation, the inspector, engineer, or verifier shall demonstrate to the Department that the inspector, engineer, or verifier:
(a) Has the appropriate education, expertise, and training to perform the verification;
(b) Does not hold an interest in the operation or entity generating the credit; and
(c) Was not involved in the original application or qualification of the credits.

(ii) Does not hold an interest in the operation or entity generating the credit; and

(iii) Was not involved in the original application or qualification of the credits.

C. Each report prepared by an inspector or verifier in accordance with §B(2) of this Regulation shall include:

(1) Documentation that the BMP implemented continues to meet baseline compliance and that the credit generating BMP continues to be operated and maintained in accordance with the terms of the trading contract and the requirements of this chapter; and

(2) Confirmation that no deficiencies exist and no corrective measures are needed, or a detailed description of deficiencies and required corrective actions.

Comment [MDE31]: The revised language offered by MCAC was accepted by the Department and the revised language is below.

(2) Confirmation that no deficiencies exist and no corrective measures are needed, or a detailed description of deficiencies and required corrective actions.

D. Based on the information obtained in the verification reports, the Department shall update the Registry as necessary.

.12 Public Participation.

A. The Department shall provide notice, and an opportunity for comment and a hearing, if requested, for NPDES permits that propose to allow trading under this chapter in accordance with the federal Clean Water Act and Code of Federal Regulations for new permits or modification of existing permits, as applicable.

B. The Department shall report all credit trades by a stormwater point source permittee annually, and make the report available to the public on the Registry.

.13 Enforcement.

A. If a BMP is not performing in conformance with its certification:

(1) The Department may order:

(a) repairs or other remedies to address or eliminate any deficiencies, within a time period determined by the Department;

(b) additional inspections; and

(c) written substantiations that corrective measures have been taken.

(2) A corrective action order does not preclude the Department from exercising its enforcement authority.

B. The Department may suspend or revoke certification of a credit if:

(1) There are any violations of this chapter;

(2) A BMP is not performing in conformance with its certification;

(3) The Department determines that misleading, false, or fraudulent information was provided in the application for certification of such credit or any other submission related to such credit; or

(4) Any other action or inaction by a credit seller or credit buyer that the Department determines provides good cause to suspend or revoke such certification.

C. Within 30 days of a determination to suspend or revoke a certification, the Department shall:

(1) Issue a notice of the suspension or revocation of credit certification, including an effective date thereof, to the credit seller and the~~or~~ credit buyer; and

(2) Update the Registry to reflect the suspension or revocation.

D. Suspension or revocation of credit certification does not preclude any other legal action that may be taken by the Department or another public or private entity.

.14 Appeal Process.

Any person aggrieved by the suspension or revocation of a credit taken in accordance with this chapter shall have the right to review in accordance with the provisions of the Administrative Procedure Act, State Government Article, Title 10, Subtitle 2, Annotated Code of Maryland.

Comment [MDE32]: The revised language offered by MCAC was accepted by the Department and the revised language is below.

(1) Issue a notice of the suspension or revocation of credit certification, including an effective date thereof, to the credit seller and the credit buyer;

From: "Karl Berger" <kberger@mwcog.org>
Sent: Wed, 30 May 2018 18:29:15 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Stevens, Amy" <Amy.Stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Gill, Joseph P." <JPGill@co.pg.md.us>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "jjoiner@frederickcountymd.gov" <jjoiner@frederickcountymd.gov>
Cc: "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Bennett, Katherine" <Katherine.Bennett@montgomerycountymd.gov>; "Maldonado, Jerry G." <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: FW: MACo Letter on Phase I MS4 Permits
Attachments: Letter 2018-05-30 MACo & County Comments to MDE on MS4 Permits (MACo).pdf

MS4 managers,

Attached is a copy of the MS4 comment letter to MDE that Les Knapp sent out today under his signature.

Thanks for the spirit of cooperation you displayed in putting this letter together. Special thanks to Les for being able to step in as the group's spokesman for these important comments.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

From: Leslie Knapp <Lknapp@mdcounties.org>
Sent: Wednesday, May 30, 2018 10:43 AM
To: Ben Grumbles -MDE- <Ben.Grumbles@maryland.gov>
Cc: lynn.buhl@maryland.gov; Lee Currey -MDE- <lee.currey@maryland.gov>; Jeffrey Fretwell -MDE- <jeffrey.fretwell@maryland.gov>; Karl Berger <kberger@mwcog.org>
Subject: MACo Letter on Phase I MS4 Permits

Secretary Grumbles,

Attached is a comment letter prepared by MACo, based on input from the county Phase I MS4 managers workgroup, on issues of concern relating to the pending Phase I MS4 permits. MACo appreciates the opportunity to work with MDE staff on this challenging process and looks forward to further discussion regarding the issues raised in the letter. As always, do not hesitate to contact me directly if you have any questions or wish to discuss the matter further.

Sincerely,

Les

Leslie Knapp Jr.
Legal & Policy Counsel
Maryland Association of Counties (MACo)
169 Conduit Street, Annapolis, MD 21401
410.269.0043
Lknapp@mdcounties.org

MARYLAND Association of COUNTIES

May 30, 2018

Benjamin H. Grumbles
Secretary, Maryland Department of the Environment
Montgomery Park Business Center
1800 Washington Blvd.
Baltimore, MD 21230

Dear Secretary Grumbles:

The Maryland Association of Counties (MACo) wishes to offer the following comments, based on input from county stormwater technical managers, on the Maryland Department of the Environment's (MDE's) pending Phase I Municipal Separate Storm Sewer System (MS4) permits. MACo is a nonpartisan organization that represents all 23 of Maryland's counties and Baltimore City.

For the past several years, both MACo and Maryland's Phase I MS4 managers have worked in partnership with MDE to meet both the spirit and the letter of their ambitious stormwater permits. We acknowledge both the dedication of MDE staff and their willingness to discuss key permit issues. While there has been significant progress in addressing permit concerns, critical components of the next permit remain unresolved with a number of the current permits set to expire in just a few months.

MACo is writing to provide the perspective of the technical managers of Maryland's Phase I MS4 permittees in getting these next generation permits issued in a timely fashion and providing regulatory certainty. These managers have formed a workgroup under the auspices of MACo, with the coordination of staff from the Metropolitan Washington Council of Governments.

Under the current permit, Maryland's 10 Phase I MS4 counties engaged in an extensive effort to reduce the impacts of urban runoff from their MS4 areas to surface waters. They have pioneered many innovations in stormwater funding, practice, and procurement; been recognized for their work at national conferences; and made substantial investments in the research and development of new stormwater best management practices (BMPs).

By the end of the current permit term, these 10 jurisdictions will have spent approximately $1.3 billion to meet permit requirements and they have already committed hundreds of millions in additional capital expenditures in years beyond the current permit term.

169 Conduit Street, Annapolis, MD 21401
410.269.0043 BALT/ANNAP ◆ 301.261.1140 WASH DC ◆ 410.268.1775 FAX
www.mdcounties.org

The challenge has not been strictly financial. Ramping up the programmatic resources – including new staff, permitting processes, procurement methods, consultant contracts and maintenance agreements – to spend these funds effectively has been a multi-year process. Despite much progress, significant logistical challenges remain. For example, the concurrent timing of the permits has created a competitive market for consultants and construction firms that has exceeded the capacity of available local resources while significantly increasing implementation costs. As previously discussed with MDE, MACo and the workgroup believe the State should evaluate the local resource capacity to achieve current and future permit requirements.

Altogether, this financial and programmatic expansion represents the MS4 jurisdictions' maximum capacity toward meeting the current permit's 20-percent impervious surface restoration (ISR) requirement. As shown in the annual reports and discussed at numerous meetings with your staff over the past two years, this rate of progress translates into achieving approximately half of the required ISR acreage in 5 years. Thus, the rate of progress envisioned when the permits were first issued is at least twice as high as what experience has shown to be achievable. Montgomery County's experience in implementing its 2010 permit provides corroboration for this pace of implementation.

While the 10-percent-per-5-years rate of progress may be manageable over two permit cycles (or full achievement of the current 20-percent ISR goal after 10 years), it is likely not sustainable over a longer term as the number of cost-effective sites for retrofits shrinks and as the cost for maintaining the expanding inventory of BMPs escalates.

Based on these recognized realities, MACo and the workgroup offer the following recommendations on the status of the current permit and the restoration provisions of a new permit:

1. Extend the schedule to complete the 20-percent ISR requirement in the current permit to the end of the next permit term. This continuation is consistent with EPA guidance that MS4 programs should be implemented under an "iterative, adaptive management best management practices approach" and would not constitute "backsliding" under the permit for numerous reasons. For example, the new permit requirements would be at least, if not more, stringent than the current permit requirements and will necessitate further treatment during the term of the permit while maintaining the treatment levels already achieved.

2. Establish a pollution trading program and modify the current permits to allow the use of credits from wastewater treatment plants and other sources to meet the ISR requirement of the current permit as a trading-in-time option. In the absence of such an option, it is highly likely that the state will resort to consent decrees with individual permittees. Such a development would penalize the MS4 jurisdictions despite their good-faith efforts to make progress on the ISR

requirement, occupy critical resources in legal negotiations, and threaten public acceptance of the continued expenditure of local funds for these programs.

3. Because certain jurisdictions may not yet be on the pace to achieve half of their ISR acreage in five years, do not place an arbitrary limit on the percentage of ISR acres that can be met with trading credits in the current permit cycle. MACo and the workgroup could agree to the condition that trading credits cannot be used to meet the 20-percent ISR requirement by the end of the next permit term. However, trading should be available in future permits to meet additional requirements for ISR or nutrient and sediment reduction that go beyond the 20-percent standard, should such requirements be necessary.

4. Do not require the inclusion of any additional ISR acreage (or the equivalent nutrient reduction) under a Chesapeake Bay Restoration provision, or any other provision, in the new permit. For the reasons noted above, adding ISR acreage beyond the current requirement would leave many permittees once again in danger of non-compliance with a key permit provision. However, MACo and the workgroup are willing to consider, and discuss at the appropriate time, the need for additional restoration work in the permit cycle following the 2019-2024 cycle with two conditions:

    a. that MDE can demonstrate the need for such work through a transparent gap analysis of future nutrient and sediment loading by source sector; and

    b. that before the end of the 2019-2024 permit cycle MDE and the Phase I jurisdictions jointly engage in the development of what constitutes "maximum extent practicable" (MEP) going forward.

MACo and the workgroup have several other comments on the conditions of the next permit that are aimed at maximizing the flexibility to implement restoration work and to avoid duplication of effort, particularly in reporting progress:

- Adding interim benchmarks to the requirement for TMDL stormwater implementation plans in Section IV.E.1 is counterproductive and does not take into account the unpredictable nature of project development. It also precludes enforcement discretion by MDE. Experience to date has shown that planned projects can often be halted or even eliminated well into the design process due to various factors beyond local control, leading to BMP implementation rates that may fluctuate significantly from year to year.

- The language for adaptive management (Section IV.E.4) should be modified to allow more flexibility with respect to project implementation or redirection of resources for emergencies. An example of such an emergency would be the 2016

flood event in Ellicott City. Currently, the language only allows for more effort if the WLA benchmarks aren't met.

- Similarly, the requirement for additional public reporting on TMDL plan implementation (as proposed in Section IV.E.5) needs to be balanced with the significant and somewhat overlapping reporting requirements that already exist. These include annual MS4 progress reports, biennial Financial Assurance Plan reports and annual Watershed Protection and Restoration Program reports. MACo and the workgroup are willing to work with MDE on ways to make the information that the Phase I permittees already report more accessible to the public.

- Finally, while MACo and the workgroup welcome additional public input on program plans and priorities, we do not support a mandatory requirement to incorporate this input (as proposed in Section IV.E.5).

Both MACo and the county MS4 workgroup members appreciate the opportunity they have had to discuss the provisions of a new permit with MDE staff prior to the issuance of a tentative determination draft. We look forward to working with you on a new permit that will avoid non-compliance while making further improvements to water quality throughout Maryland.

Please do not hesitate to contact me at 410.269.0043 or lknapp@mdcounties.org if you have questions or need further information.

Sincerely,

Leslie Knapp Jr.

Leslie Knapp Jr.
Legal and Policy Counsel
MACo

CC: Lynn Y. Buhl, Assistant Secretary, MDE
D. Lee Currey, Water & Science Administration Director, MDE

From: "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>
Sent: Fri, 6 Jul 2018 13:02:39 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Jerry Maldonado" <jgmaldonado@co.pg.md.us>; "David Lykens" <dlykens@baltimorecountymd.gov>; "tdevilbiss@ccg.carr.org" <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <WiggenK@charlescountymd.gov>; "Hessong, Gary" <GHessong@frederickcountymd.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Mark Richmond" <msrichmond@howardcountymd.gov>; "Sonal Ram" <SRam@sha.state.md.us>
Cc: "Amy Stevens" <amy.stevens@montgomerycountymd.gov>; "Erik Michelsen" <pwmich20@aacounty.org>; "jenniferm.smith@maryland.gov" <jenniferm.smith@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Subject: Re: MS4 Modification Request Needed to Allow Trading

All,

The Department has decided that any request for an MS4 permit modification should include the amount of nutrient trading to be acquire. This should be an educated guess, with a measure of conservatism, of where you think that your jurisdiction will be at the end of its permit term.

For example:

Estimate of restoration requirement completed by county on the date of MS4 permit expiration date: 67%
Estimate of nutrient trading that the county will need to acquire to remain in compliance with its MS4 permit's restoration requirement: 33%

Also include an estimate of the lbs of TN, TP, and TSS based on the 2014 MS4 Guidance and impervious acre equivalency rates of:

TN = 7.69 lbs/acre/year
TP = 1.91 lbs/acre/year
TSS = 0.43 tons/acre/year

Please contact Jennifer or me if you have any questions?

Sincerely,

Raymond P Bahr
Deputy Program Manager
Sediment, Stormwater, and Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1708
(410) 537-3545

On Thu, Jun 14, 2018 at 4:34 PM, Raymond Bahr -MDE- <raymond.bahr@maryland.gov> wrote:

Dear Kim, Jerry, David, Tom, Karen, Gary, Christine, Mark, and Sonal:

MDE's trading program will be available on or about July 12, 2018. In accordance with your permit, Part VII.E.1. Permit Revocation and Modification, and the Code of Federal Regulations (CFR) under 40 CFR Part 122.62, the Department plans to issue a major permit modification for any MS4 phase I permittee that requests a modification. An individual public hearing to discuss the modification for each jurisdiction and a comment period of 90 days are required. With large MS4 permits expiring beginning in December 2018, MDE encourages large MS4s that wish a modification to their permit to submit a request into the Department prior to July 10, 2018, and medium MS4s prior to May 31, 2019.

Please contact Jennifer or me if you have questions or wish to discuss this further.

Sincerely,

Raymond P Bahr
Deputy Program Manager
Sediment, Stormwater, and Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1708
(410) 537-3545

Jennifer M. Smith, P.E.
Program Manager
Sediment, Stormwater and Dam Safety Program
Water and Science Administration
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 30 Apr 2018 13:56:21 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Stevens, Amy" <Amy.Stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Gill, Joseph P." <JPGill@co.pg.md.us>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "jjoiner@frederickcountymd.gov" <jjoiner@frederickcountymd.gov>
Cc: "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Bennett, Katherine" <Katherine.Bennett@montgomerycountymd.gov>; "Maldonado, Jerry G." <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Sonal Ram" <SRam@sha.state.md.us>
Subject: Final agenda for MDE meeting tomorrow
Attachments: Agenda for 05-01-18 meeting.final.docx

MD MS4 managers,

Here is the final agenda for tomorrow's meeting after some minor revisions by MDE staff.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MS4 Phase I - MDE Meeting

May 1, 2018
10 a.m. – noon

Multi-purpose Room, Office of Maintenance
SHA Statewide Operation Center
7491 Connelley Drive, Building 1
Hanover, MD 21076

Draft Agenda

1. Introductions
2. Status of trading regulations and options for allowing trading in current permits
3. Gap analysis results for 2025 Bay TMDL deadline
    a. Construction completion guidance finalized for use
    b. Status of Opti CMAC as a retrofit
    c. Credit discussion for larger regional ponds
4. New permit discussion
    a. Section E restoration requirements
    b. MDE response to other issues raised in March 22 comments submitted by group
5. Plans for advisory group re Accounting Guidance revisions

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 30 Apr 2018 17:07:34 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Stevens, Amy" <Amy.Stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Gill, Joseph P." <JPGill@co.pg.md.us>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "jjoiner@frederickcountymd.gov" <jjoiner@frederickcountymd.gov>
Cc: "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Bennett, Katherine" <Katherine.Bennett@montgomerycountymd.gov>; "Maldonado, Jerry G." <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Sonal Ram" <SRam@sha.state.md.us>; "Karen Coffman" <KCoffman@sha.state.md.us>
Subject: Background info for tomorrow's meeting with MDE
Attachments: Response to Ridgway Hall-MCAC Cover Letter+Redline NT Regulations.FINAL.04-26-18.pdf, Proposed MDWQTP Regulations w Nonsubstantive Changes.FINAL.04-26-18.pdf, Response to Comments.MDWQTP Proposed Regulations.FINAL.04-26-18.pdf, Summary.MDWQTP Proposed Regulations.FINAL.04-26-18.pdf, The Hon Roger P Manno_4-27-18.pdf, MS4 group comments on Maryland Draft Next Gen MS4 Phase I Permit 12_29_2017 - March 2017 final.docx

Folks,

Lynn Buhl sent along the attached PDFs related to the trading issue. They appear to represent MDE's response to the AELR committee's concerns about the draft regulations, including documents showing changes to the proposed regs in strikeout-redline form and a useful summary of the proposed final regulations.

Also attached FYR are the new permit template comments that we put together and sent to MDE on March 22.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

Title 26
DEPARTMENT OF THE ENVIRONMENT
Subtitle 08 Water Pollution
26.08.11 Maryland Water Quality Trading Program

Response to Comments

Regulations to administer the Maryland Water Quality Trading Program were published in the Maryland Register on December 8, 2017. The Notice of Proposed Action began a 30-day comment period that ended on January 8, 2018. In addition to the Notice of Proposed Action, the Maryland Department of the Environment (Department or MDE) also conducted a public hearing on December 18, 2017. During the comment period, MDE received comments from approximately 40 public agencies and private organizations, which related to the following categories:

- Legal authority;
- Trading regions;
- Local water quality; and
- Ratios.

Each of these categories, as well as other comments is addressed below.

NUTRIENT / SEDIMENT TRADING IS ILLEGAL UNDER THE CLEAN WATER ACT

COMMENT: The Clean Water Act (CWA) simply does not allow for water pollution trading as a mechanism for point sources to avoid meeting permit effluent limitations at the point of discharge.

RESPONSE: The record is clear that Congress and the U.S. Environmental Protection Agency (EPA) support the use of nutrient credit exchange programs to accelerate water quality improvements. Critics of nutrient trading have consistently failed to convince courts and regulatory bodies that general authority is lacking. Courts have consistently affirmed the legality of trading under the CWA as a flexible tool for states to achieve water quality standards, including the Total Maximum Daily Load (TMDL) for the Chesapeake Bay. In fact, the federal district court in *Food & Water Watch v. EPA* affirmed the concept of trading, rejecting Food & Water Watch's challenge to the Chesapeake Bay TMDL that supported the states' use of such programs. *Food & Water Watch v. U.S. EPA*, 5 F. Supp. 3d 62, 77-78 (D.D.C., Dec. 13, 2013) (court dismissed case for lack of standing while affirming state authority to adopt offset and trading programs to implement Bay TMDL), also stating that (". . . offset programs have been authorized and supported by the EPA since at least the 1980s.").

When proposing the regulations, MDE cited authorities in both the Environment Article and the Agriculture Article. Md. Code Ann., Envir. § 9-319 authorizes MDE to "develop comprehensive programs and plans for the prevention, control, and abatement of pollution of the waters of this State" and grants MDE the authority to adopt rules and regulations to carry this out. Md. Code Ann., Envir. §§ 9-313(a), 9-315. Additionally, Md. Code Ann., Envir. § 9-325 authorizes MDE to "adopt rules and regulations that relate to application for, issuance of, revocation of, or modification of discharge permits." Therefore, because nutrient credits are part of discharge permits, MDE has the authority to adopt regulations to govern them. In Md. Code Ann.,

Agriculture § 8-901, the General Assembly "finds and declares that: (1) Voluntary nutrient trading and sediment trading programs provide an innovative and cost effective approach to enhance water quality and achieve additional water and air quality benefits . . ." Additionally, in § 8-904 the General Assembly acknowledges the "authority of the Department of the Environment to establish eligibility and other requirements for use of nutrient or sediment offset credits under any State or federal permit or other regulation program."

EPA TECHNICAL MEMORANDA ON NUTRIENT TRADING

COMMENT: The regulations must adhere to the EPA Technical Memoranda on nutrient trading.

RESPONSE: EPA has been an important partner in the development of Maryland's Water Quality Trading Program regulations. The Department sought EPA's counsel on a variety of issues early in the drafting process to ensure that the regulations were not only consistent with the Technical Memoranda, but also with other guidance documents produced by EPA. EPA has also been an important member of the Maryland Water Quality Trading Advisory Committee, which acts as an ongoing consultative group to provide direction to the overall trading program and to oversee further enhancement of the trading infrastructure.

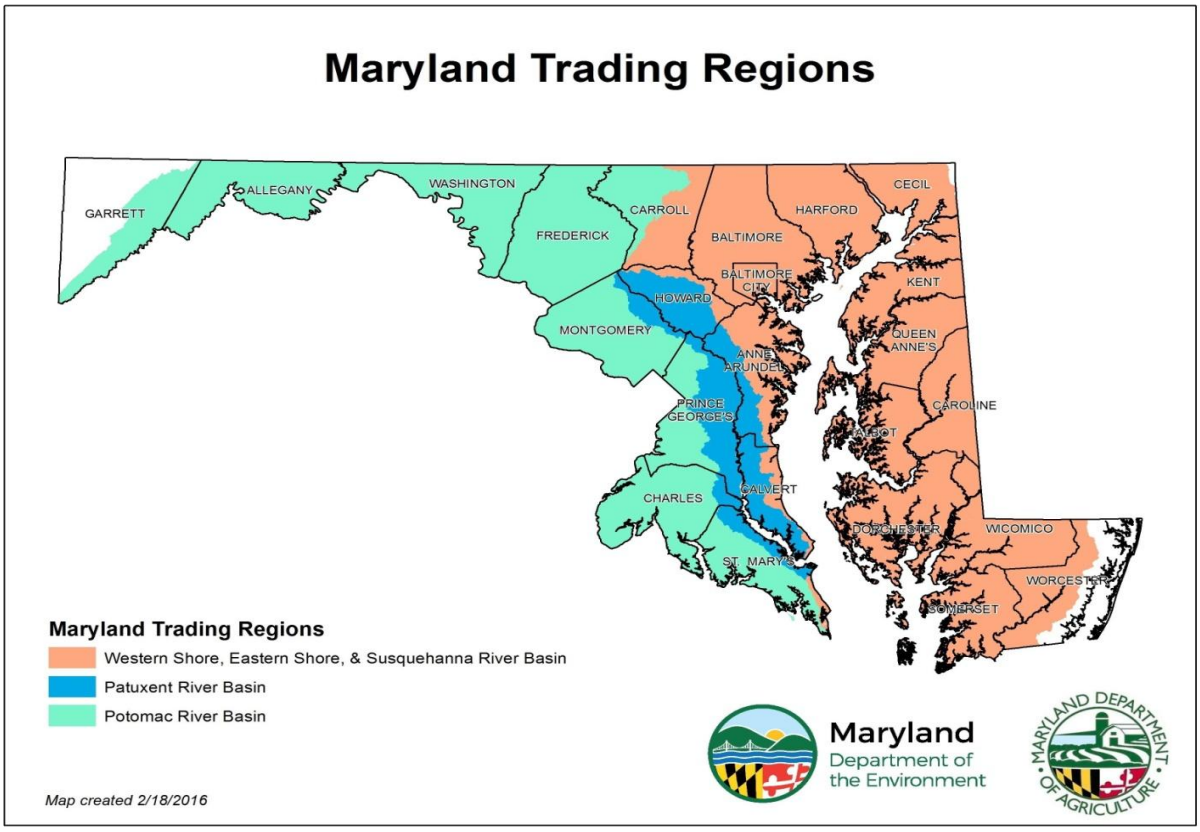
In its January 23, 2018 letter to the Department, the Acting Director of EPA's Region III Water Protection Division, Catherine McManus, stated, "EPA has no further comments on the proposed regulations," which is an indication that the regulations successfully incorporated the tenets of EPA's guidance. It is important to note, however, that Ms. McManus also advised that the regulations directly impact MDE's implementation of the federal National Pollutant Discharge Elimination System (NPDES) permit program and thereby require EPA's review and approval. Consequently, the Department will continue to work closely with EPA to ensure that the final regulations meet their guidance.

TRADING REGIONS ARE TOO LARGE

COMMENT: Trading across the entire proposed trading area will fail to prevent hotspots of pollution and is contrary to EPA's guidance. These regions are too large, and there is no hydrological justification for their boundaries. Any trades that do not involve credits generated directly upstream of the credit purchaser threaten to create pollution hotspots that will impair local water quality and disproportionately impact environmental justice communities.

RESPONSE: Maryland's three trading regions are based on the geographical boundaries of the three large watersheds within Maryland – the Potomac River Basin, the Patuxent River Basin, and the Eastern Shore and Western Shore River Basins, including a portion of the Susquehanna watershed. These trading regions were originally adopted in Maryland's 2008 Policy for Nutrient Cap Management and Trading in Maryland's Chesapeake Bay Watershed and reflect the intention to ensure the protection of the waterbody to which an area drains.

The main driver for Maryland's trading program is to efficiently achieve the nutrient and sediment reductions necessary to reach and to maintain water quality standards for the main stem of the Chesapeake Bay. Although this is a high priority, it is necessary to balance this objective with other water quality objectives, including the need to maintain local water quality. Keeping trades within the Potomac and Patuxent river basins helps those specific rivers. Analogously, the



waterbody to which Maryland's Western Shore and Eastern Shore drain is the main stem of the Chesapeake Bay. Implementation of various credit generating Best Management Practices (BMPs) on and associated reductions from these two shores provide nearly equivalent water quality response for the main stem of the Bay.

The proposed regulations provide further protection to local water quality in subsection .08E(1), which states that "[T]he use of a credit may not cause nor contribute to local water quality impairments or prevent the attainment of local water quality standards." In addition, subsection .08E(2) requires that "[C]redits used within any impaired waters must be generated within such impaired waters or upstream of the credit user's discharge."

LOCAL WATER QUALITY

COMMENT: In order to prevent creation of hot spots and worsening of a local water impairment, credits must be generated upstream of where the credit will be used, and if the credit is used within an impaired water body, the credit must be generated within that same impaired waterbody.

RESPONSE: Many interested parties commented that trading should not compromise local water quality; the challenge has been protecting local water quality while developing a viable trading program. MDE believes the current language achieves that goal by referring to and defining local water quality impairments, as well as "impaired waters".

The term "impaired waters" is defined in the proposed regulations as "waters included on the 303(d) list for nitrogen, phosphorus, or sediment." The 303(d) listings for nutrient and sediment

impairments are typically managed at either the MD 8-digit watershed scale for nontidal impairments or at the Chesapeake Bay segment scale for tidal impairments. MDE will be utilizing the 8-digit watershed or segment scale when evaluating whether the location of a credit generating BMP protects local water quality in relation to where it is used.

The fundamental concept is that in order to prevent the creation of hot spots and worsening of a local water quality impairment, credits must be generated within the same impaired waterbody or upstream of where the credit will be used, so that there is no stretch of impaired water that continues to be unaddressed until the flow reaches the location of the credit-generating BMP. In other words, a credit can potentially be generated at multiple locations within the watershed of an impairment and draining to that impaired waterbody, as long as it is not downstream.

If the local water body to which a discharge is directed is not impaired for the nutrient of concern, then the purchase of any credits for use by that discharger is only limited by the more stringent of 1) the watershed draining to the nearest downstream impaired segment or 2) the three trading regions.

RATIOS

COMMENT: The costs associated with these ratios are excessive. In addition to the credit for the actual reduction, the buyer would also need to pay the cost equivalent of that credit for the uncertainty ratio, plus a minimum of that same cost again for the Edge of Tide (EoT) ratio, plus the reserve ratio. This results in a cost that is actually a minimum of 300% of the credit itself. While the market may control the cost of the credit for the reduction, MDE is overly inflating the cost through these additional ratio requirements. Excessive costs will significantly discourage participation in the program. The cost should be pound for pound.

RESPONSE: The Department's goal in developing the Maryland Water Quality Trading Program was to encourage cost efficiency, engage the private sector, and stimulate a restoration economy. In order to accomplish this goal, MDE only incorporated those ratios necessary to comply with EPA's guidance, while creating a more cost-effective, flexible option for compliance with water quality based effluent limits in NPDES permits.

Uncertainty Ratio

EPA's 2014 Technical Memoranda on "Accounting for Uncertainty in Offset and trading Programs" and "Component of Credit Calculation" stated that: "EPA expects the Bay jurisdictions to address uncertainty by employing an uncertainty ratio to offsets and trades. Safeguards are necessary to ensure that credits generated result in actual pollutant reductions."

"Edge of Tide" Ratio

The EoT ratio is being used by all trading programs in the Bay watershed, not just Maryland. It is a required component of trading as it normalizes loads based on delivery to the mainstem of the Chesapeake Bay. EPA's Technical Memoranda on "Component of Credit Calculation," indicated that: "EPA expects the Bay jurisdictions to use the constant delivery factors from the Chesapeake Bay Program (CBP) Partnership's Watershed Model to adjust the load between the buyer and the seller based on the relative position of each in the major river basin. The purpose of a location adjustment is to account for the distance between each of the offset or trading partners and the Chesapeake Bay. Landscape features and in-stream processes vary throughout the Chesapeake Bay Watershed, and the CBP Partnership's Watershed Model provides factors

that make adjustments to loads based on these factors. Using a delivery factor normalizes the load reduced to the amount delivered to the Chesapeake Bay.

Subsequent to promulgating the regulations, the Department learned that the underlying EoT assumption for paragraph .08C(2)(a) – that there is only one EoT for each segmentshed – is incorrect. Consequently, because there can be different EoT ratios in the same segmentshed, the trading requirements for the EoT ratio were revised as presented below.

(2) Edge of Tide Ratio.

(a) An EoT numeric adjustment factor shall be applied to all applicable credits to normalize loads based on delivery to the mainstem of the Chesapeake Bay. The appropriate factor shall be calculated using assessment tools consistent with the Chesapeake Bay Program modeling tools and accepted by the Department.

(b) EoT adjustment factors for credits from wastewater point sources shall be determined by the Department based on the latest Chesapeake Bay Model used by the Department in issuing permits with trades.

Retirement Ratio

In its Technical Memorandum on "Component of Credit Calculation," EPA indicated that: "Some Bay jurisdictions set aside a percentage of credits for improving water quality (e.g., retirement credits or retirement ratios). While these do not address uncertainty, they are encouraged for general water quality improvement." In the proposed regulations, MDE substituted the Reserve Ratio for the Retirement Ratio because the Reserve Ratio allows greater flexibility than the Retirement Ratio by not only improving water quality, but also guarding against unforeseen events.

A 2:1 UNCERTAINTY RATIO MUST BE APPLIED TO ALL TRADES INVOLVING NONPOINT CREDIT GENERATORS

COMMENT: The uncertainty ratio should be 2:1 for all trades involving credits generated by BMPs from non-point sources, given the effectiveness of these types of BMPs can vary widely based on site-specific factors and differences in annual weather patterns. The water quality benefits generated by a BMP implemented at a nonpoint source is the same whether the credit is used by a stormwater point source or a wastewater point source. Therefore the uncertainty ratio must be 2:1 in each case. This is EPA's "expectation" as set forth in its Technical Memorandum "Accounting for Uncertainty in Offset and Trading Programs" (Feb, 12, 2014) at p.10.

RESPONSE: As previously noted, MDE has discussed a number of issues with EPA during the development of Maryland's Water Quality Trading Program. Among these issues was the EPA Technical Manual addressing "uncertainty trading ratios." In response to inquiries by the Department related to the implementation of the uncertainty ratio, EPA offered the following:

> "Normally, we expect a trading ratio of two to one between a point source and a non-point source. This uncertainty ratio was intended to account for the difference in load certainty between point sources and non-point sources. For traditional point sources, it is quite easy to measure and use those measurements to extrapolate with a high degree of certainty the load. It is not the case with non-point sources where load certainty is only an estimate. The prediction of the load

> is dependent on a range of factors from the original efficiency estimation, to construction, to climatic condition**.** *The MS4 while a point source, shares more of the characteristics with a NPS, and so we believe that for NPS to MS4 trades a one to one ratio is appropriate."(Emphasis added)*

EPA maintained this early position on the application of the uncertainty ratio to trades involving credits generated by nonpoint sources and acquired by stormwater point sources or other nonregulated sources in its January 23, 2018 comment letter on the regulations. In that letter EPA stated:

> "EPA agrees with MDE's application of the 1:1 ratio and not a 2:1 ratio. The uncertainty ratio of 2:1 recommended in EPA's technical memorandum dated February 12, 2014 and titled, "Accounting for Uncertainty in Offset and Trading Program" was primarily designed to address the difference between monitored and modeled loads. As loads from both MS4 permittees and non-point sources are both modeled loads, it would be inappropriate to apply this technical memorandum to MS4 trading. Given the nature of loads for both classes of sources, the approach that MDE has proposed is not unreasonable."

Based on this determination by EPA, MDE will continue to propose the use of a one to one ratio for trades between a nonpoint source and a Municipal Separate Storm Sewer System (MS4) permittee.

COMMENT: The proposed regulations provide for an uncertainty ratio of 2:1 applied to trades involving credits generated by non-point sources and acquired by wastewater point sources, unless the generator, seller, or buyer of the credit is able to demonstrate to the Department that the lower ratio is justified and protective of water quality standards. The review process by which the buyer can demonstrate to the Department that a lower ratio is justified is not clearly outlined.

RESPONSE: EPA's Technical Memorandum entitled "Accounting for Uncertainty in Offset and Trading Programs, states that the justification for a lower ratio must demonstrate that water quality is being protected through "direct and representative monitoring of a nonpoint source performed at a level similar to that performed at traditional NPDES point sources as well as consistency in operation that approaches that of a traditional point source." EPA also suggests that "a ratio of less than 2:1 may be appropriate for projects involving implementation of land conservation measures that ensure permanent protection through a conservation easement or other instrument attached to the deed and where load reductions can be reliably determined. Examples of land conservation measures may include, though are not limited to, reforested lands, vegetated buffers, and restored wetlands that are subject to perpetual easement and annual inspections." As MDE pursues the completion of its policy and guidance manual, it will work with EPA to develop specific criteria that may be used to document and justify the appropriateness of a lower ratio.

RESERVE RATIO

COMMENT: How will the Reserve Ratio be implemented by the Department?

RESPONSE: The proposed regulations create a Reserve Ratio applied to each credit when it is certified. During the credit certification process, a credit generator will subtract the 5% Reserve Ratio from the total number of credits generated at the EoT. As a result, the total number of

credits posted on the Registry will reflect number of EoT credits available for trade in the marketplace, as well as the number of credits posted to the reserve account.

COMMENT: Some of the uses of the reserve ratio under subsection .08C(3) are concerning. Paragraph .08C(3)(a) and paragraph .08C(3)(d) are reasonable uses; having a reserve in case of an act of God (out of human control) as well as holding a reserve to improve water quality are the only defensible uses for a reserve ratio in a robust trading scheme. However, paragraph .08C(3)(b) and paragraph .08C(3)(c) leave the door open for illegitimate uses and the vague language may allow bad actors to get a bailout by covering poorly maintained BMPs. The availability of credits should not be a factor in the reserve ratio. The credits should be retired whenever possible, and Maryland should have the goal of 5% of credits generated by point sources, and 10% of credits generated by nonpoint sources be retired.

COMMENT: A reserve ratio of 5% piled on top of the Uncertainty Ratio and the Edge of Tide Ratio is neither necessary nor desirable. There is ample authority in the proposed regulations to impose accountability where a credit project fails.

RESPONSE: The Department established the Reserve Ratio to set aside a portion of generated credits that are used to create a cache or pool of credits which may be used by the State at its discretion and can be applied annually with priority given to the sector that provided credits to the reserve. The Reserve Ratio allows greater flexibility in the operation of the Trading Program than a Retirement Ratio by not only improving water quality, but also guarding against unforeseen events or assisting a credit seller in default. For example, credits from the Reserve may be used to: temporarily substitute for failed credits while the credit buyer impacted by the failure negotiates the purchase of replacement credits in the marketplace, or temporarily offset a new discharge associated with a project that does not have an assigned allocation. Moreover, as recommended by many commenters, reserve credits could be "retired" for overall water quality improvement during a year when some or all of the reserve is not being used. While some see the Reserve Ratio as a compliance tool to assist a bad actor or as an unnecessary expense placed on a credit generator, MDE believes it is an important tool that can be used to maintain water quality during a time of transition.

DEFINITIONS

Best Management Practice

COMMENT: Oyster restoration and propagation is a prime example of a cost-effective activity that undeniably improves water quality and is beneficial to local economies; and yet under the proposed regulations such "practice" is not an eligible BMP. The regulations should be amended to permit consideration of in water practices that mitigate pollution through nutrient assimilation or otherwise, which would incentivize investments by local governments and the private sector that result in more oysters in the water.

RESPONSE: In order to generate credits under the Maryland Water Quality Trading Program a person must implement a BMP that has been approved by the CBP. See Regulation .04C(2)(b). Approved CBP practices include both land based activities, such as tree planting and reforestation, as well as water-based activities such as oyster aquaculture. When drafting the definition of Best Management Practice, it was the Department's intention to capture the entire suite of approved CBP practices and not limit the use of a practice, or combination of practices,

that is determined by the CBP to be an effective and practicable method of preventing or reducing pollutants generated by point or nonpoint sources.

Since there is a concern, however, that the definition, as written, excludes in-water practices, the Department believes it is necessary to clarify the definition. As a result, definition .03B(9) "Best management practice" has been revised by including practices that remove pollutants "from waters of the State." Additionally, and for similar reasons, the Department also struck the language limiting structural and nonstructural pollution controls to agriculture and urban practices, once again accepting all structural and nonstructural pollution controls that have been approved by the CBP. The revised language, which will not alter how the regulation works, is presented below.

(9) Best Management Practice (BMP).

(a) "Best management practice (BMP)" means a practice, or combination of practices, that is determined by the Chesapeake Bay Program to be an effective and practicable method of preventing or reducing pollutants generated by point or nonpoint sources so as to minimize the movement of those pollutants into or remove those pollutants from waters of the State, or mitigate flooding.

(b) "Best management practice (BMP)" includes: structural and nonstructural pollution controls, operations, and maintenance procedures and practices that prevent or reduce pollutants.

Enhanced Nutrient Removal

COMMENT: The draft regulation's definition of enhanced nutrient removal (ENR) must be changed to set concentrations of 3 milligrams per liter (mg/l) for nitrogen to be consistent with existing statutory law and the rest of the draft regulations. Currently the definition sets concentrations of 4 mg/l for nitrogen, which is inconsistent with state law.

RESPONSE: The Department has clarified definition .03B(19) in the proposed regulations by relying on the existing definition in the Environment Article §9-1601(n).

(19) "Enhanced nutrient removal (ENR)" has the meaning stated in Environment Article, §9-1601, Annotated Code of Maryland.

For ease of reference, §9-1601(n) of the Environment Article is presented below:

"Enhanced nutrient removal" means:

(1) An enhanced nutrient removal technology that is capable of reducing the nitrogen and phosphorus concentrations in wastewater effluent to concentrations of not more than 3 milligrams per liter total nitrogen and not more than 0.3 milligrams per liter total phosphorus, as calculated on an annually averaged basis; or

(2) If the Department has determined that the concentrations under item (1) of this subsection are not practicable for a wastewater facility, the lowest average annual wastewater effluent nitrogen and phosphorus concentrations that the Department determines are practicable for that facility.

Nonregulated Source

COMMENT: It is not clear what specifically is considered a nonregulated source. If the whole county, border to border, is under the MS4 Permit, it is not clear if this only applies to the permittee or any party within those boundaries.

RESPONSE: The Department has clarified definition .03B(32) "Nonregulated source."

> *(32) "Nonregulated source" means a point source or nonpoint source that the Department has determined is not required to obtain an NPDES or State discharge permit and that is not an agricultural operation.*

Performance-based Benchmark

COMMENT: The definition of "Performance-based benchmark" would apply ENR-based benchmarks for credit calculation to both sewage treatment plants and all other "wastewater point sources." There are many industrial point source dischargers in Maryland with average discharge concentrations well below ENR levels. As written, the regulation would authorize these sources to claim credit for the difference between ENR levels and their actual discharge. This would open the door to "paper credits" that do not represent real, additional reductions in nutrient loads.

Furthermore, the definition of "Wastewater point source" includes industrial NPDES permits but it is unclear how the calculations for credit generation in the draft regulations would apply to the metrics found in industrial NPDES permits. Industrial NPDES permits should be separated from wastewater treatment plants due to the vast differences in permit structure and pollution limits. The calculation of credits for wastewater treatment plants also appears to eliminate the possibility of generating credits from minor wastewater treatment plants that have made voluntary reductions beyond permitted levels, but that have not obtained ENR levels.

RESPONSE: The Department did not intend for the calculations based on the "Performance-based benchmark" to apply to other wastewater point sources, such as industrial dischargers. ENR treatment capability is already set in Maryland law at 3 mg/l for nitrogen and .3 mg/l for phosphorus, while Maryland's Watershed Implementation Plan for the Chesapeake Bay TMDLs apply ENR as the default treatment requirement for sewage dischargers with a design flow greater than or equal to .5 million gallons per day (mgd). Since the Department has not applied these sewage treatment standards to other wastewater point sources, the Department is revising .03B(35) "Performance-based benchmark" to clarify that the benchmark applies to sewage treatment ENR facilities, and does not apply to non-sewage discharges such as industrial operations, ensuring the performance-based benchmark's consistency with the above requirements.

Additionally, under the revised definition, paragraph .03B(35)(b) has been added to clarify that other wastewater point sources will be assigned a performance concentration on a case by case basis, which will allow industrial facilities the opportunity to supply credits to stormwater point sources. As noted above, industrials as a group do not have a pre-existing standard treatability concentration for nitrogen and phosphorus as is otherwise true for large sewage treatment facilities. The addition of paragraph .03B(35)(b) also captures smaller design sewage treatment facilities that, for example, employ advanced nutrient removal on a voluntary basis consistent with goals of the Watershed Implementation Plan for Maryland's Chesapeake Bay TMDL. Therefore, the definition of performance-based benchmark now allows all other sewage treatment dischargers (i.e. those with a design flow of less than .5 mgd) a performance concentration established on a case by case basis.

Finally, the definition of "Wastewater point source" (paragraph .03B(54) was revised to complement the changes to made to the "Performance-based benchmark."

Pollutant Reduction

COMMENT: The definition for "pollutant reduction." is not used in any functional way in the regulations. There is potential for confusion here because the definition suggests a method for calculating credits (the difference between actual loads and baselines) that is inconsistent with the "calculation of credits" language applicable to wastewater point sources (calculating credits as the difference between actual loads and performance-based benchmarks). Since removing the definition would have no effect on the regulation, and retaining it could create confusion, we suggest removing the definition.

RESPONSE: The Department has struck the definition .03B(39) "Pollutant reduction." In concert with this action, MDE also clarified the definition .03B(15) "Credit."

> *"Credit" means a unit of load reduction below baseline of one pound of nitrogen, phosphorus, or sediment.*

Sector

COMMENT: The introduction of a new and separate sector, Forests, in definition .03B(43) "Sector" is inappropriate.

RESPONSE: The Department has struck Forests from the definition of "Sector." The inclusion of a Forest sector in the definition was a remnant of a previous draft and its deletion makes the definition consistent with the stated purpose of the regulations as expressed in section .01A. of the regulations: "The purpose of this chapter is to establish a Water Quality Trading Program between the agricultural, stormwater, wastewater, and on-site sewage disposal sectors …" Striking "Forests" makes the "Sector" definition consistent with the regulation's purpose statement.

CREDIT GENERATOR WITH MULTIPLE FACILITIES AND / OR PRACTICES

COMMENT: The proposed regulations are not clear on who can generate credits and appear to prohibit a County from generating credits at all through its WWTP. 26.08.11.04C(2)(a) prohibits a "person" from generating credits if they do not meet baseline requirements. See also 26.08.11.03B(7), which prohibits credit sellers from engaging in a trade unless the credit seller meets baseline requirements. Based on these proposed requirements, it is not clear that a "person" such as a County, which holds several NPDES permits, would be able to generate credits if any one of its permits did not meet a baseline.

RESPONSE: The Department has clarified that the generation and registration of credits is by individual facility or practice by adding the following language under section .04C Program Participation.

> *(3) A person's ability to generate credits is based on the performance of each individual facility or best management practice and their compliance with Regulation .07 of this chapter.*

WASTEWATER TO WASTEWATER NONPARTICIPATION

COMMENT: MDE should clarify why the regulations don't cover trading between wastewater point sources.

RESPONSE: MDE opened the door to trading and offsets within the point source sector under the auspices of the "Policy for Nutrient Cap Management and Trading in Maryland Chesapeake Watershed" adopted in 2008. Wastewater point source "trading" since 2008 has been a process primarily involving transfers of wasteload allocations or "capacity" solely between plants within the wastewater sector. The level of wastewater point to point trading thus far is insignificant with regard to the overall potential market volume, but has been a timely solution for unexpected operational challenges or to promote/support operational efficiencies. All transfers of allocation are approved through a permit modification that is subject to public comment. The trading of capacity credits is prohibited in cross-sector trading and thus is excluded from these regulations.

BASELINE REQUIREMENTS

COMMENT: There are three problems with section .05(A):

- MS4s are currently working to comply with restoration requirements in their permits based on the 2010 Chesapeake Bay TMDL and the Maryland Phase I and II WIPs. If the Bay TMDL is amended as a part of the Midpoint Assessment, there is a concern that the baseline for MS4s could change in a way that would be harmful to permittees, likely by moving MS4s even farther away from the day that they can generate nutrient and sediment credits.
- The baseline should not be based on "any local TMDL" for MS4s; rather, the baseline for MS4s should be set based on the requirements for addressing particular local nutrient and/or sediment TMDLs expressed by the MS4 permit. Once the MS4 has complied with its permit, baseline should be met.
- The baseline for an MS4 established in the Bay TMDL and the baseline for a local nutrient and/or sediment TMDL may not be the same; if they are not, it would be impossible for a baseline to be consistent with both.

RESPONSE: The purpose of the Maryland Water Quality Trading Program is to develop a marketplace for nutrient and sediment credit trading that attracts public and private participation and enhances Maryland's effort to protect and restore not only the water resources of the Chesapeake Bay and its tributaries, but also local waters. In order to encourage cost efficiency, engage the private sector, and stimulate a restoration economy, the Department must provide a framework that provides both clarity and certainty to the marketplace. At the same time, however, the Department must also ensure that trading activities do not cause nor contribute to local water quality impairments or prevent the attainment of local water quality standards. Consequently, the Department has clarified section A. of Regulation .05 Baseline Requirements as presented below:

A. General policies.

(1) All baselines shall be consistent with the 2010 Chesapeake Bay TMDL, as may be amended from time to time, or, if more restrictive, a local TMDL that may be reflected in an NPDES or State discharge permit.

(2) In the event of an amendment to the Chesapeake Bay TMDL, the:

(a) Baseline established in a permit remains in effect until a new permit or a permit modification is issued by the Department; and

(b) Credits calculated with a baseline established under the previous Chesapeake Bay TMDL and approved by the Department prior to the effective date of the amendment shall remain available for sale until the certification period ends for that credit.

Subsection A(1) addresses the dilemma created by language in the original regulation requiring all baselines to be consistent with both the 2010 Chesapeake Bay TMDL and any local TMDL. Since it is impossible for a credit generator to comply with this requirement whenever the Bay TMDL and the local TMDL for a specific location are not the same value, it was necessary for the Department to revise the regulation.

Paragraph A(2)(a) clarifies when the Department would apply an amendment to the Chesapeake Bay TMDL. According to the revision, which is consistent with subsection .07A(2) of this chapter, a baseline established in a permit remains in effect until a new permit or a permit modification is issued by the Department, regardless of the amendment. The Department believes that it is important to maintain a level playing field as the permittee works to comply with the conditions of the permit.

Finally, paragraph A(2)(b) clarifies how an amendment to the Chesapeake Bay TMDL will affect certified credits. Every credit placed on the Registry by the Department goes through a rigorous certification and verification process that culminates in a valid credit that is tradable on the market. Additionally, as part of the certification process, the Department establishes the number of years a credit is generated. Consistent with regulation .08D(3), which establishes the lifespan of each registered credit, paragraph A(2)(b) affirms that, regardless of the adoption of an amendment to the Chesapeake Bay TMDL, the value of a registered credit is stable and remains available for sale until the certification period established by the Department ends for that credit. However, it is important to note that, following the expiration of the certification, a new certification will be based upon the credit certification and verification process accepted at that time, which may result in a different valuation.

COMMENT: MDE should clarify baseline requirements to ensure that trading adheres to the EPA Technical Memoranda and provides adequate transparency.

RESPONSE: EPA developed Technical Memoranda to assist the Bay jurisdictions in developing or updating various aspects of their trading programs. Technical Memoranda elaborate on the expectations set out in Section 10 and Appendix S of the Chesapeake Bay TMDL but are not regarded as rules, regulations, or official agency guidance and do not establish any binding legal requirements. Notwithstanding, COMAR 26.08.11.05, Baseline Requirements, requires all baselines to be consistent with the 2010 Chesapeake Bay TMDL and any local TMDLs, as may be amended from to time. This requirement meets EPA's "Establishing Offset and Trading Baselines in the Chesapeake Bay Watershed" Technical Memoranda expectations of "Consistency of Offset and Trading Baseline with the applicable TMDL." Additionally, COMAR 26.08.11.05 outlines distinct baseline requirements for both regulated wastewater and stormwater point sources as well as nonregulated sources.

COMMENT: Baseline limits should be revised to reflect consistency between the stated limits and the calculation of credits. Currently, the stated baseline limit and the basis for calculating credits for certain wastewater sources is inconsistent and confusing.

RESPONSE: In most other trading environments, baselines which are included in the permit serve as starting point for credit generation. For the MS4 trades, MDE has chosen to allow

credits generated by Publicly Owned Treatment Works to be eligible for use by an MS4 permittee only after achieving a specific level of performance beyond the TMDL baseline – i.e. only after achieving the performance-based benchmark. This benchmark therefore is an additional criteria for credits to be used by MS4 permittees beyond the wasteload allocation baseline for the 0.5 mgd sewage treatment plants, and potentially (but not automatically) more stringent than the baseline for industrial wastewater dischargers. However it is not necessary to label the performance benchmark as a baseline as that can bring in its own level of confusion.

COMMENT: An MS4 permittee's baseline is defined as "the restoration requirements of the stormwater point source's current NPDES discharge permit." DRAFT 26.08.11.05D. Under the definition, an MS4 permittee will never meet the baseline as defined in the proposed regulations. The MS4 baseline is the goal the MS4 is suppose to meet at the end of it permit term. Thus, as currently drafted, the regulations would prohibit a person who holds an MS4 permit from ever being able to generate credits in any form.

RESPONSE: If an MS4 permittee is interested in participating in the trading program, it is incumbent on the permittee to meet the restoration requirements early in the permit term. For example, if an MS4 permittee demonstrates that it has achieved its 20-percent restoration goal by year two of the permit term, the permittee will be eligible to generate and sell credits during years three through five of the permit term. The same approach would be employed for the term of each subsequent MS4 permit.

PERFORMANCE-BASED BENCHMARK

COMMENT: MDE should set the performance-based benchmark for Wastewater treatment plants at 4 mg/l total nitrogen.

RESPONSE: The difficult decision to set the performance-based benchmark at 3 mg/l nitrogen and 0.3 mg/l total phosphorus was based on three underlying factors. First, the Bay Restoration Fund Act created a dedicated fund to upgrade Maryland's wastewater treatment plants with enhance nutrient removal (ENR) technology so they would be capable of achieving wastewater effluent quality of 3 mg/l total nitrogen and 0.3 mg/l total phosphorus. Consequently, the obligation of each jurisdiction receiving financial assistance through the Bay Restoration Fund is "to achieve ENR and to meet the annual average nutrient goals of plant effluent quality on Total Nitrogen at 3 mg/l and on Total Phosphorus at 0.3mg/l." Second, during the development of the regulations, MDE evaluated performance data of ENR facilities for calendar year 2016 and determined that they are capable of operating continuously below 3 mg/l. Finally, MDE has consistently recognized the difficulties encountered by wastewater treatment plant operators during day-to-day operations. As noted in the comments, wastewater treatment plants experience process variability due to weather and other factors outside of their control. MDE addresses these operational challenges by establishing a nitrogen limit of 4 mg/l and a phosphorus limit of 0.3 mg/l in NPDES discharge permits, unless lower limits are required to meet local water quality. The permitted effluent limits protect the Bay water quality, while enabling wastewater treatment plants to comply with permit conditions under trying operational conditions. On the other hand, the performance-based benchmark of 3 mg/l nitrogen and 0.3 mg/l phosphorus reflect optimization and additionality under the operation goals of the Bay Restoration Fund and serve as benchmarks for the generation of credits under the Maryland Water Quality Trading Program.

CREDIT CERTIFICATION THROUGH A WASTEWATER PERMIT MODIFICATION

COMMENT: In the certification procedures found in subsection A(2) of the Regulation .07, after the word "permit" in the second line, insert "or permit modification.

RESPONSE: The requested change has been made to the regulation to harmonize the certification process for wastewater point sources with the public participation process described in Regulation .12. During the development of the regulations, many stakeholders encouraged the Department to provide an opportunity for the public to participate in the credit certification process. In response, the Department incorporated the existing NPDES public participation process into the trading program. However, where section .12A. included both "new permits or modification of existing permits," the certification procedure in subsection .07A(2) only addressed permits. Consequently, in order to provide consistency throughout the regulations, "permit modification" has been added to subsection .07A(2), which now reads:

> *(2) Wastewater point source credits are certified by the Department through issuance of an NPDES or State discharge permit or permit modification.*

FINANCIAL ASSURANCES / TRADE DEFAULT / EXPIRATION, SUSPENSION, OR REVOCATION OF CREDITS

COMMENT: Under the proposed regulations, a credit purchaser permittee could be found in violation of their permit if their purchased credits are found to be functioning improperly. It is the permittee's responsibility to comply with their permit, but should not be held entirely and solely liable if the separate entity that sold the permittee the credits was not fulfilling its duty to the purchaser permittee. Virginia has financial assurance requirements to account for this scenario, but Maryland's proposed regulations do not include those assurances.

COMMENT: The seller needs to be responsible for the actual BMP/credit generated and sold. The buyer should not be penalized if the seller defaults, as this is beyond the buyer's control. Since the buyer may still be responsible for addressing the credits/reductions needed, a grace period of six months to one year should be given to the buyer to secure replacement credits or install new BMPs if the seller defaults.

RESPONSE: MDE made a concerted effort to promulgate regulations that would comply with EPA's Technical Memoranda and other trading guidance, while supporting a marketplace where competition, supply and demand regulate trades rather than the Department. It is the responsibility of the credit buyer to negotiate a binding contract with appropriate safeguards that protect the buyer in the event that the credit seller does not fulfill its contractual responsibilities.

TRADING PROHIBITIONS

COMMENT: Bad actors should be banned from the trading program. There is a distinction, however, between violating a part of the trading regulations and violating a totally unrelated section of a permit, the Code, or regulations. Such a severe approach is overly broad and runs counter to MDE's expressed interest in having a vibrant, voluntary, market-based trading program. The prohibitions established under section .08F of the regulations should be fine-tuned to tie trading prohibitions to related infractions.

RESPONSE: The Department is taking this comment under advisement. The Department's goal is to establish clear, enforceable mechanisms that ensure legal accountability for the generation and use of credits.

REPORTING TIMEFRAMES

COMMENT: Currently, section .10C states: "The Department shall update the Registry within 30 days after receiving notice from the credit buyer of a change in the intended use of the credit." The Registry should be updated more quickly.

RESPONSE: The Department is taking this comment under advisement. The Department's goal is to ensure that the Maryland Water Quality Trading Program runs efficiently and provides timely service to its customers.

VERIFIER QUALIFICATIONS

COMMENT: The criteria for verifiers established under subsection .11B(2), such as "the appropriate education, expertise, and training...", "does not hold an interest in the operation or entity generating the credit," and "was not involved in the original application," should be applicable to all three listed verifiers. As currently drafted, it appears that this subsection could be read as applying those qualifying criteria only to the third listed authorized verifier category, namely the Department-approved verifiers. Obviously, these criteria speak directly to the ability of a verifier to perform the work in an unbiased manner and therefore should explicitly apply to all persons authorized to verify credit generating practices.

RESPONSE: The Department has revised this subsection of the regulations by clarifying that the qualifying criteria applies to all listed verifiers – State or county inspectors; professional engineers registered in Maryland; and Department-approved verifiers.

(2) Verification of credits generated by any other source shall be performed by a:

(a) State or county inspector;

(b) Professional engineer registered in Maryland; or

(c) Department-approved verifier.

(3) Before performing any verification under §B(2) of this regulation, the inspector, engineer, or verifier shall demonstrate to the Department that the inspector, engineer, or verifier:

(a) Has the appropriate education, expertise, and training to perform the verification;

(b) Does not hold an interest in the operation or entity generating the credit; and

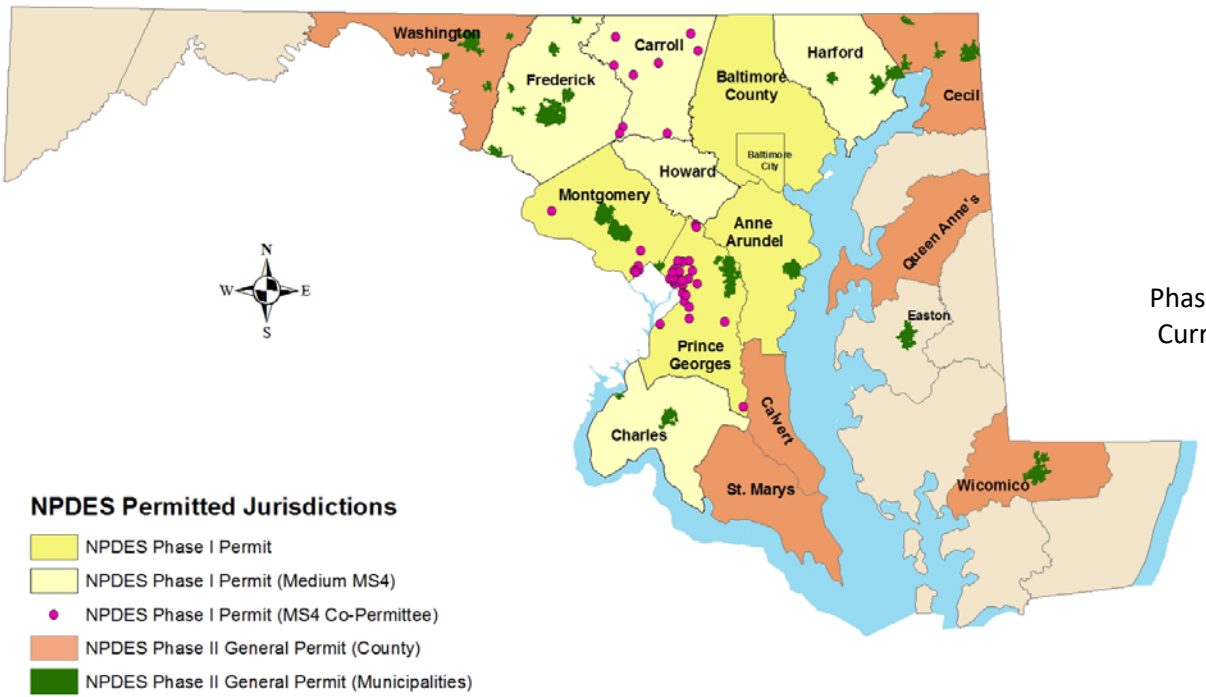
(c) Was not involved in the original application or qualification of the credits.

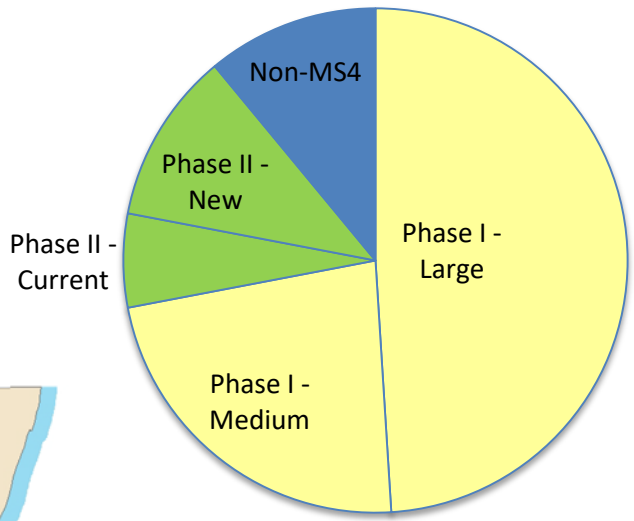
Maryland's NPDES MS4 Permits

Jennifer M. Smith
Maryland Department of the Environment

2018 MACO Annual Summer Conference

MS4 Permits Cover the Majority of MD's Urban Runoff

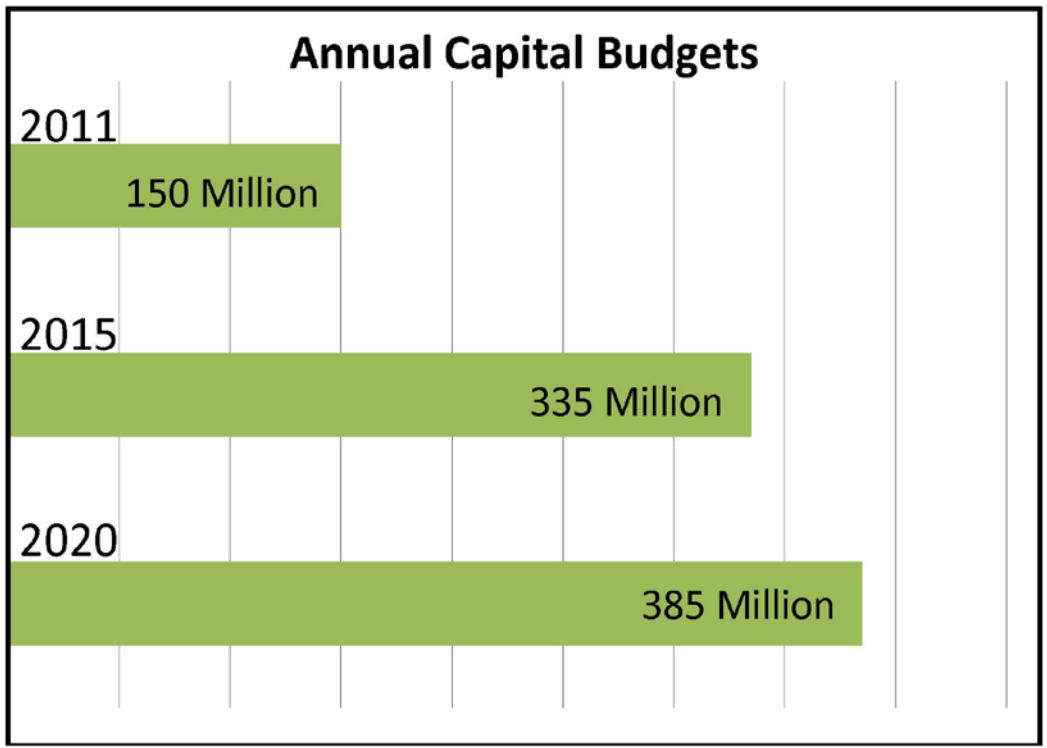




Impervious Surface Restoration

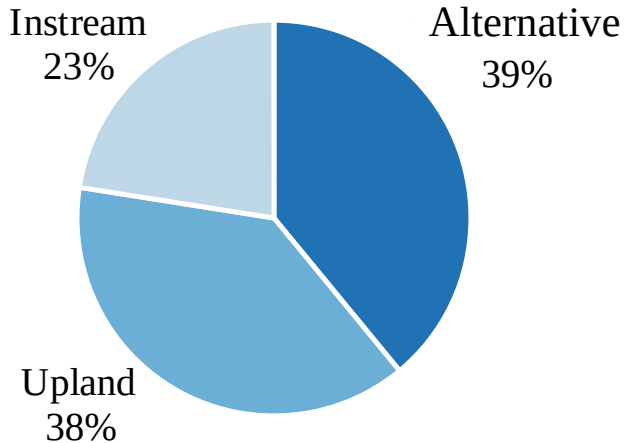
- Current Phase I Permit requires restoration of 20% of existing unmanaged impervious area. (36,882 + 4,439 = 41,321 impervious acres)
- The new Phase II permit requires a similar restoration effort. (9,000 impervious acres)

Restoration Project Investment Continues to Increase



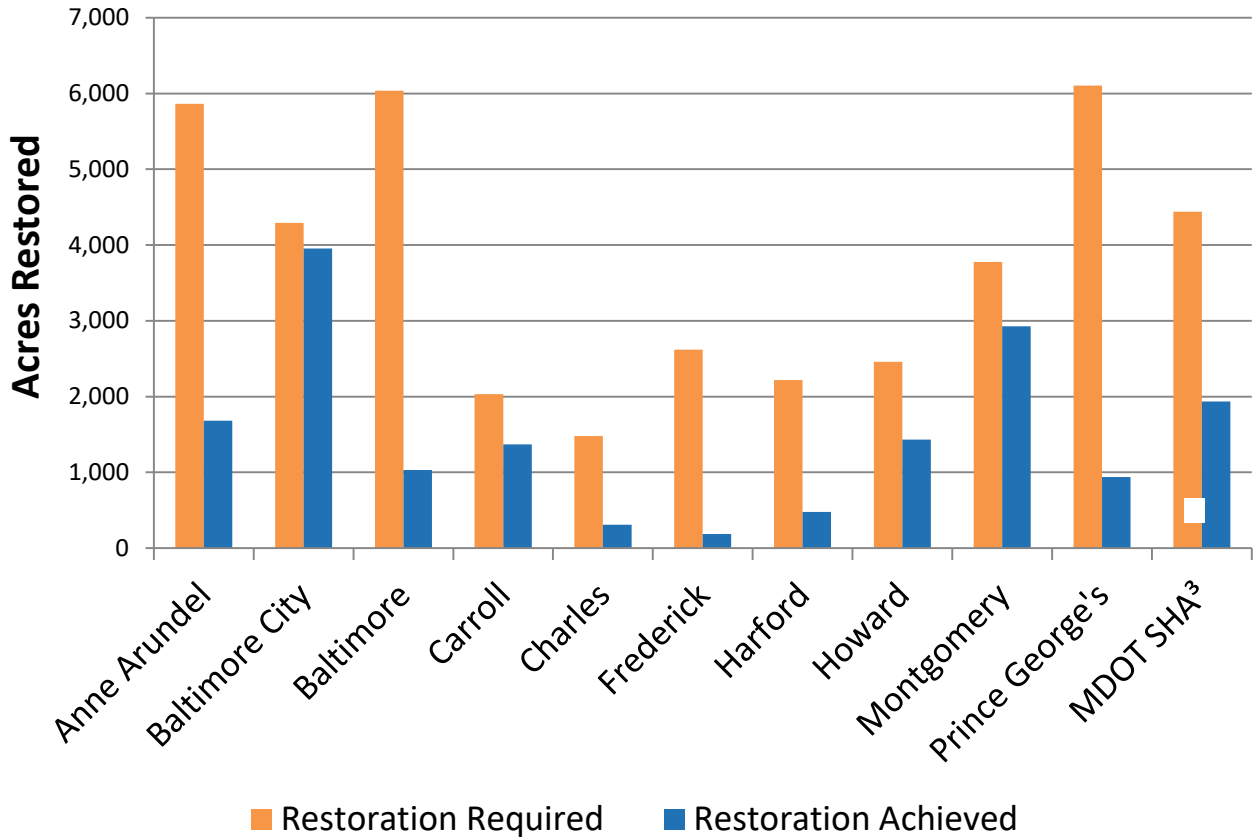
About $1.3 Billion in investments from 10 counties in current permit term.

Diverse Projects to Meet MS4 Permit Requirements



Source: Annual Report on Financial Assurance Plans and the Watershed Protection and Restoration Program (2017)

Specific Actions Completed Through FY2017 to Meet ISRP Permit Requirements



Road Blocks and Issues

- High cost and limited opportunities for constructing SW BMP retrofits
- Permitting Delays
- Access to Private Property
- Limited Available Sites
- Public Acceptance
- Limited Availability of Design/Construction Contractors

Cost Effective Strategies

- Pay For Performance Contracts
- Design, Build, Operate, Maintain (DBOM)Contracts
- Low Interest Loans
- Public - Private Partnerships

Creating Flexibility

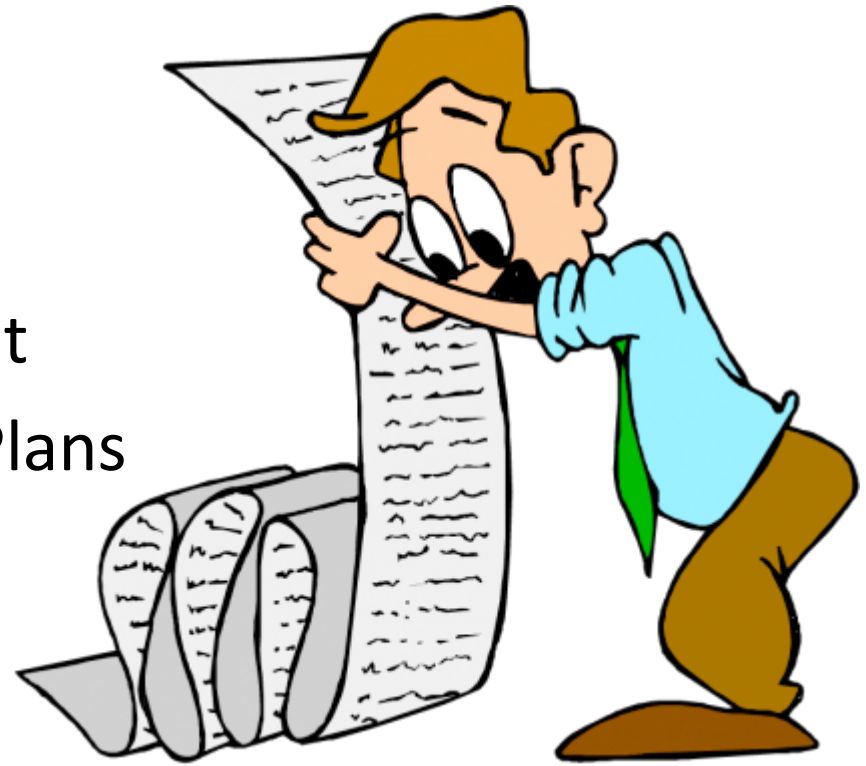
- Water Quality Trading
- Impervious Acre Baseline
- Further Clarification on Restoration Crediting
- Pilot Alternative Practices and Accounting

What's Next?

- Phase I Permit Modifications (November-December 2018)
- Annual Reports and Financial Assurance Plans (2018/2019)
- Phase I Large Permits Expire (end 2018/early 2019)
- Phase I Medium and SHA Phase I Large Permits Expire (2019/2020)

Next Phase I Permit Expectations

- Water Quality Trading
- Pooled Monitoring
- Restoration Requirement
- TMDL Implementation Plans
- Consistent with TMDLs
- Crediting Co-Benefits



Questions?

Jennifer M. Smith
Program Manager
Sediment, Stormwater,
& Dam Safety Program

410-537-3561

Jenniferm.smith@maryland.gov

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Isiah Leggett
County Executive

Patty Bubar
Acting Director

July 11, 2018

Ms. Lynn Buhl
Assistant Secretary
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Dear Ms. Buhl:

The purpose of this letter is to provide the submittals required by the Consent Decree (CD) signed by Montgomery County (the County) and the Maryland Department of the Environment (MDE) on April 13, 2018. The CD Section II, Corrective Actions, requires the County to provide the following three items within 90 days of its execution:

- A detailed annual milestone schedule for completion by December 31, 2020, of the Impervious Surface Restoration Plan requirement set forth in Part III.G.2 of the Permit
- A detailed description and annual milestone schedule for completion of the Supplemental Environmental Projects (SEPs) by December 31, 2020
- A proposal and schedule for review and approval, pursuant to Part III.E.1.a of the Permit, for the submission of inspection data regarding the 71 BMPs that do not have current or future inspection information

The sections below present the County's response to each of these items.

Schedule for completion of the Impervious Surface Restoration Plan

Section II, Paragraph 3 of the CD states that: "Within 90 days of the execution of this Consent Decree by the County and the Department, the County shall submit to the Department for review and approval, a detailed annual milestone schedule for completion by December 31, 2020, of the Impervious Surface Restoration Plan requirement set forth in Part III.G.2 of the Permit. The schedule will establish how many acres of impervious surface will be treated by the County by the end of Calendar Year 2018 and then by the end of Calendar Year 2019 (collectively, 'the Annual Restoration Goals'), in addition to meeting the entire requirement of 3,778 acres of Impervious Surface restoration by December 31, 2020 ('the Final Restoration

Goal'). The County may replace individual scheduled projects as necessary, as long as the restoration goals are fulfilled."

The County is proposing the following annual milestone schedule for completion of the Impervious Surface Restoration (ISR) requirement:

Calendar Year	Proposed Annual Restoration Goal* (acres)	Total ISR Completed* (acres)
2018	427	3,354
2019	403	3,757
2020	21	3,778

* Proposed schedule assumes MDE approval of ISR progress of 2,927 acres reported in the County's FY17 MS4 annual report. Should MDE deny credit for any of the FY17 ISR progress, the schedule will need to be revised.

The County will report on progress in each MS4 annual report and is optimistic that the ISR will be completed ahead of schedule. The MS4 annual reports will include the ISR completed in each fiscal year (July to June), as well as the ISR completed by the end of the calendar year (following July to December). For example, the FY18 MS4 annual report will include ISR completed from July 1, 2017 through June 30, 2018, as well as ISR completed from July 1, 2018 through December 31, 2018. The FY20 annual report will provide the FY20 impervious area completed for the 2010 permit, as well as show that the County has achieved the final restoration goal.

The list of projects scheduled to be completed is presented in Table 1. The County may replace individual scheduled projects as necessary to ensure that each annual restoration goal is met, and remains committed to completing the ISR required by the permit no later than December 31, 2020.

Schedule for completion of the SEPs

Section II, Paragraph 4 of the CD states that: "Within 90 days after the execution of this Consent Decree by the County and the Department, the County shall submit to the Department for its review and approval a detailed description and annual milestone schedule for completion of the SEPs by December 31, 2020."

In response to the requirements of Section II, Paragraph 4, the schedule for completing the SEPs in compliance with the CD is as follows:

- December 31, 2018: Substantial completion of the Olney Elementary School project, including the posting of interpretive signage.

The County will also be pursuing additional educational opportunities not required by the CD based on the following preliminary schedule:

- October/November 2018: Ribbon cutting ceremony with partners (tentative.)
- March 31, 2019: Development of a schedule of educational activities at Olney Elementary School. These activities will be done with other partners for enhanced learning experience opportunities.

The CD, Section I, Judgement, states that "These SEPs shall be impervious surface area restoration projects that will demonstrably treat stormwater runoff using green infrastructure or low impact development standards, can be accessed by the public, include interpretive signage, and are located in the County with a minimum cost of $300,000." The County's proposed SEPs consist of two bioretention facilities and a rain garden to be installed at the Olney Elementary School that will treat 2.26 acres of impervious surface with an estimated construction cost of $581,203 based on the accepted construction bid proposal. The bioretention facilities and rain gardens satisfy the requirement for green infrastructure or low impact development standards, are publicly accessible since the project is on Montgomery County Public School property, and have an estimated construction cost exceeding the minimum cost of $300,000 required in Paragraph 1.

A fact sheet summarizing the proposed SEPs was submitted to MDE on April 9, 2018 and three comments were received from MDE on May 25, 2018. On June 7, 2018, the County responded to MDE's comments and provided more detailed information on the SEPs, including the description of the interpretive signs that will be installed for the SEPs. MDE approved the SEPs on July 6, 2018 "under condition that the County provide more details on how these facilities will be integrated into the environmental education curriculum at Olney Elementary School." The County believes that it has satisfied the requirements specified in CD Section II, Paragraph 4, as evidenced by MDE's approval of the County's submittal. That submittal included a detailed description and annual milestone schedule for completion of the SEP and a restoration project that treats stormwater runoff using green infrastructure or low impact development standards that, as required by Section I, Paragraph 1, can be accessed by the public, includes interpretative signage, and will require the County to incur expenditures of at least $300,000. The County believes the above-quoted condition of approval to be above and beyond the requirements of the CD as well as the MS4 Permit. Therefore, the County should not be subject to a financial penalty for failure to meet that condition. That said, the County intends to pursue these additional educational opportunties in accordance with the schedule provided to MDE with the understanding that the County will not be financially penalized for not meeting conditions that are beyond the scope of the CD.

Schedule for submission of missing inspection data

Section II, Paragraph 6 of the CD states that: "Within 90 days after the execution of this Consent Decree by the County and the Department, the County shall submit to the Department a

proposal and schedule for review and approval, pursuant to Part III.E.1.a of the Permit, for the submission of inspection data regarding the 71 BMPs that do not have current or future inspection information. The County shall comply with terms of the approved schedule. Depending on the type of facility and year of installation, the County may remove some facilities from the County's inventory. The County shall ensure that facilities removed from its urban BMP inventory are not being used as credit toward restoration impervious area treatment. If a removed facility has been counted toward its baseline, the County must remove the acreage managed by this facility from the County's baseline. Such removal from the inventory shall not constitute a violation of this Consent Decree or the Permit if undertaken in accordance with the approved plan."

The list of 71 BMPs and their approval, built, last inspection and next inspection dates are presented in Table 2. Of these 71 BMPs, nine are no longer in service and have been withdrawn from the inventory. As a result, they will no longer be inspected and are not being used as credit toward restoration of impervious area. Inspection dates are provided for the remaining 62 BMPs.

The County continues to refine its Urban BMP Database and has identified the following issues and steps to resolve them:

- Existing but newly discovered BMPs: these facilities were being added to the Urban BMP Inventory and reported as soon as they were discovered. However, because they were newly discovered they had not all been inspected within the last three years. The County has changed the procedure so that newly discovered BMPs are not added to the Urban BMP Inventory or to the impervious area treated until they have been inspected.
- BMPs on individual residential lots: The County began obtaining easements allowing access to BMPs on individual residential lots in January 2017. Prior to that, there was no mechanism allowing access to private property for the purpose of inspecting stormwater BMPs. For BMPs installed prior to January 2017, the County has sent letters to residential property owners to notify them that they are eligible for credit towards the Water Quality Protection Charge (WQPC). To receive the credit, the property owner must conduct an inspection using the department approved form, and certify that the maintenance is being conducted. The County will use the property owner's inspection data to satisfy the requirement for triennial inspections, and will audit approximately 5% of the forms submitted to ensure the facilities are functioning properly.
- All other BMPs are programmed to be inspected every three years and maintained as needed.
- Inspection dates will continue to be reported in Appendix A Table B of each annual report.

The County believes that the preceding sections satisfy the CD requirements to provide schedules for completion of the Impervious Surface Restoration Plan, completion of the SEPs, and submission of missing inspection data within 90 days of the execution of the CD.

The County appreciates MDE's efforts to find a path to compliance and stands ready to achieve the restoration goal in the timeframe prescribed by the CD. We look forward to MDE's review and approval of this submittal. Please feel free to contact me should you have any questions or wish to discuss the submittal in more detail.

Sincerely,

Patty Bubar

Patty Bubar
Acting Director

PB:kdm

Enclosures: As stated

Table 1: Impervious Surface Restoration Projects Scheduled for Completion Prior to December 31, 2020				
Structure Name	Structure Type	Restoration Type	Proposed ISR Credit	Anticipated Completion
Aldershot Dr	STRE	WSSC - Stream Restoration	8.3	12/31/2018
Argyle Country Club	STRE	WSSC - Stream Restoration	1.5	12/31/2018
Argyle Middle School	BR	LID	1.5	12/31/2018
Argyle Middle School	BR	LID	2.0	12/31/2018
Argyle Middle School	MBR	LID	0.2	12/31/2018
Bannockburn Stream Restoration - 1	STRE	WSSC - Stream Restoration	16.0	12/31/2018
Bannockburn Stream Restoration - 2	STRE	WSSC - Stream Restoration	1.0	12/31/2018
Bannockburn Stream Restoration - 3	STRE	WSSC - Stream Restoration	0.5	12/31/2018
Bannockburn Stream Restoration - 4	STRE	WSSC - Stream Restoration	0.6	12/31/2018
Bannockburn Stream Restoration - 5	STRE	WSSC - Stream Restoration	0.4	12/31/2018
Bedfordshire Stream Restoration	STRE	Stream Restoration	11.0	12/31/2018
Bedfordshire SWM Retrofit	EDSW	SW POND RETRO	67.3	12/31/2018
Bentcross	STRE	WSSC - Stream Restoration	0.3	12/31/2018
Carter Road	STRE	WSSC - Stream Restoration	1.0	12/31/2018
Fox Hills East	EDSD	SW POND RETRO	4.3	12/31/2018
Fox Hills North SWM Retrofit	EDSD	SW POND RETRO	15.3	12/31/2018
Horizon Run Pond Retrofit	EDSW	SW POND RETRO	28.5	12/31/2018
Little Falls Library	LID	LID	0.5	12/31/2018
Lower NW- Oakview Road and East Light Street - widening	STRE	WSSC - Stream Restoration	2.0	12/31/2018
Manchester Farms	EDSD	SW POND RETRO	154.0	12/31/2018
Montrose	STRE	WSSC - Stream Restoration	0.8	12/31/2018
Morton Hall Road	STRE	WSSC - Stream Restoration	3.0	12/31/2018
Newport Mills Middle School	BR	LID	0.5	12/31/2018
Oakview Hedin Drive - 2	STRE	WSSC - Stream Restoration	0.5	12/31/2018

Table 1: Impervious Surface Restoration Projects Scheduled for Completion Prior to December 31, 2020				
Structure Name	Structure Type	Restoration Type	Proposed ISR Credit	Anticipated Completion
Old Farm Creek IV	STRE	WSSC - Stream Restoration	5.0	12/31/2018
Patton Dr - 1	STRE	WSSC - Stream Restoration	1.0	12/31/2018
Patton Dr - 2	STRE	WSSC - Stream Restoration	2.5	12/31/2018
Patton Dr - 3	STRE	WSSC - Stream Restoration	0.3	12/31/2018
Potomac Ridge - 10876 (Pond B)	EDSD	SW POND RETRO	2.5	12/31/2018
Potomac Ridge - 10887 (Pond A)	EDSD	SW POND RETRO	10.6	12/31/2018
Potomac Ridge Pond C - 10847	EDSD	SW POND RETRO	18.5	12/31/2018
Potomac Ridge Pond D - 10891	EDSD	SW POND RETRO	11.2	12/31/2018
Rock Run Oaklyn Dr - 1	STRE	WSSC - Stream Restoration	3.2	12/31/2018
Rock Run Oaklyn Dr - 2	STRE	WSSC - Stream Restoration	0.4	12/31/2018
Sligo Middle School	ESDRG	LID	1.1	12/31/2018
Sligo Middle School	BR	LID	1.2	12/31/2018
Snakeden Branch Stream Restoration - 1	STRE	WSSC - Stream Restoration	20.0	12/31/2018
Snakeden Branch Stream Restoration - 2	STRE	WSSC - Stream Restoration	5.0	12/31/2018
Springlake	STRE	WSSC - Stream Restoration	2.0	12/31/2018
Strathmore Elementary School	BR	LID	1.2	12/31/2018
The Plantations II SWM Pond Retrofit	EDSW	SW POND RETRO	20.7	12/31/2018
ASPEN HILL PARK	STRE	WSSC - Stream Restoration	2.5	12/31/2019
Avenel SWM Retrofit	EDSW	SW POND RETRO	60.0	12/31/2019
BEEKMAN PL	STRE	WSSC - Stream Restoration	0.3	12/31/2019
BELLS MILL RD (North)	STRE	WSSC - Stream Restoration	3.0	12/31/2019
BELLS MILL RD (South)	STRE	WSSC - Stream Restoration	1.3	12/31/2019
B'Nai SWM Retrofit	EDSW	SW POND RETRO	72.0	12/31/2019
BRADFORD ROAD	STRE	WSSC - Stream Restoration	0.8	12/31/2019
BROAD GREEN	STRE	WSSC - Stream Restoration	0.5	12/31/2019

Table 1: Impervious Surface Restoration Projects Scheduled for Completion Prior to December 31, 2020				
Structure Name	Structure Type	Restoration Type	Proposed ISR Credit	Anticipated Completion
BUCKSPARK LN	STRE	WSSC - Stream Restoration	9.0	12/31/2019
CABIN JOHN TO7 - VFD (2)	STRE	WSSC - Stream Restoration	0.0	12/31/2019
CABIN JOHN TO7 - VFD (Riffle)	STRE	WSSC - Stream Restoration	0.0	12/31/2019
CABIN JOHN TO7 - VFD (RSC)	STRE	WSSC - Stream Restoration	1.0	12/31/2019
CAPRI PL	STRE	WSSC - Stream Restoration	0.5	12/31/2019
CEDAR HILL DR	STRE	WSSC - Stream Restoration	1.0	12/31/2019
CHERRY TREE LN	STRE	WSSC - Stream Restoration	1.0	12/31/2019
Croydon Creek - 1	STRE	WSSC - Stream Restoration	0.8	12/31/2019
Croydon Creek - 2	STRE	WSSC - Stream Restoration	1.5	12/31/2019
Croydon Creek - 3	STRE	WSSC - Stream Restoration	1.8	12/31/2019
DALE DRIVE	STRE	WSSC - Stream Restoration	3.5	12/31/2019
DAMERON DRIVE	STRE	WSSC - Stream Restoration	2.0	12/31/2019
DENNIS AVE	STRE	WSSC - Stream Restoration	2.0	12/31/2019
DERBY RIDGE LA	STRE	WSSC - Stream Restoration	0.5	12/31/2019
DEVERE DR	STRE	WSSC - Stream Restoration	3.0	12/31/2019
DOMER AVE	STRE	WSSC - Stream Restoration	2.5	12/31/2019
EAST WAYNE AVE	STRE	WSSC - Stream Restoration	2.0	12/31/2019
EMORY LANE	STRE	WSSC - Stream Restoration	1.5	12/31/2019
FLOWER AVE	STRE	WSSC - Stream Restoration	3.5	12/31/2019
GLEN ROAD	STRE	WSSC - Stream Restoration	0.5	12/31/2019
Glenstone Stream Restoration	STRE	Stream Restoration	66.0	12/31/2019
Greentree Wssc task order 10 - 1	STRE	WSSC - Stream Restoration	1.5	12/31/2019
Greentree Wssc task order 10 - 2	STRE	WSSC - Stream Restoration	1.0	12/31/2019
Grotto Lane - 1	STRE	WSSC - Stream Restoration	6.5	12/31/2019
Grotto Lane - 2	STRE	WSSC - Stream Restoration	1.0	12/31/2019

Table 1: Impervious Surface Restoration Projects Scheduled for Completion Prior to December 31, 2020				
Structure Name	Structure Type	Restoration Type	Proposed ISR Credit	Anticipated Completion
HEATHERHILL RD	STRE	WSSC - Stream Restoration	0.3	12/31/2019
LAKE POTOMAC	STRE	WSSC - Stream Restoration	2.5	12/31/2019
LITTLE FALLS PKWY	STRE	WSSC - Stream Restoration	1.0	12/31/2019
LOWER BOOZE CREEK	STRE	WSSC - Stream Restoration	4.5	12/31/2019
MCALPINE	STRE	WSSC - Stream Restoration	2.0	12/31/2019
Mills Farm SWM Retrofit	EDSD	SW POND RETRO	11.7	12/31/2019
MORRIS PARK (A)	STRE	WSSC - Stream Restoration	0.3	12/31/2019
MORRIS PARK (B)	STRE	WSSC - Stream Restoration	0.3	12/31/2019
Northlake Apartments	EDSD	SW POND RETRO	6.0	12/31/2019
Northwood Presbyterian Church	LID	LID	0.5	12/31/2019
PARK VALLEY RD	STRE	WSSC - Stream Restoration	3.5	12/31/2019
PARKEDGE DR	STRE	WSSC - Stream Restoration	5.0	12/31/2019
PARKSIDE	STRE	WSSC - Stream Restoration	0.8	12/31/2019
Potomac Chase SWM Retrofit	EDSW	SW POND RETRO	29.6	12/31/2019
PROSPECT ST	STRE	WSSC - Stream Restoration	0.8	12/31/2019
Pueblo Road	EDSD	SW POND RETRO	42.8	12/31/2019
Quail Valley 2 Infiltration Berm Concept	ESDIB	SW POND RETRO	14.4	12/31/2019
SHANNANDALE DR	STRE	WSSC - Stream Restoration	3.0	12/31/2019
Sherwood Elementary School	LID	LID	0.3	12/31/2019
SLIGO CREEK PKWY	STRE	WSSC - Stream Restoration	1.0	12/31/2019
Thornley court task order 15 Wssc consent decree	STRE	WSSC - Stream Restoration	3.3	12/31/2019
TIBER COURT	STRE	WSSC - Stream Restoration	3.0	12/31/2019
TITAN WAY	STRE	WSSC - Stream Restoration	0.8	12/31/2019
University Towers	LID	LID	4.2	12/31/2019

Table 1: Impervious Surface Restoration Projects Scheduled for Completion Prior to December 31, 2020				
Structure Name	**Structure Type**	**Restoration Type**	**Proposed ISR Credit**	**Anticipated Completion**
VEIRS MILL RD	STRE	WSSC - Stream Restoration	2.0	12/31/2019
VFD	STRE	WSSC - Stream Restoration	1.0	12/31/2019
WESTWOOD DR	STRE	WSSC - Stream Restoration	0.8	12/31/2019
WORTH AVE	STRE	WSSC - Stream Restoration	4.3	12/31/2019
Urban Tree Canopy Expansion	N/A	Alternative BMPs	21.0	12/31/2020

Table 2: BMPs Missing Current or Future Inspection Information							
Structure ID	Structure Name	Structure Type	Approval Date	Built Date	Last Inspection	Next Inspection	Status
MO15969	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO15973	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16020	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16021	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16022	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16023	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16024	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16025	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16026	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16027	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16028	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16029	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16030	Bethesda Country Club	DW	2/6/2008	12/3/2009	5/29/2018	5/1/2021	Installed
MO16311	Bethesda Country Club	DW	12/18/2007	1/11/2010	5/29/2018	5/1/2021	Installed
MO16312	Bethesda Country Club	DW	12/18/2007	1/11/2010	5/29/2018	5/1/2021	Installed
MO16313	Bethesda Country Club	DW	12/18/2007	1/11/2010	5/29/2018	5/1/2021	Installed
MO16314	Bethesda Country Club	DW	12/18/2007	1/11/2010	5/29/2018	5/1/2021	Installed
MO16315	Bethesda Country Club	DW	12/18/2007	1/11/2010	5/29/2018	5/1/2021	Installed
MO16549	Won Buddhism	DW	3/4/2008	10/9/2009	4/12/2018	3/1/2021	Installed
MO16550	Won Buddhism	DW	3/4/2008	10/9/2009	4/12/2018	3/1/2021	Installed
MO16551	Won Buddhism	DW	3/4/2008	10/9/2009	4/12/2018	3/1/2021	Installed
MO16926	Wendy's Colesville	DW	12/22/2009	3/4/2011	5/24/2017	5/1/2020	Installed
MO17087	Silverwood	DW	1/9/2006	12/9/2009	9/8/2017	6/1/2020	Installed
MO17261	Ivymount School Annex	ESDDW	2/2/2011	11/9/2011	7/9/20188	6/1/2021	Installed

Table 2: BMPs Missing Current or Future Inspection Information							
Structure ID	Structure Name	Structure Type	Approval Date	Built Date	Last Inspection	Next Inspection	Status
MO17262	Ivymount School Annex	ESDDW	2/2/2011	11/9/2011	7/9/2018	6/1/2021	Installed
MO17263	Ivymount School Annex	ESDDW	2/2/2011	11/9/2011	7/9/2018	6/1/2021	Installed
MO17264	Ivymount School Annex	ESDDW	2/2/2011	11/9/2011	7/9/2018	6/1/2021	Installed
MO17265	Ivymount School Annex	ESDDW	2/2/2011	11/9/2011	7/9/2018	6/1/2021	Installed
MO17266	Ivymount School Annex	ESDDW	2/2/2011	11/9/2011	7/9/2018	6/1/2021	Installed
MO17321	River Plantation	DW	5/21/2009	12/20/2010	5/30/2018	10/1/2019	Installed
MO17327	Randolph Manor	DW	8/20/2003	5/17/2011	9/8/2017	6/1/2020	Installed
MO17328	Randolph Manor	DW	8/20/2003	5/17/2011	9/8/2017	6/1/2020	Installed
MO17329	Randolph Manor	DW	8/20/2003	5/17/2011	9/8/2017	6/1/2020	Installed
MO17392	River Plantation	DW	5/21/2009	12/20/2010	5/30/2018	10/1/2019	Installed
MO17393	River Plantation	DW	5/21/2009	12/20/2010	5/30/2018	10/1/2019	Installed
MO17394	River Plantation	DW	5/21/2009	12/20/2010	5/30/2018	10/1/2019	Installed
MO17395	River Plantation	DW	5/21/2009	12/20/2010	5/30/2018	10/1/2019	Installed
MO17807	Dennis Avenue West SWM#27B	BR	3/27/2013	3/27/2013	3/13/2018	3/1/2020	Installed
MO18050	Sligo Park Hills SWM#26A	ESDPERMP	10/22/2012	1/27/2014	3/23/2018	5/1/2020	Installed
MO18170	Oakland Terrace Elementary	BR	12/8/2000	12/8/2000	12/12/2017	5/1/2020	Installed
MO18171	Sherwood Elementary School	BR	4/17/2009	3/11/2014	12/14/2017	6/1/2020	Installed
MO18177	Sherwood Elementary School	FlSp	4/17/2009	3/11/2014	7/14/2017	7/1/2020	Installed
MO18366	Sligo Park Hills #223	ESDPERMP	7/1/2014	11/18/2014	12/18/2017	5/1/2020	Installed
MO18367	Sligo Park Hills #225	ESDPERMP	7/1/2014	11/18/2014	12/18/2017	5/1/2020	Installed
MO18396	Donnybrook LID #12	ESDSW	10/20/2014	12/5/2014	3/15/2018	5/1/2020	Installed

Table 2: BMPs Missing Current or Future Inspection Information

Structure ID	Structure Name	Structure Type	Approval Date	Built Date	Last Inspection	Next Inspection	Status
MO18397	Donnybrook LID #11	ESDSW	10/20/2014	12/5/2014	3/15/2018	5/1/2020	Installed
MO18439	The Solana Olney	ESDDW	6/10/2011	7/1/2013	7/9/2018	6/1/2021	Installed
MO18440	The Solana Olney	ESDDW	6/10/2011	7/1/2013	7/9/2018	6/1/2021	Installed
MO18441	The Solana Olney	ESDDW	6/10/2011	7/1/2013	7/9/2018	6/1/2021	Installed
MO18442	The Solana Olney	ESDDW	6/10/2011	7/1/2013	7/9/2018	6/1/2021	Installed
MO18443	The Solana Olney	ESDDW	6/10/2011	7/1/2013	7/9/2018	6/1/2021	Installed
MO18444	The Solana Olney	ESDDW	6/10/2011	7/1/2013	7/9/2018	6/1/2021	Installed
MO18947	Griffiths Add. To Woodside Park	ESDDW	3/15/2012	7/19/2012	7/10/2017	7/1/2020	Installed
MO19063	Edgemoor	ESDDW	10/11/2011	9/24/2012	7/9/2018	6/1/2021	Installed
MO19064	Edgemoor	ESDDW	10/11/2011	9/24/2012	7/9/2018	6/1/2021	Installed
MO19065	Edgemoor	ESDDW	10/11/2011	9/24/2012	7/9/2018	6/1/2021	Installed
MO19066	Edgemoor	ESDDW	10/11/2011	9/24/2012	7/9/2018	6/1/2021	Installed
MO19067	Edgemoor	ESDDW	10/11/2011	9/24/2012	7/9/2018	6/1/2021	Installed
MO19068	Edgemoor	ESDDW	10/11/2011	9/24/2012	7/9/2018	6/1/2021	Installed
MO19411	Donnybrook LID #13	SW	8/28/2008	1/29/2015	12/12/2017	5/1/2020	Installed
MO19733	Gold Mine Crossing	FlSp	11/30/1992	1/14/2009	12/21/2015	9/1/2018	Installed
MO19778	Gold Mine Crossing	FlSp	11/30/1992	1/14/2009	12/21/2015	9/1/2018	Installed
MO16014	Alpine Forest	DW	2/24/2006	2/18/2009	2/18/2009	N/A	Withdrawn
MO16015	Alpine Forest	DW	2/24/2006	2/18/2009	2/18/2009	N/A	Withdrawn
MO16516	Heritage Christian Church	DW	5/27/2008	5/24/2010	5/24/2010	N/A	Withdrawn
MO16552	Heritage Christian Church	DW	5/27/2008	5/24/2010	5/24/2010	N/A	Withdrawn
MO16553	Heritage Christian Church	DW	5/27/2008	5/24/2010	5/24/2010	N/A	Withdrawn
MO17363	Saint Stephens Church	DW	1/23/2008	10/26/2009	10/26/2009	N/A	Withdrawn
MO17364	Saint Stephens Church	DW	1/23/2008	10/26/2009	10/26/2009	N/A	Withdrawn

Table 2: BMPs Missing Current or Future Inspection Information							
Structure ID	Structure Name	Structure Type	Approval Date	Built Date	Last Inspection	Next Inspection	Status
MO19609	Franklin Knolls LID #52 TB	ESD	8/28/2008	1/29/2015	10/29/2015	N/A	Withdrawn
MO19612	Franklin Knolls LID #58B TB	OTH	8/28/2008	1/29/2015	10/29/2015	N/A	Withdrawn

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horaclo Tablada, Deputy Secretary

July 6, 2018

Mr. Frank Dawson
Chief, Watershed Management
Montgomery County Department of Environmental Protection
255 Rockville Pike, Suite 120
Rockville, MD 20850

Dear Mr. Dawson:

The Maryland Department of the Environment (the Department) has conducted a review of Montgomery County's (County) Supplemental Environmental Project (SEP), which is part of the County's municipal separate storm sewer system (MS4) permit Consent Decree, Montgomery County Circuit Court, Case # 445684-V. The SEP will consist of the installation of two bioretention facilities and a rain garden at the Olney Elementary School in Olney, MD. These facilities will treat 2.26 acres of impervious area with an estimated construction cost of $581,203.

On May 25, 2018, after an initial review of County SEP materials, the Department requested additional design information, computations, and how the project would be integrated into the learning experience of the students at the school. The County submitted the requested documents on June 7, 2018. On June 25, 2018, the Department, accompanied by County personnel, conducted a field visit of the Olney Elementary School site as part of a larger review of the County's watershed restoration program.

Upon review of the supplemental materials and as a result of the June 25th field visit, the Department formally approves the County's SEP under the condition that it provide more details on how these facilities will be integrated into the environmental education curriculum at Olney Elementary School. If you have any questions, feel free to contact me at either 410-537-3543 or raymond.bahr@maryland.gov.

Sincerely,

Raymond P Bahr
Deputy Program Manager
Sediment, Stormwater, and Dam Safety Program

cc: Amy Stevens, Department of Environmental Protection, Montgomery County

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

July 30, 2018

Patty Bubar
Acting Director
Montgomery County Department of Environmental Protection
255 Rockville Pike, Suite 120
Rockville, MD 20850

Dear Ms. Bubar:

The Maryland Department of the Environment (the Department) acknowledges receipt of the submittals provided by Montgomery County (the County) as part of the Consent Decree signed by both parties on April 13, 2018. Section II of the Consent Decree, Corrective Actions, required the County to provide the following materials to the Department within 90 days of implementation:

- A detailed annual milestone schedule for completion by December 31, 2020, of the Impervious Surface Restoration Plan requirement set forth in Part III.G.2 of the County's municipal separate storm sewer system permit.
- A detailed description and annual milestone schedule for completion of the Supplemental Environmental Projects by December 31, 2020.
- A proposal and schedule for review and approval, pursuant to Part III.E.1.a of the permit, for the submission of inspection data regarding the 71 best management practices that do not have current or future inspection information.

The above outlined materials were submitted by the County in a July 11, 2018 letter to the Department, meeting the 90-day requirement under Section II. The Department has reviewed these materials. This letter and the attached Enclosure serve as the formal approval by the Department of the County's schedules and goals outlined in its July 11, 2018 letter. The Department requests that the County continue to provide updates on the implementation of these initiatives. If you have any questions or concerns, please contact me at 410-537-3897, or Ms. Jennifer Smith, Program Manager, Sediment, Stormwater and Dam Safety Program at jenniferm.smith@maryland.gov.

Sincerely,

Lynn Buhl

Lynn Buhl
Assistant Secretary
Maryland Department of the Environment

Enclosure

Enclosure

Approval of Montgomery County's Schedules for the Implementation of Actions as Required by Section II of the Consent Decree

July 27, 2018

Schedule for completion of the impervious surface restoration plan (ISRP) requirement

Section II, Paragraph 3 of the Consent Decree required Montgomery County ("the County") to submit to the Maryland Department of the Environment ("the Department"), for review and approval, a detailed annual milestone schedule for completion of the ISRP requirement set forth in Part III.G.2 of the County's municipal separate storm sewer system (MS4) permit by December 31, 2020. This schedule was provided by the County on page 2 of a 14-page July 11, 2018 letter to the Department. The County also submitted a list of restoration projects scheduled for completion by December 31, 2020 on pages 6-10 of the letter.

The County reported the restoration of 2,927 acres of impervious surface in its FY2017 Annual Report. The Department's review of the FY2017 Annual Report will serve as the formal approval of this value. The County may therefore adhere to its proposed schedule responsive to the Consent Decree and should continue to report on the progress of implementation in subsequent Annual Reports.

Schedule for completion of the supplemental environmental project (SEP)

Section II, Paragraph 4 of the Consent Decree required the County to submit to the Department, for review and approval, a detailed description and annual milestone schedule for completion of the SEP by December 31, 2020. The Department previously approved the County's SEP in a July 6, 2018 letter on condition that "...the County provide more details on how [the proposed bioretention and rain garden facilities] will be integrated into the environmental education curriculum at Olney Elementary School." The County outlined a preliminary schedule for implementation of the SEP in the July 11, 2018 letter on pages 2-3, including "[s]ubstantial completion of the Olney Elementary School project, including the posting of interpretive signage" by December 31, 2018, as well as a "ribbon cutting ceremony with partners (tentative.)" in October/November 2018 and "[d]evelopment of a schedule of educational activities at Olney Elementary School" by March 31, 2019. The Department is in concurrence with the County's initiatives and requests that the County provide updates on the implementation of the SEP, including signage and development of educational activities, in accordance with the schedule outlined in its July 11, 2018 letter.

Schedule for submission of missing best management practice (BMP) inspection data

Section II, Paragraph 6 of the Consent Decree required the County to submit to the Department, for review and approval, a schedule for the submission of inspection data regarding the 71 BMPs that do not have current or future inspection information. The County submitted this information as a spreadsheet on pages 11-14 in the July 11, 2018 letter. On page 4 of the letter, the County

states: "Of these 71 BMPs, nine are no longer in service and have been withdrawn from the inventory. As a result, they will no longer be inspected and are not being used as credit toward restoration of impervious area. Inspection dates are provided for the remaining 62 BMPs." The County also outlines steps it is taking to refine and resolve this issue within its urban BMP database. According to the spreadsheet on pages 11-14, all 62 BMPs have had an inspection in the last three years (as of the date of this Enclosure), and have a next inspection date scheduled between 2019 and 2021. The Department approves the County's schedule as outlined, and this submission satisfies the requirement under Section II, Paragraph 6 of the Consent Decree.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Tue, 21 Aug 2018 18:55:03 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Stevens, Amy" <Amy.Stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Gill, Joseph P." <JPGill@co.pg.md.us>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "jjoiner@frederickcountymd.gov" <jjoiner@frederickcountymd.gov>
Cc: "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Bennett, Katherine" <Katherine.Bennett@montgomerycountymd.gov>; "Maldonado, Jerry G." <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: Proposed Sept 5 MDE meeting agenda, various information items
Attachments: MOCO Consent Decree Response Letter to MDE_FINAL_Red.pdf, MDE Response 07_30_1815_52_52DOC.PDF, MACO NPDES Permit Presenation - Jennifer Smith-August 2018.pdf

MD MS4 managers,

Here is a proposed agenda for our Sept. 5 meeting with MDE.

1. Introductions

2. Status of modification requests for allowing trading in current permits (group)

3. Schedule for developing new permits (MDE)

4. Response to MS4 group comments of May 30 (MDE)

5. Gap analysis status (MDE)

6. Flexibility: restoration crediting clarification/pilot alternative practices (MDE)

At this point, I don't propose to try to squeeze in a pre-MDE meeting planning call ahead of the Sept. 5 meeting next week, when many folks will still be on vacation. I foresee the need for an internal meeting after we meet with MDE, to decide if the group will try to develop any proposals in response to what MDE is likely to seek in the next permit.

FYI, Montgomery staff has provided the group with copies of the implementation schedules and other documentation the county was required to submit under its consent decree as well as MDE's response to these documents (see attached .pdfs)

Also FYI, attached is Jennifer Smith's presentation from last week's MACo conference. You may want to note slide #6, showing progress toward the ISR requirement and which I presume is derived from annual report submissions. Item #5 in the proposed agenda shows up on slide #9.

Karl Berger

Principal Environmental Planner

Metropolitan Washington Council of Governments

202-962-3350

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 23 Jul 2018 14:38:44 +0000
To: "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>
Cc: "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>; "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "stewart.comstock@maryland.gov" <stewart.comstock@maryland.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>
Subject: Next meeting with Maryland Phase I technical managers group

Lee,

There are several items on which the members of the Maryland Phase I technical managers' group are hoping to hear from you by the time of our next meeting. These include a response to our permit proposals (as a provided in the MACo letter of May 30, 2018) and your thoughts about what MDE will include in the tentative determination draft. We also could build a meeting around the analysis of what will be needed for the state to meet its Chesapeake Bay TMDL obligations for 2025, which will inform the reduction requirements of the new permit.

The group last met with you and other MDE staff on May 1. We have had some discussion about meeting again in the latter part of August, which will be particularly opportune if we have updates to discuss by then.

We understand that MDE's timetable for issuing the new Phase I permit has shifted several months into 2019, which gives us more time to work together on its content. However, it's also important that MDE provide certainty on new permit obligations as soon as possible, given the length of time it takes to initiate and complete restoration projects.

Please let me know about possible meeting dates in August, perhaps after the MACo conference sessions on Aug. 17, as well as any new information you will have to discuss.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MARYLAND Association of COUNTIES

November 16, 2018

Ben Grumbles
Secretary
Maryland Department of the Environment
Montgomery Park Business Center
1800 Washington Blvd.
Baltimore, MD 21230

Dear Secretary Grumbles:

The Maryland Association of Counties (MACo) and the technical managers of Maryland's Phase I Municipal Separate Storm Sewer System (MS4) permittees (MS4 jurisdictions) respectfully request that the Maryland Department of the Environment (MDE) clarify existing guidance to remove "impervious acre equivalent" load caps when crediting the progress of practices toward meeting the impervious surface reduction (ISR) requirement in current permits. In addition, we request clarification of the calculation of the impervious acre equivalent calculation for stream restoration practices.

Both MACo and the MS4 jurisdictions appreciate the open communication and positive working relationship we have with MDE and hope that these issues can be resolved promptly.

The Case for Removing Impervious Area Caps

Recent discussions between the MS4 jurisdictions and MDE have brought to light an inconsistency in MDE's MS4 Accounting Guidance which needs to be addressed swiftly and decisively to not hamper Maryland's progress toward achieving the Chesapeake Bay and local TMDLs, as well as local progress toward MS4 restoration targets. Based on these recent discussions, we understand MDE staff is considering this issue. The following comments provide the MACo and Phase I MS4 jurisdiction perspective.

Impervious area caps have negative consequences because they artificially limit the ability of MS4 jurisdictions to optimize project effectiveness and pollution reductions at a time when both MS4 jurisdictions and the State should be looking for every opportunity to maximize progress toward the 2025 Chesapeake Bay TMDL goals.

169 Conduit Street, Annapolis, MD 21401
410.269.0043 BALT/ANNAP ◆ 301.261.1140 WASH DC ◆ 410.268.1775 FAX
www.mdcounties.org

The artificial imposition of "actual impervious area" caps on the crediting of best management practices (BMP) implementation also creates a perception that Maryland's MS4 jurisdictions are making less progress in reducing pollution than they actually are. By reducing the amount of ISR credit available from certain practices, the cap also threatens to increase the cost of meeting MS4 permit requirements.

Precedence in Guidance

Since the original publication of "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated" by MDE in August 2014, there has been a means to provide more ISR credit than the actual impervious area in a BMP's drainage area for certain BMPs. To create an "incentive for extra credit," this method allows practices that treat up to the 2.6-inch rain event to receive up to 140 percent of the impervious acre credit for conventional (i.e., runoff reduction and stormwater treatment) stormwater practices. This allowance has, in many cases, led to the optimization of retrofits of conventional stormwater management practices in the MS4 restoration work conducted to date.

In the case of "alternative urban BMPs" (e.g., land conversion, street sweeping, stream restoration and shoreline management), the guidance includes no actual impervious area caps on the "impervious acre equivalent" that can be treated, instead deferring to a TN/TP/TSS load reduction metric that can be translated into the equivalent impervious acre reduction number.

Disincentivizing Pollution Reduction and Habitat Restoration Work

Several of these alternative urban BMPs (e.g., stream restoration, outfall restoration, shoreline management), actually do treat not only pollutants from the practice's drainage area, but also an active and significant pollution source (e.g., bank erosion) at the point of origin. Placing actual impervious area caps on the impervious acre equivalent that can be derived from this work not only limits the work's apparent "cost effectiveness" (i.e., acres treated/total cost), it also disincentivizes the implementation of such practices in areas where actual pollution loading is high but actual impervious area is low. This is also true in locations where drainage areas may be small, but pollution loading is high as a result of outfall discharges onto steep slopes or erosive soils.

Nitrogen, phosphorus, and sediment pollution are not the only water quality impairments that stream restoration and shoreline management directly address. Local water quality across Maryland is also impaired by poor physical habitat. The 303d list shows many water bodies impaired by habitat modification: 18 watersheds are listed for channelization and 11 are listed for lack of riparian buffer. These impaired water bodies cannot be restored by practices that only reduce pollutant loads; their physical habitat also must be repaired. Stream

restoration, outfall restoration and shoreline management directly address physical impairments by adding riparian buffers and eliminating channelization, restoring degraded aquatic habitats that cannot support their designated uses with high quality physical habitat.

Handicapping MS4 Progress

There are already several ways in which MDE makes it more difficult for local jurisdictions in Maryland to achieve MS4 progress than is the case for local governments in neighboring states. For instance, MDE doesn't give local governments ISR credit for extended detention or dry pond facilities for MS4 purposes (although the state itself takes Bay TMDL credit for nutrient and sediment reduction from those practices). Lack of such crediting is also a negative incentive for jurisdictions to use these practices to improve channel protection and reduce channel erosion.

Capping the "impervious area equivalent" of alternative urban BMPs, particularly stream and outfall restoration, represents a significant constraint on the ability of local governments in Maryland to demonstrate real pollution-reducing progress in their MS4 permit work. Several jurisdictions in Maryland already have completed significant amounts of this stream and outfall work; most have even more in the pipeline. It is a detriment to both local MS4s and MDE to put artificial caps in place and perpetuates a notion that Maryland's MS4s are doing "less than their fair share," when, in fact, Maryland's Phase I jurisdictions are doing more stormwater work on a per capita basis than just about any other region of the country.

Request

We ask that MDE promptly issue a clarification to the existing guidance that "impervious acre equivalent" load caps do not apply to all "alternative urban BMPs" for the purpose of documenting ISR progress.

The Case for Prompt Clarification of the Impervious Acre Equivalent Calculation

Participants in the Accounting Guidance workgroup recently received new numbers from MDE staff on calculating impervious acre equivalencies for stream restoration BMPs that represent a very significant change from previous calculations. Because stream restoration is so critical to many jurisdictions' stormwater restoration efforts, it is important to pin down what the equivalency will be going forward. These numbers will have a major impact on calculating compliance with MS4 permit requirements, as well as WIP and TMDL goals. They will also have an impact on which BMPs jurisdictions will choose to implement in their next permits, for which planning is well underway.

Request

We need clear direction from MDE on the impervious acre equivalency calculation as soon as possible to conduct our programs efficiently.

Potential Impervious Acre Equivalency Calculations

New

Pollutant	Phase 6 Δ (Impervious-Forest) (lbs/acre)	Stream Restoration (lbs/lf)	Phase 6 IA Equivalent (Stream Rest/Δ) (acres/lf)
TN	13.250	0.075	0.006
TP	0.670	0.068	0.101
TSS	1,720.820	248.000	0.144
Average			0.084

Old

Pollutant	Phase 5 Δ (Impervious-Forest) (lbs/acre)	Stream Restoration (lbs/lf)	Phase 5 IA Equivalent (Stream Rest/Δ) (acres/lf)
TN	7.690	0.075	0.010
TP	1.910	0.068	0.036
TSS	860.000	248.000	0.288
Average			0.111

Thank you for your consideration on these important matters. Please do not hesitate to contact me at 410.269.0043 or lknapp@mdcounties.org if you have questions or wish to discuss further.

Sincerely,

Leslie Knapp Jr.

Leslie Knapp, Jr.
Legal and Policy Counsel
MACo

CC: Lynn Buhl, Assistant Secretary, MDE
D. Lee Currey, Water and Science Administration Director, MDE

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 19 Nov 2018 16:34:15 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "'JPGill@co.pg.md.us'" <JPGill@co.pg.md.us>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "jjoiner@frederickcountymd.gov" <jjoiner@frederickcountymd.gov>
Cc: "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Bennett, Katherine" <Katherine.Bennett@montgomerycountymd.gov>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: Stream restoration crediting letter, Accounting Guidance update, Doodle poll for next call date
Attachments: Letter 2018-11-16 Letter to MDE on MS4 Crediting Procedures (MACo).pdf, BMP_IE_Calculations_101618.xlsx, MS4 Guidance -- New BMP List - determinations 9_12_2018.xlsx

MS4 managers,

Here is an official copy of the letter re loading caps and stream restoration crediting that MACo sent on our behalf to MDE. I previously sent a draft version of the letter as an email attachment to Lee Currey and selected MDE stormwater staff on Nov. 5. As yet, I have heard nothing back from MDE.

On a related note, the next meeting of the Accounting Guidance advisory group will be Nov. 29 (which may be when we hear about the loading cap, etc. Although most folks have seen this information already, I am attaching two spreadsheets from the last meeting of this group, which lay out the ISR equivalence for currently approved practices and which describe a number of new BMPs that the workgroup members have proposed for crediting.

Now that the Advisory Group is focused on these critical crediting issues, we will try to have regular feedback between the full group and our representatives on the Advisory Group, which include Kim Grove, Rob Hirsch, Christine Buckley, Erik Michelson, Gail Engles and Amy Stevens/Kate Bennett. You can contact any of them with comments or questions. I also propose to hold a group conference call after the Nov. 29 meeting to have a debrief on the meeting and to decide on any consensus comments or other actions.

Here is a link to a Doodle poll with potential dates for such a group call in early December. Please provide preferences by Monday, Nov. 26.

https://doodle.com/poll/kyqer4mp547rgixf

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

BMP Practice	Total Nitrogen Load Reduction
Other Efficiency BMPs	
Advanced Grey Infrastructure Nutrient Discovery Program (IDDE)	0.001
Urban Forest Buffer Upland Acres	2.906
Algal Flow-ways	545
Algal Flow-ways (Monitored)	
Street Sweeping BMPs	
Advanced Sweeping Technology - 1 pass/12 weeks	0.000
Advanced Sweeping Technology - 1 pass/2 weeks	0.349
Advanced Sweeping Technology - 1 pass/4 weeks	0.175
Advanced Sweeping Technology - 1 pass/8 weeks	0.122
Advanced Sweeping Technology - 1 pass/week	0.524
Advanced Sweeping Technology - 2 pass/week	0.698
Advanced Sweeping Technology - fall 1 pass/1-2 weeks else monthly	0.349
Advanced Sweeping Technology - spring 1 pass/1-2 weeks else monthly	0.175
Mechanical Broom Technology - 1 pass/4 weeks	0.000
Mechanical Broom Technology - 1 pass/week	0.000
Mechanical Broom Technology - 2 pass/week	0.000
Load Reduction BMPs	
Urban Stream Restoration (per linear foot)	0.075
Stream Restoration Protocols	
Urban Shoreline Management (per foot)	0.048
Shoreline Management Protocols	
Storm Drain Cleaning	1.5
Storm Drain Cleaning - Organic (lbs/ton wet sediment)	4.4
Storm Drain Cleaning - Inorganic (lbs/ton wet sediment)	3.8
Oyster Aquaculture BMPs	
Diploid Oyster Aquaculture 2.25 Inches (per 1,000 oysters harvested)	0.00011
Diploid Oyster Aquaculture 3.0 Inches (per 1,000 oysters harvested)	0.00020
Diploid Oyster Aquaculture 4.0 Inches (per 1,000 oysters harvested)	0.00033
Diploid Oyster Aquaculture 5.0 Inches (per 1,000 oysters harvested)	0.00049
Diploid Oyster Aquaculture Greater 6.0 Inches (per 1,000 oysters harvested)	0.00068
Triploid Oyster Aquaculture 2.25 Inches (per 1,000 oysters harvested)	0.000132
Triploid Oyster Aquaculture 3.0 Inches (per 1,000 oysters harvested)	0.000287
Triploid Oyster Aquaculture 5.0 Inches (per 1,000 oysters harvested)	0.00097

Triploid Oyster Aquaculture Greater than 6.0 Inches (per 1,000 oysters harvested)	0.001477
Site-Specific Monitored Oyster Aquaculture	

Land Use Conversion BMPs

Urban Impervious to Turf	4.882
Urban Impervious to Tree Canopy over Impervious	0.881
Urban Impervious to Tree Canopy over Turf	7.539
Urban Impervious to Forest	13.25
Urban Impervious to Mixed Open	12.650
Urban Pervious (Turf) to Canopy over Turf	2.657
Urban Pervious (Turf) to Forest	8.373
Urban Pervious (Turf) to Mixed Open	7.768

Urban Forest Buffer - use appropriate LU conversion (ie turf->forest)

Septic BMPs

Septic Connections	10.573
Septic Denitrification-Conventional	5.570
Septic Denitrification-Enhanced	7.687
Septic Effluent - Enhanced	4.233
Septic Pumping	0.557
Septic Secondary Treatment Conventional	2.228
Septic Secondary Treatment Enhanced	5.570

Total Phosphorus Load Reduction	Total Suspended Soilds Load Reduction	TN Impervious Acre Equivalent	TP. Impervious Acre Equivalent	TSS Impervious Acre Equivalent	Equivalent Impervious Acre	Previous Impervious
0.003	0.000	0.000	0.005	0.000	**0.002**	
0.040	564.455	0.219	0.059	0.328	**0.202**	0.34
45		41.118	67.061		**54.089**	
0.008	35.360	0.000	0.013	0.021	**0.011**	0.07
0.042	194.479	0.026	0.063	0.113	**0.067**	0.07
0.025	106.079	0.013	0.038	0.062	**0.037**	0.07
0.017	70.720	0.009	0.025	0.041	**0.025**	0.07
0.067	282.878	0.040	0.100	0.164	**0.101**	0.07
0.084	371.278	0.053	0.125	0.216	**0.131**	0.07
0.042	176.799	0.026	0.063	0.103	**0.064**	0.07
0.034	123.759	0.013	0.050	0.072	**0.045**	0.07
0.000	1.768	0.000	0.000	0.001	**0.0003**	0.07
0.000	8.840	0.000	0.000	0.005	**0.002**	0.07
0.000	17.680	0.000	0.000	0.010	**0.003**	0.07
0.068	248	0.006	0.101	0.144	**0.084**	0.01
0.034	164	0.003588177	0.05010188	0.095303568	**0.050**	0.04
0.6	600	0.113	0.894	0.349	**0.452**	0.4
0.5	400	0.335	0.715	0.232	**0.428**	0.4
0.8	1400	0.285	1.252	0.814	**0.784**	0.4
0.00002	0	0.00001	0.00003	0.00000	**0.014**	
0.00002	0	0.00001	0.00003	0.00000	**0.016**	
0.00004	0	0.00002	0.00007	0.00000	**0.030**	
0.00004	0	0.00004	0.00007	0.00000	**0.034**	
0.00007	0	0.00005	0.00010	0.00000	**0.050**	
0.000022	0	0.00001	0.00003	0.00000	**0.014**	
0.000022	0	0.00002	0.00003	0.00000	**0.018**	
0.00011	0	0.00007	0.00016	0.00000	**0.079**	

0.000154	0	0.00011	0.00023	0.00000	**0.114**	
-0.328	1133.776	0.37	-0.49	0.66	**0.179**	0.75
-0.001	25.174	0.07	0.00	0.01	**0.027**	
-0.064	1221.320	0.57	-0.09	0.71	**0.395**	
0.671	1720.817	1	1	1	**1**	1
0.451	855.076	0.95	0.67	0.50	**0.708**	
0.265	87.543	0.20	0.39	0.05	**0.215**	
0.999	587.041	0.63	1.49	0.34	**0.821**	0.38
0.779	-278.701	0.59	1.16	-0.16	**0.528**	
0	0	0.797719741	0	0	**0.266**	0.39
0	0	0.420230119	0	0	**0.140**	0.26
0	0	0.579917564	0	0	**0.193**	0.26
0	0	0.31937489	0	0	**0.106**	
0	0	0.042023012	0	0	**0.014**	0.03
0	0	0.168092048	0	0	**0.056**	
0	0	0.420230119	0	0	**0.140**	

Notes

Based on aggregate urban pervious (turf only) loading rates. See "Efficiency BMPs" worksheet.
Based on weighted urban (pervious + impervious) loading rates. See "Efficiency BMPs" worksheet. Make sure to also add the Urban Forest Buffer BMP.
average lbs reduction default value from the Expert Panel Report. These are a permitted point source now, so they cannot be entered as a BMP
user can input monitored TN/TP reductions.

Based on road impervious-only loading rate (road impervious, no tree canopy). See "Efficiency BMPs" worksheet.

Provide the exact TN/TP/TSS reductions.

Provide the exact TN/TP/TSS reductions.
Based on previous defaults

**per 1,000 oysters harvested*

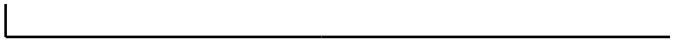
User can provide the exact TN/TP/TSS reductions (determined through monitoring)

TBD

Sector	BMPFullName	BMPShortName
Developed	Advanced Grey Infrastructure Nutrient Discovery Program (IDDE)	AdvancedGI
Developed	Advanced Sweeping Technology - 1 pass/12 weeks	SCP6
Developed	Advanced Sweeping Technology - 1 pass/2 weeks	SCP3
Developed	Advanced Sweeping Technology - 1 pass/4 weeks	SCP4
Developed	Advanced Sweeping Technology - 1 pass/8 weeks	SCP5
Developed	Advanced Sweeping Technology - 1 pass/week	SCP2
Developed	Advanced Sweeping Technology - 2 pass/week	SCP1
Developed	Advanced Sweeping Technology - fall 1 pass/1-2 weeks else monthly	SCP8
Developed	Advanced Sweeping Technology - spring 1 pass/1-2 weeks else monthly	SCP7
Developed	Mechanical Broom Technology - 1 pass/4 weeks	SCP11
Developed	Mechanical Broom Technology - 1 pass/week	SCP10
Developed	Mechanical Broom Technology - 2 pass/week	SCP9
Developed	Urban Forest Buffer Upland Acres	ForestBufUrbanEff
Developed	Floating Treatment Wetland 10% Coverage of Pond	FTW1
Developed	Floating Treatment Wetland 20% Coverage of Pond	FTW2
Developed	Floating Treatment Wetland 30% Coverage of Pond	FTW3
Developed	Floating Treatment Wetland 40% Coverage of Pond	FTW4
Developed	Floating Treatment Wetland 50% Coverage of Pond	FTW5
Septic	Septic Denitrification-Conventional	SepticDeCon
Septic	Septic Denitrification-Enhanced	SepticDeEnhance
Septic	Septic Effluent - Enhanced	septiceffenhance
Septic	Septic Pumping	SepticPump
Septic	Septic Secondary Treatment Conventional	SepticSecCon
Septic	Septic Secondary Treatment Enhanced	SepticSecEnhance

LoadSource	HydroGeomorphicRegion	AvgNitrogenEfficiencyPct %	AvgPhosphorusEfficiencyPct %
All	All	0.2	0.2
Impervious	All	0.00	1.00
Impervious	All	2.00	5.00
Impervious	All	1.00	3.00
Impervious	All	0.70	2.00
Impervious	All	3.00	8.00
MS4 Roads	All	4.00	10.00
MS4 Roads	All	2.00	5.00
MS4 Roads	All	1.00	4.00
Impervious	All	0.00	0.00
Impervious	All	0.00	0.00
Impervious	All	0.00	0.00
Developed Urban	All	25.00	50.00
Developed Urban	All	0.80	1.60
Developed Urban	All	1.70	3.30
Developed Urban	All	2.50	4.90
Developed Urban	All	3.30	6.50
Developed Urban	All	4.10	8.00
Septic	All	50.00	0.00
Septic	All	69.00	0.00
Septic	All	38.00	0.00
Septic	All	5.00	0.00
Septic	All	20.00	0.00
Septic	All	50.00	0.00

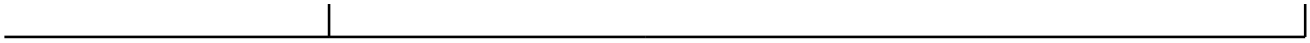
Nitrogen, Phosphorus, and Sediment efficiencies expressed as



AvgSedimentEfficiencyPct %	AvgNitrogenEfficiencyPct	AvgPhosphorusEfficiencyPct	AvgSedimentEfficiencyPct
0.00	0.002	0.002	0
2.00	0	0.01	0.02
11.00	0.02	0.05	0.11
6.00	0.01	0.03	0.06
4.00	0.007	0.02	0.04
16.00	0.03	0.08	0.16
21.00	0.04	0.1	0.21
10.00	0.02	0.05	0.1
7.00	0.01	0.04	0.07
0.10	0	0	0.001
0.50	0	0	0.005
1.00	0	0	0.01
50.00	0.25	0.5	0.5
2.30	0.008	0.016	0.023
4.70	0.017	0.033	0.047
7.00	0.025	0.049	0.07
9.20	0.033	0.065	0.092
11.50	0.041	0.08	0.115

0.00	0.5	0	0
0.00	0.69	0	0
0.00	0.38	0	0
0.00	0.05	0	0
0.00	0.2	0	0
0.00	0.5	0	0

s a percentage.	Nitrogen, Phosphorus, and Sediment efficiencies converted to a ratio (divide the percentage by 100).

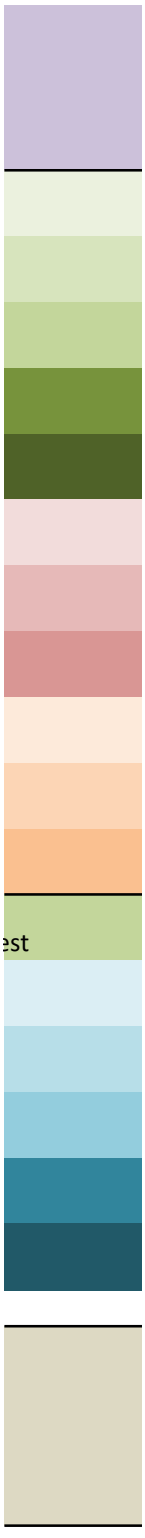


TN Loading Rate	TP Loading Rate	TSS Loading Rate	TN Impervious Equiv	TP Impervious Equiv	TSS Impervious Equiv	Avg Imp Equiv	Old Imp Equiv
0.02	0.00	0.00	0.001	0.003	0.000	**0.002**	
0.00	0.01	35.36	0.000	0.013	0.021	**0.011**	0.07
0.35	0.04	194.48	0.026	0.063	0.113	**0.067**	0.07
0.17	0.03	106.08	0.013	0.038	0.062	**0.037**	0.07
0.12	0.02	70.72	0.009	0.025	0.041	**0.025**	0.07
0.52	0.07	282.88	0.040	0.100	0.164	**0.101**	0.07
0.70	0.08	371.28	0.053	0.125	0.216	**0.131**	0.07
0.35	0.04	176.80	0.026	0.063	0.103	**0.064**	0.07
0.17	0.03	123.76	0.013	0.050	0.072	**0.045**	0.07
0.00	0.00	1.77	0.000	0.000	0.001	**0.000**	0.07
0.00	0.00	8.84	0.000	0.000	0.005	**0.002**	0.07
0.00	0.00	17.68	0.000	0.000	0.010	**0.003**	0.07
2.91	0.04	564.45	0.219	0.059	0.328	**0.202**	
0.09	0.00	25.96	0.007	0.002	0.015	**0.008**	
0.20	0.00	53.06	0.015	0.004	0.031	**0.017**	
0.29	0.00	79.02	0.022	0.006	0.046	**0.025**	
0.38	0.01	103.86	0.029	0.008	0.060	**0.032**	
0.48	0.01	129.82	0.036	0.010	0.075	**0.040**	
5.57	0.00	0.00	0.420	0.000	0.000	**0.140**	0.26
7.69	0.00	0.00	0.580	0.000	0.000	**0.193**	0.26
4.23	0.00	0.00	0.319	0.000	0.000	**0.106**	
0.56	0.00	0.00	0.042	0.000	0.000	**0.014**	0.03
2.23	0.00	0.00	0.168	0.000	0.000	**0.056**	
5.57	0.00	0.00	0.420	0.000	0.000	**0.140**	

Loading Rate = Efficiency x Loading rate for the specific land use the BMP is applied to. The land use differs between Efficiency BMPs. See the Notes column for more information.	Impervious acre equivalent is determined by dividing the loating rates by the impverious-to-forest conversion delta (Impervious loading rate - Forest loading rate) for each pollutant.

Note
Based on Expert Panel report- 1% efficiency applied to 20% (=0.2% efficiency via CAST Source Data) of TN&TP load. Calculated using only the urban pervious (turf without tree canopy) loading rate.
Calculated using the Aggregate Impervious Road loading rates
Calculated using the Aggregate Impervious Road loading rates
Calculated using the Aggregate Impervious Road loading rates
Calculated using the Aggregate Impervious Road loading rates
Calculated using the Aggregate Impervious Road loading rates
Calculated using the Aggregate Impervious Road loading rates
Calculated using the Aggregate Impervious Road loading rates
Calculated using the Aggregate Impervious Road loading rates
Calculated using the Aggregate Impervious Road loading rates
Calculated using the Aggregate Impervious Road loading rates
Calculated using the Aggregate Impervious Road loading rates
Calculated using a weighted urban loading rate
Calculated using a weighted urban loading rate
Calculated using a weighted urban loading rate
Calculated using a weighted urban loading rate
Calculated using a weighted urban loading rate
Calculated using a weighted urban loading rate
Calculated using a septic loading rate
Calculated using a septic loading rate
Calculated using a septic loading rate
Calculated using a septic loading rate
Calculated using a septic loading rate
Calculated using a septic loading rate

should be this plus the actual acres of buffer planted. If you plant 5 acres of forest buffer you also get the credit for turf -> fore


est

Sector	BMPFullName	BMPShortName	BMPUnitFullName	StateName
Developed	*Storm Drain Cleaning*	*StormDrainClean*	*Lbs of Nitrogen*	*All*
Natural	Diploid Oyster Aquaculture 2.25 Inches	DiploidOysters2.25	Oysters Harvested	All
Natural	Diploid Oyster Aquaculture 3.0 Inches	DiploidOysters3	Oysters Harvested	All
Natural	Diploid Oyster Aquaculture 4.0 Inches	DiploidOysters4	Oysters Harvested	All
Natural	Diploid Oyster Aquaculture 5.0 Inches	DiploidOysters5	Oysters Harvested	All
Natural	Diploid Oyster Aquaculture Greater 6.0 Inches	DiploidOysters6	Oysters Harvested	All
Natural	Site-Specific Monitored Oyster Aquaculture	MonitoredOysters	Lbs of Nitrogen	All
Natural	Site-Specific Monitored Oyster Aquaculture	MonitoredOysters	Lbs of Phosphorus	All
Natural	Algal Flow-way Non-Tidal Monitored	NonTideAftMon	Lbs of Nitrogen	All
Natural	Algal Flow-way Non-Tidal Monitored	NonTideAftMon	Lbs of Phosphorus	All
Natural	Algal Flow-way Non-Tidal Monitored	NonTideAftMon	Lbs of Sediment	All
Natural	Urban Shoreline Erosion Control Non-Vegetated	ShoreUrbNoVeg	Protocol 1: TN Lbs	All
Natural	Urban Shoreline Erosion Control Non-Vegetated	ShoreUrbNoVeg	Protocol 1: TP Lbs	All
Natural	Urban Shoreline Erosion Control Non-Vegetated	ShoreUrbNoVeg	Protocol 1: TSS Lbs	All
Natural	Urban Shoreline Erosion Control Vegetated	ShoreUrbVeg	Acres	All
Natural	Urban Shoreline Erosion Control Vegetated	ShoreUrbVeg	Protocol 1: TN Lbs	All
Natural	Urban Shoreline Erosion Control Vegetated	ShoreUrbVeg	Protocol 1: TP Lbs	All
Natural	Urban Shoreline Erosion Control Vegetated	ShoreUrbVeg	Protocol 1: TSS Lbs	All
Natural	Algal Flow-way Tidal Monitored	TideAftMon	Lbs of Nitrogen	All
Natural	Algal Flow-way Tidal Monitored	TideAftMon	Lbs of Phosphorus	All
Natural	Algal Flow-way Tidal Monitored	TideAftMon	Lbs of Sediment	All
Natural	Triploid Oyster Aquaculture 2.25 Inches	TriploidOysters2.25	Oysters Harvested	All
Natural	Triploid Oyster Aquaculture 3.0 Inches	TriploidOysters3	Oysters Harvested	All
Natural	Triploid Oyster Aquaculture 5.0 Inches	TriploidOysters5	Oysters Harvested	All
Natural	Triploid Oyster Aquaculture Greater than 6.0 Inches	TriploidOysters6	Oysters Harvested	All
Natural	*Urban Stream Restoration*	*UrbStrmRest*	*Feet*	*All*
Natural	*Urban Stream Restoration Protocols*	*UrbStrmRestPro*	*See examples (JMT etc)*	*All*
Natural	*Urban Shoreline Management*	*ShoreUrb*	*Feet*	*Maryland*
	Algal Flow-way default			

HydroGeomorphicRegion
All
All
All
All
All
All
All
All
All
All
All
All
All
All
All
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All
All
All
All
All
All
All
All
All
All
All

Nitrogen Reduction Factor

recalculate using new deltas - use 532 default lbs/ton rate - show example like stream restoration

0.000110
0.000198
0.000331
0.000485
0.000683
1.000000
0.000000
1.000000
0.000000
0.000000
1.000000
0.000000
0.000000
91.830000
1.000000
0.000000
0.000000
1.000000
0.000000
0.000000
0.000132
0.000287
0.000970
0.001477
0.075000

0.047560
545.000000

Phosphorus Reduction Factor	Sediment Reduction Factor					
0.000022	0.000000					
0.000022	0.000000					
0.000044	0.000000					
0.000044	0.000000					
0.000066	0.000000					
0.000000	0.000000					
1.000000	0.000000					
0.000000	0.000000					
1.000000	0.000000					
0.000000	1.000000					
0.000000	0.000000					
1.000000	0.000000					
0.000000	1.000000					
5.589000	6959.000000					
0.000000	0.000000					
1.000000	0.000000					
0.000000	1.000000					
0.000000	0.000000					
1.000000	0.000000					
0.000000	1.000000					
0.000022	0.000000	0.0100				per 1,000 harvested
0.000022	0.000000					
0.000110	0.000000					
0.000154	0.000000					
0.068000	*248.000000*					
0.033620	*164.000000*	*0.004*	*0.050*	*0.095*		
45.000000		*41.118*	*67.061*		54.089	

Sector	BMPFullName	BMPShortName
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Tree Planting	TreePlant
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Saturated Buffer	SaturatedBuffer
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Saturated Buffer	SaturatedBuffer
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Saturated Buffer	SaturatedBuffer
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Saturated Buffer	SaturatedBuffer
Natural	Wetland Enhancement	WetlandEnhance
Natural	Wetland Rehabilitation	WetlandRehabilitate
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain

Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Developed	Forest Buffer	ForestBufUrban
Developed	Forest Buffer	ForestBufUrban
Developed	Forest Planting	UrbanForPlant
Developed	Forest Planting	UrbanForPlant
Developed	Grass Buffers	UrbGrassBuffers
Developed	Grass Buffers	UrbGrassBuffers
Developed	Impervious Surface Reduction	ImpSurRed
Developed	Impervious Surface Reduction	ImpSurRed
Developed	Impervious Surface Reduction	ImpSurRed
Developed	Impervious Surface Reduction	ImpSurRed
Developed	Impervious Surface Reduction	ImpSurRed
Developed	Impervious Surface Reduction	ImpSurRed
Developed	Tree Planting - Canopy	UrbanTreePlant
Developed	Tree Planting - Canopy	UrbanTreePlant
Developed	Tree Planting - Canopy	UrbanTreePlant
Developed	Tree Planting - Canopy	UrbanTreePlant
Developed	Tree Planting - Canopy	UrbanTreePlant
Developed	Tree Planting - Canopy	UrbanTreePlant
Natural	Wetland Enhancement	WetlandEnhance
Natural	Wetland Rehabilitation	WetlandRehabilitate
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Saturated Buffer	SaturatedBuffer
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Forest Buffer-Streamside with Exclusion Fencing	ForestBuffExcl
Agriculture	Grass Buffer-Streamside with Exclusion Fencing	GrassBuffExcl
Agriculture	Forest Buffer-Narrow with Exclusion Fencing	ForestBuffExclNar
Agriculture	Grass Buffer-Narrow with Exclusion Fencing	GrassBuffExclNar
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Tree Planting	TreePlant
Septic	Septic Connection	SepticConnect

Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Saturated Buffer	SaturatedBuffer
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Saturated Buffer	SaturatedBuffer
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Saturated Buffer	SaturatedBuffer
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Saturated Buffer	SaturatedBuffer
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Saturated Buffer	SaturatedBuffer
Agriculture	Forest Buffer	ForestBuffers
Agriculture	Forest Buffer - Narrow	ForestBuffNarrow
Agriculture	Wetland Restoration - Floodplain	WetlandRestoreFloodplain
Agriculture	Wetland Restoration - Headwater	WetlandRestoreHeadwater
Agriculture	Wetland Creation - Floodplain	WetlandCreateFloodplain
Agriculture	Wetland Creation - Headwater	WetlandCreateHeadwater
Agriculture	Grass Buffer	GrassBuffers
Agriculture	Grass Buffer - Narrow	GrassBuffNarrow
Agriculture	Tree Planting	TreePlant
Agriculture	Saturated Buffer	SaturatedBuffer

FromLoadSource	ToLoadSource
Ag Open Space	True Forest
Ag Open Space	True Forest
Ag Open Space	Non-tidal Floodplain Wetland
Ag Open Space	Headwater or Isolated Wetland
Ag Open Space	Non-tidal Floodplain Wetland
Ag Open Space	Headwater or Isolated Wetland
Ag Open Space	True Forest
Double Cropped Land	True Forest
Double Cropped Land	True Forest
Double Cropped Land	Non-tidal Floodplain Wetland
Double Cropped Land	Headwater or Isolated Wetland
Double Cropped Land	Non-tidal Floodplain Wetland
Double Cropped Land	Headwater or Isolated Wetland
Double Cropped Land	Ag Open Space
Double Cropped Land	Ag Open Space
Double Cropped Land	True Forest
Double Cropped Land	Ag Open Space
Full Season Soybeans	True Forest
Full Season Soybeans	True Forest
Full Season Soybeans	Non-tidal Floodplain Wetland
Full Season Soybeans	Headwater or Isolated Wetland
Full Season Soybeans	Non-tidal Floodplain Wetland
Full Season Soybeans	Headwater or Isolated Wetland
Full Season Soybeans	Ag Open Space
Full Season Soybeans	Ag Open Space
Full Season Soybeans	True Forest
Full Season Soybeans	Ag Open Space
Grain with Manure	True Forest
Grain with Manure	True Forest
Grain with Manure	Non-tidal Floodplain Wetland
Grain with Manure	Headwater or Isolated Wetland
Grain with Manure	Non-tidal Floodplain Wetland
Grain with Manure	Headwater or Isolated Wetland
Grain with Manure	Ag Open Space
Grain with Manure	Ag Open Space
Grain with Manure	True Forest
Grain with Manure	Ag Open Space
Grain without Manure	True Forest
Grain without Manure	True Forest
Grain without Manure	Non-tidal Floodplain Wetland
Grain without Manure	Headwater or Isolated Wetland
Grain without Manure	Non-tidal Floodplain Wetland
Grain without Manure	Headwater or Isolated Wetland
Grain without Manure	Ag Open Space
Grain without Manure	Ag Open Space
Grain without Manure	True Forest
Grain without Manure	Ag Open Space
Headwater or Isolated Wetland	Headwater or Isolated Wetland
Headwater or Isolated Wetland	Headwater or Isolated Wetland
Leguminous Hay	True Forest
Leguminous Hay	True Forest
Leguminous Hay	Non-tidal Floodplain Wetland

Leguminous Hay	Headwater or Isolated Wetland
Leguminous Hay	Non-tidal Floodplain Wetland
Leguminous Hay	Headwater or Isolated Wetland
Leguminous Hay	Ag Open Space
Leguminous Hay	Ag Open Space
Leguminous Hay	True Forest
MS4 Turf Grass	True Forest
Non-Regulated Turf Grass	True Forest
MS4 Turf Grass	True Forest
Non-Regulated Turf Grass	True Forest
MS4 Turf Grass	MS4 Turf Grass
Non-Regulated Turf Grass	Non-Regulated Turf Grass
MS4 Tree Canopy over Impervious	MS4 Tree Canopy over Turf Grass
MS4 Buildings and Other	MS4 Turf Grass
MS4 Roads	MS4 Turf Grass
Non-Regulated Tree Canopy over Impervious	Non-Regulated Tree Canopy over Turf Grass
Non-Regulated Buildings and Other	Non-Regulated Turf Grass
Non-Regulated Roads	Non-Regulated Turf Grass
MS4 Buildings and Other	MS4 Tree Canopy over Impervious
MS4 Roads	MS4 Tree Canopy over Impervious
MS4 Turf Grass	MS4 Tree Canopy over Turf Grass
Non-Regulated Buildings and Other	Non-Regulated Tree Canopy over Impervious
Non-Regulated Roads	Non-Regulated Tree Canopy over Impervious
Non-Regulated Turf Grass	Non-Regulated Tree Canopy over Turf Grass
Non-tidal Floodplain Wetland	Non-tidal Floodplain Wetland
Non-tidal Floodplain Wetland	Non-tidal Floodplain Wetland
Other Agronomic Crops	True Forest
Other Agronomic Crops	True Forest
Other Agronomic Crops	Non-tidal Floodplain Wetland
Other Agronomic Crops	Headwater or Isolated Wetland
Other Agronomic Crops	Non-tidal Floodplain Wetland
Other Agronomic Crops	Headwater or Isolated Wetland
Other Agronomic Crops	Ag Open Space
Other Agronomic Crops	Ag Open Space
Other Agronomic Crops	True Forest
Other Agronomic Crops	Ag Open Space
Other Hay	True Forest
Other Hay	True Forest
Other Hay	Non-tidal Floodplain Wetland
Other Hay	Headwater or Isolated Wetland
Other Hay	Non-tidal Floodplain Wetland
Other Hay	Headwater or Isolated Wetland
Other Hay	Ag Open Space
Other Hay	Ag Open Space
Other Hay	True Forest
Pasture	True Forest
Pasture	Ag Open Space
Pasture	True Forest
Pasture	Ag Open Space
Pasture	Non-tidal Floodplain Wetland
Pasture	Headwater or Isolated Wetland
Pasture	Non-tidal Floodplain Wetland
Pasture	Headwater or Isolated Wetland
Pasture	True Forest
Septic	

Silage with Manure	True Forest
Silage with Manure	True Forest
Silage with Manure	Non-tidal Floodplain Wetland
Silage with Manure	Headwater or Isolated Wetland
Silage with Manure	Non-tidal Floodplain Wetland
Silage with Manure	Headwater or Isolated Wetland
Silage with Manure	Ag Open Space
Silage with Manure	Ag Open Space
Silage with Manure	True Forest
Silage with Manure	Ag Open Space
Silage without Manure	True Forest
Silage without Manure	True Forest
Silage without Manure	Non-tidal Floodplain Wetland
Silage without Manure	Headwater or Isolated Wetland
Silage without Manure	Non-tidal Floodplain Wetland
Silage without Manure	Headwater or Isolated Wetland
Silage without Manure	Ag Open Space
Silage without Manure	Ag Open Space
Silage without Manure	True Forest
Silage without Manure	Ag Open Space
Small Grains and Grains	True Forest
Small Grains and Grains	True Forest
Small Grains and Grains	Non-tidal Floodplain Wetland
Small Grains and Grains	Headwater or Isolated Wetland
Small Grains and Grains	Non-tidal Floodplain Wetland
Small Grains and Grains	Headwater or Isolated Wetland
Small Grains and Grains	Ag Open Space
Small Grains and Grains	Ag Open Space
Small Grains and Grains	True Forest
Small Grains and Grains	Ag Open Space
Specialty Crop High	True Forest
Specialty Crop High	True Forest
Specialty Crop High	Non-tidal Floodplain Wetland
Specialty Crop High	Headwater or Isolated Wetland
Specialty Crop High	Non-tidal Floodplain Wetland
Specialty Crop High	Headwater or Isolated Wetland
Specialty Crop High	Ag Open Space
Specialty Crop High	Ag Open Space
Specialty Crop High	True Forest
Specialty Crop High	Ag Open Space
Specialty Crop Low	True Forest
Specialty Crop Low	True Forest
Specialty Crop Low	Non-tidal Floodplain Wetland
Specialty Crop Low	Headwater or Isolated Wetland
Specialty Crop Low	Non-tidal Floodplain Wetland
Specialty Crop Low	Headwater or Isolated Wetland
Specialty Crop Low	Ag Open Space
Specialty Crop Low	Ag Open Space
Specialty Crop Low	True Forest
Specialty Crop Low	Ag Open Space

Sector	BMPFullName	FromLoadSource	From - Aggregate
Developed	Tree Planting - Canopy	MS4 Buildings and Other	Impervious
Developed	Tree Planting - Canopy	MS4 Roads	Impervious
Developed	Tree Planting - Canopy	Non-Regulated Buildings and Other	Impervious
Developed	Tree Planting - Canopy	Non-Regulated Roads	Impervious
Developed	Impervious Surface Reduction	MS4 Tree Canopy over Impervious	Impervious
Developed	Impervious Surface Reduction	Non-Regulated Tree Canopy over Impervious	Impervious
Developed	Impervious Surface Reduction	MS4 Buildings and Other	Impervious
Developed	Impervious Surface Reduction	MS4 Roads	Impervious
Developed	Impervious Surface Reduction	Non-Regulated Buildings and Other	Impervious
Developed	Impervious Surface Reduction	Non-Regulated Roads	Impervious
			Impervious
			Impervious
Developed	Tree Planting - Canopy	MS4 Turf Grass	Turf
Developed	Tree Planting - Canopy	Non-Regulated Turf Grass	Turf
Developed	Forest Buffer	MS4 Turf Grass	Turf
Developed	Forest Buffer	Non-Regulated Turf Grass	Turf
Developed	Forest Planting	MS4 Turf Grass	Turf
Developed	Forest Planting	Non-Regulated Turf Grass	Turf
			Turf
Developed	Grass Buffers	MS4 Turf Grass	Turf
Developed	Grass Buffers	Non-Regulated Turf Grass	Turf
Septic	Septic Connection	Septic	

ToLoadSource	To - Aggregate	TN Delta	Tp Delta
MS4 Tree Canopy over Impervious	Canopy over Impervious	0.88	-0.000717874
MS4 Tree Canopy over Impervious	Canopy over Impervious	0.88	-0.000717874
Non-Regulated Tree Canopy over Impervious	Canopy over Impervious	0.88	-0.000717874
Non-Regulated Tree Canopy over Impervious	Canopy over Impervious	0.88	-0.000717874
MS4 Tree Canopy over Turf Grass	Canopy over Turf	7.539004312	-0.063583681
Non-Regulated Tree Canopy over Turf Grass	Canopy over Turf	7.539004312	-0.063583681
MS4 Turf Grass	Turf	4.882122256	-0.328173886
MS4 Turf Grass	Turf	4.882122256	-0.328173886
Non-Regulated Turf Grass	Turf	4.882122256	-0.328173886
Non-Regulated Turf Grass	Turf	4.882122256	-0.328173886
	Mixed Open	12.65008506	0.450663793
	Forest	13.25464252	0.671032703
MS4 Tree Canopy over Turf Grass	Canopy over Turf	2.656882056	0.264590205
Non-Regulated Tree Canopy over Turf Grass	Canopy over Turf	2.656882056	0.264590205
True Forest	Forest	8.372520261	0.999206589
True Forest	Forest	8.372520261	0.999206589
True Forest	Forest	8.372520261	0.999206589
True Forest	Forest	8.372520261	0.999206589
	Mixed Open	7.767962801	0.77883768
MS4 Turf Grass	Turf	*no credit for this BMP.	
Non-Regulated Turf Grass	Turf	*no credit for this BMP.	

TSS Delta	TN Imp Equiv	TP Imp Equiv	TSS Imp Equiv	
25.17380806	0.066438303	-0.001069805	0.014628986	0.026665828
25.17380806	0.066438303	-0.001069805	0.014628986	0.026665828
25.17380806	0.066438303	-0.001069805	0.014628986	0.026665828
25.17380806	0.066438303	-0.001069805	0.014628986	0.026665828
1221.319558	0.568782168	-0.094754966	0.709732388	0.39458653
1221.319558	0.568782168	-0.094754966	0.709732388	0.39458653
1133.776399	0.368333001	-0.489057963	0.658859367	0.179378135
1133.776399	0.368333001	-0.489057963	0.658859367	0.179378135
1133.776399	0.368333001	-0.489057963	0.658859367	0.179378135
1133.776399	0.368333001	-0.489057963	0.658859367	0.179378135
855.0756571	0.954389003	0.671597363	0.496900982	0.707629116
1720.816998	1	1	1	1
87.54315869	0.200449167	0.394302997	0.050873021	0.215208395
87.54315869	0.200449167	0.394302997	0.050873021	0.215208395
587.0405993	0.631666999	1.489057963	0.341140633	0.820621865
587.0405993	0.631666999	1.489057963	0.341140633	0.820621865
587.0405993	0.631666999	1.489057963	0.341140633	0.820621865
587.0405993	0.631666999	1.489057963	0.341140633	0.820621865
-278.7007419	0.586056002	1.160655325	-0.161958385	0.528250981

Geography	Sector	LoadSource	2010 No Action_Amount	2010 No Action_NLoadEOS
Maryland	Agriculture	Ag Open Space	14872.629	62025.604
Maryland	Wastewater	Combined Sewer Overflow	0.000	35857.696
Maryland	Developed	CSS Buildings and Other	2235.230	0.000
Maryland	Developed	CSS Construction	0.000	0.000
Maryland	Natural	CSS Forest	2188.172	0.000
Maryland	Natural	CSS Mixed Open	3155.304	0.000
Maryland	Developed	CSS Roads	847.339	0.000
Maryland	Developed	CSS Tree Canopy over Impervious	304.965	0.000
Maryland	Developed	CSS Tree Canopy over Turf Grass	735.664	0.000
Maryland	Developed	CSS Turf Grass	2023.380	0.000
Maryland	Agriculture	Double Cropped Land	179445.025	5498728.893
Maryland	Agriculture	Full Season Soybeans	274136.794	6828889.131
Maryland	Agriculture	Grain with Manure	218336.859	11757744.960
Maryland	Agriculture	Grain without Manure	228153.482	7565562.007
Maryland	Natural	Harvested Forest	11339.020	121719.457
Maryland	Natural	Headwater or Isolated Wetland	167359.729	251265.466
Maryland	Wastewater	Industrial Wastewater Treatment Plant	0.000	14945511.809
Maryland	Agriculture	Legume Hay	47106.580	378617.324
Maryland	Natural	Mixed Open	258581.759	524499.098
Maryland	Developed	MS4 Buildings and Other	209371.460	2811185.898
Maryland	Developed	MS4 Roads	86678.404	1496776.059
Maryland	Developed	MS4 Tree Canopy over Impervious	55886.549	860564.171
Maryland	Developed	MS4 Tree Canopy over Turf Grass	162401.137	1148897.700
Maryland	Developed	MS4 Turf Grass	422115.816	4145465.965
Maryland	Wastewater	Municipal Wastewater Treatment Plant	0.000	44036820.367
Maryland	Agriculture	Non-Permitted Feeding Space	1246.481	904830.952
Maryland	Developed	Non-Regulated Buildings and Other	57297.637	794684.511
Maryland	Developed	Non-Regulated Roads	27446.797	489398.448
Maryland	Developed	Non-Regulated Tree Canopy over Impervious	12321.186	197909.423
Maryland	Developed	Non-Regulated Tree Canopy over Turf Grass	42875.363	313326.162
Maryland	Developed	Non-Regulated Turf Grass	206773.982	1999313.895
Maryland	Natural	Non-tidal Floodplain Wetland	160120.142	236446.374
Maryland	Agriculture	Other Agronomic Crops	98895.676	1575348.754
Maryland	Agriculture	Other Hay	147844.432	1669132.686
Maryland	Agriculture	Pasture	202617.557	2235072.985
Maryland	Agriculture	Permitted Feeding Space	841.479	1491844.677
Maryland	Septic	Rapid Infiltration Basin	0.000	7548.615
Maryland	Developed	Regulated Construction	9283.557	201727.918
Maryland	Agriculture	Riparian Pasture Deposition	0.000	677895.978
Maryland	Septic	Septic	403170.892	4491058.851
Maryland	Natural	Shoreline	5508.805	0.000
Maryland	Agriculture	Silage with Manure	30320.235	1607132.449
Maryland	Agriculture	Silage without Manure	5350.630	192158.638
Maryland	Agriculture	Small Grains and Grains	71940.926	2088001.289

Maryland	Agriculture	Specialty Crop High	13285.896	609090.828
Maryland	Agriculture	Specialty Crop Low	25978.929	280284.200
Maryland	Natural	Stream Bed and Bank	10353.019	4706952.126
Maryland	Natural	True Forest	2335614.301	3330180.760
Maryland	Natural	Water	179063.050	1551203.548

2010 No Action_PLoadEOS	2010 No Action_SLoadEOS	EOS TN LR	EOS TP LR	EOS TSS LR
8997.381	1012048.980	4.17	0.60	68.05
4207.104	572965.683			
0.000	0.000	0.00	0.00	0.00
0.000	0.000			
0.000	0.000	0.00	0.00	0.00
0.000	0.000	0.00	0.00	0.00
0.000	0.000	0.00	0.00	0.00
0.000	0.000	0.00	0.00	0.00
0.000	0.000	0.00	0.00	0.00
0.000	0.000	0.00	0.00	0.00
198331.946	183078104.315	30.64	1.11	1020.25
277155.974	353391483.343	24.91	1.01	1289.11
285929.115	253599990.292	53.85	1.31	1161.51
207209.439	354392430.315	33.16	0.91	1553.31
2807.356	2744614.133	10.73	0.25	242.05
11257.692	1236031.316	1.50	0.07	7.39
428527.153	36304401.927			
12300.877	12242414.994	8.04	0.26	259.89
70784.970	232219519.619	2.03	0.27	898.05
141680.550	372729633.484	13.43	0.68	1780.23
73169.746	156330670.445	17.27	0.84	1803.57
40143.328	97913480.727	15.40	0.72	1752.00
124498.539	76430202.797	7.07	0.77	470.63
423465.574	289548344.958	9.82	1.00	685.95
7339470.102	36697350.186			
49352.963	7175123.427	725.91	39.59	5756.30
39145.179	93078813.053	13.87	0.68	1624.48
22244.512	45441389.218	17.83	0.81	1655.62
9103.507	23380342.611	16.06	0.74	1897.57
36863.473	32737227.560	7.31	0.86	763.54
236669.661	99954499.997	9.67	1.14	483.40
9864.969	2029116.867	1.48	0.06	12.67
119722.201	33775809.085	15.93	1.21	341.53
31935.522	9049537.461	11.29	0.22	61.21
169470.568	5561522.490	11.03	0.84	27.45
85537.184	1044043.281	1772.88	101.65	1240.72
969.914	0.000			
28643.403	77854908.674	21.73	3.09	8386.32
189320.418	103709609.115			
0.000	0.000	11.14	0.00	0.00
0.000	0.000	0.00	0.00	0.00
41650.738	131890143.759	53.01	1.37	4349.91
6457.897	23274731.738	35.91	1.21	4349.91
79213.083	174574234.908	29.02	1.10	2426.63

33039.030	33203170.572	45.84	2.49	2499.13
61926.578	101115580.419	10.79	2.38	3892.22
1620836.374	4582169698.946	454.65	156.56	442592.60
126579.944	75462106.967	1.43	0.05	32.31
107911.478	0.000	8.66	0.60	0.00

2010 No Action_NLoadEOT	2010 No Action_PLoadEOT	2010 No Action_SLoadEOT		
39858.666	4456.410	299308.948	2.680001395	0.299638357
4070194.622	136662.593	58673826.224		
4854153.983	184703.887	113905614.180	2171.657724	82.6330654
8220973.116	190632.039	75411011.857		
5366276.476	135147.622	108821809.591	2452.401236	61.76278788
237677.482	4245.331	3175717.649	75.32634292	1.345458661
667575.537	32694.204	2579596.293	787.8493771	38.58455994
1076964.701	78897.792	9352148.528	3531.441452	258.711296
1057948.259	17904.807	2538996.689	1438.086932	24.33830598
1469044.026	97213.937	1792352.164	726.034528	48.04530953
993724.358	57708.011	303021.219	5.537764872	0.321591589
468198.113	106215.621	40375651.497	1.707899572	0.387454815
1132857.549	24204.376	50743494.434	5.188576754	0.110857949
134469.392	3734.518	8954734.495	0.589381283	0.016368448
1455827.040	49642.031	54879812.818	128.3909028	4.377982418
436181.163	22214.833	10258127.839	2.606249217	0.132737028
189156.445	37310.945	29555575.069		
0.000	0.000	0.000	0	0
0.000	0.000	0.000	0	0
0.000	0.000	0.000	0	0
0.000	0.000	0.000	0	0
0.000	0.000	0.000	0	0
0.000	0.000	0.000	0	0
1936746.965	94312.903	142910504.265	4.588188582	0.223428973
1038520.584	48344.471	61145703.542		
618071.022	27013.624	38849013.700	495.8528217	21.67191364
781340.202	80991.411	29924172.089	13.636517	1.413520965
2717951.005	255045.252	99517490.742	99.02616376	9.292350337
523676.887	23787.073	21705848.235	42.50215075	1.93058317
328972.246	13729.029	9660993.099	7.672757107	0.320207882
133682.304	5462.029	5004805.184	0.646514144	0.026415457
197964.859	21064.527	6529202.065	1.236352008	0.131554512
1371435.187	151841.292	23402177.049	13.86749388	1.535368351
135795.554	18240.177	27292643.913	0.918502997	0.123374124
0.000	0.000	0.000	0	0
0.000	0.000	0.000	0	0
76346.985	1477.804	254884.246		
168499.222	7882.510	331056.293	18.15028687	0.849082981
347635.703	39792.596	73840078.916		
141446.064	6380.675	613121.952	0.350834017	0.01582623
1695623.364	1198630.318	5846977181.059	307.8024151	217.5844675
3204201.966	984524.836	1409171676.496	105.6786656	32.47088417
2166011.876	64916.747	20225637.537	404.8143789	12.13254323
1234876.925	86573.215	0.000	17.16515202	1.203393122

6584.418	810.615	0.000	0.495594582	0.061013221
3074848.967	0.000	0.000	118.3593449	0
29787.540	3563.854	574283.932	2.877183898	0.344233307
14682002.746	382171.150	24740432.637	6.286141826	0.16362768
41956577.207	6864058.218	30177001.006	234.3117539	38.33319176

20.12481811

50959.24186

49731.8283
1006.469751
3044.34962
30666.33934
3451.301072
885.820666
1.688657675
147.2828615
232.4091991
39.24873038
4839.907848
61.29388416

0
0
0
0
0
0
338.5575687

31166.95717
522.2583967
3625.832591
1761.668803
225.3273776
24.20423075
40.77689407
236.6349865
184.6037996
0
0

35.66050096

1.520749548
1061387.65
46476.27832
3780.048016
0

0

0

55.47018885

10.5926876

168.527237

2010 No Action Loading Rates - Individual							
		TN		*TP*		*TSS*	
Land-Use	*Units*	*EOS*	*EOT*	*EOS*	*EOT*	*EOS*	*EOT*
Construction	lbs/acre	21.80	14.68	3.10	1.98	8,386	2,903
Harvested Forest	lbs/acre	10.77	6.75	0.25	0.13	242	22
Non-road Impervious	lbs/acre	13.56	9.26	0.68	0.45	1,747	610
Road Impervious	lbs/acre	17.46	12.02	0.84	0.55	1,768	613
Tree Canopy over Impervious	lbs/acre	15.57	11.06	0.72	0.48	1,778	635
Mixed Open	lbs/acre	2.04	1.35	0.27	0.15	898	282
Septic	lbs/unit	11.14		0		0	
Shoreline	lbs/linear foot	0.00	307.80	0	217.58	0	1,061,388
Stream Bed and Bank	lbs/linear foot	464.03	316.05	161.64	98.50	459,659	138,104
True Forest	lbs/acre	1.43	0.93	0.05	0.03	32	9
Tree Canopy over Turf	lbs/acre	7.15	4.79	0.79	0.50	532	175
Turf	lbs/acre	9.80	6.52	1.05	0.65	619	192
Water	lbs/acre	8.66	6.90	0.60	0.48	0	0
Wetland	lbs/acre	1.49	0.95	0.06	0.04	10	3

2010 No Action Loading Rates - Aggregate							
		TN		*TP*		*TSS*	
Land-Use	*Units*	*EOS*	*EOT*	*EOS*	*EOT*	*EOS*	*EOT*
Impervious	lbs/acre	14.86	10.23	0.73	0.48	1,757	615
Turf	lbs/acre	9.15	6.10	0.99	0.61	598	188

Weighted Urban (w/o tree canopy)	lbs/acre	11.62		0.08		1,128.91	
Impervious (without tree canopy)	lbs/acre	14.69		0.73		1,753.13	

Forest-Impervious (without tree canopy)	**Impervious (lbs/acre/yr)**	**Forest (lbs/acre/yr)**	**Delta (lbs/acre/yr)**
TN	14.69	1.43	13.25

TP	0.73	0.05	0.67
TSS	1,753	32	1,720.82
TSS (tons)	0.876563159	0.016154659	0.86

	Nitrogen				Phosp	
	EOS		*EOT*		*EOS*	
	2010 NA w/ 1000 septics	2010 NA	2010 NA w/ 1000 septics	2010 NA	2010 NA w/ 1000 septics	2010 NA
Developed	14,459,250	14,459,250	9,784,157	9,784,157	1,175,627	1,175,627
Natural	10,721,636	10,722,267	9,034,225	9,034,642	1,950,043	1,950,043
Septic	4,488,665	4,498,607	3,074,722	3,081,433	970	970
Wastewater	59,018,190	59,018,190	56,668,367	56,668,367	7,772,204	7,772,204

	Nitrogen		Phosphorus		Sediment	
	EOS	*EOT*	*EOS*	*EOT*	*EOS*	*EOT*
Natural Δ	631	417	0	0	0	0
Septic Δ	9,943	6,711	0	0	0	0

Net change	10,573	
	10.57349	**lbs N per septic**

horus		Sediment			
EOT		*EOS*		*EOT*	
2010 NA w/ 1000 septics	2010 NA	2010 NA w/ 1000 septics	2010 NA	2010 NA w/ 1000 septics	2010 NA
739,832	739,832	1,365,399,514	1,365,399,514	465,942,554	465,942,554
2,390,179	2,390,179	4,895,861,088	4,895,861,088	7,351,413,637	7,351,413,637
811	811	0	0	0	0
7,249,793	7,249,793	73,574,718	73,574,718	55,491,718	55,491,718

Storm Drain Cleaning

Source: Section 6.4 of the Expert Panel Report on Street and Storm Drain Cleaning (May 19, 2016)

Step 1

Measure the mass of solids/organic matter that are captured on an annual basis

Step 2

Convert the initial wet mass captured (from step 1) into dry weight.

Inorganic (wet sediments)
Organic (wet organic)

Step 3

Multiply the dry weight (step 2) by the default nutrient enrichment factor.

Note: locals may substitute their own enrichment factor if they sample the nutrient and carbon content of the collected solids.

Enrichment Factor (%)
Enrichment Factor
Dry Weight
nutrient/sediment lbs per ton wet solids collected

Impervious Acre Equivalents

Imp Acre Equiv per ton wet solids collected

Inorganic - Impervious Acre Equivalent per ton of wet sediment collected
Organic - Impervious Acre Equivalent per ton of wet sediment collected

2000	lbs	solids captured annually*

We are calculating per 1 ton of solids captured

Wet Weight*	Wet-Dry Conversion Factor	Dry Weight
2000	0.7	1400
2000	0.2	400

**We are calculating per 1 ton of solids captured*

TN			TP		
Inorganic	Organic		Inorganic	Organic	
0.27	1.11		0.06	0.12	
0.0027	0.0111		0.0006	0.0012	
1400	400		1400	400	
3.78	4.44		0.84	0.48	

0.2852	0.3350		1.2518	0.7153	

0.7835
0.4276

TSS	
Inorganic	Organic
1400	400
1400	400

0.8136	0.2324

New BMPs Under Consideration	BMP Definition	BMP Design Criteria
Montgomery County		
Conservation Landscaping		
Tree Canopy (urban tree planting)		IA equivalent = 300 trees/acre
Tree Canopy (reforestation)		IA equivalent = 300 trees/acre
Organic Filters		

New BMPs Under Consideration	BMP Definition	BMP Design Criteria
Sand Filters		
Dry Pond conversion to Extended Detention		
CBP Expert Panels, past, present and future	The CBP expert panel process gathers experts in the field related to each BMP to determine how each BMP should be credited. This is a collaborative effort led by EPA and in which the jurisdictions directly participate.	Each expert panel report spells out the basis for the credit, as well as how the practice should be implemented, verified and maintained.
Audubon		
Urban Tree Canopy Expansion	Planting of individual trees in developed areas (over turfgrass or impervious cover).	Each tree planted in a developed areas is eligible for a creditable area of 144 sq.ft; IA equivalent = 300 trees/acre; trees of 1" diameter or larger. Crediting is cumulative - acres reported in a given year carry over into the next year.

New BMPs Under Consideration	BMP Definition	BMP Design Criteria
Urban Forest Planting	The Urban Forest Planting BMP is defined as tree planting projects in urban or suburban areas that are not part of a riparian buffer, structural BMP, or Urban Tree Canopy Expansion BMP, with the intent of establishing forest ecosystem processes and function.	IA equivalent = 300 trees/acre; trees of 1" diameter or larger. Trees must be contiguous. Follow MD DNR guidelines for survivability and maintenance. Reforestation success also depends upon soil condition and other factors. The credit of this BMP is cumulative, which means that the acres reported in a previous year carry over into the next year.
Urban Riparian Forest Buffer Planting*	An Urban Riparian Forest Buffer is a newly-established buffer consisting of trees planted contiguously next to a stream, and is managed to maintain the integrity of stream channels and shorelines and reduce the impacts of upstream land uses.	Crediting to be based upon meeting of basic riparian buffer reforestation criteria; and, the width of the reforested buffer.

New BMPs Under Consideration	BMP Definition	BMP Design Criteria
Forest Retention* Floodplains, Stream Buffers	Protection of existing forested stream buffers and 100-year floodplains by local ordinance; conservation easement; or parkland acquisition.	Riparian buffer protection for a width of 35 - 100 feet; with a tree density of 200 trees/acre. Documentation by the MS4 program lead of the number of acres of existing riparian forest retained each year through permanent preservation measures and using accountability guidelines. http://dnr.maryland.gov/forests/Pages/programapps/ripfbi.aspx. Protection of the 100-year floodplain (e.g. no buildings/structures allowed).
Forest Retention* Upland Areas	Protection of existing forests in upland areas by conservation easement or parkland acquisition.	Documentation by the MS4 program lead of the number of acres of existing upland forest retained each year through permanent preservation measures and using accountability guidelines.
Forest Regeneration*	Forest regenerative practices include measures that regenerate and improve the runoff reduction and pollutant avoidance and removal functions of existing forests. Such measures can include native tree, woody & herbaceous plantings, soil amendments, berms, non-chemical invasives removal, and protection from deer predation. Many forests now in Poor Condition; aim is to attain "Woods in Good Condition."	Forest condition assessment, including canopy; understory; ground cover; and topsoil conditions, must be the first step in this practice. Additional steps TBA.

New BMPs Under Consideration	BMP Definition	BMP Design Criteria
Conservation Landscaping	Conservation landscaping areas consist of perennial meadows using species that are native to the Chesapeake Bay region. The landscaping areas are slightly depressed so they can hold rainfall and, in some cases, treat runoff from adjacent hard surfaces.	75% native plants (cultivars are accepted), 25% can be non-native,non-invasive. Plant spacing to create full ground coverage within 1-2 years. Soils de-compacted at least 9". Soil amended with 2" of compost; 3" of natural, undyed mulch.
Compost Amendment to Pervious Areas*	Addition of mature compost (e.g. from yard debris, food waste) with mechanical aeration at a level sufficient to increase soil organic carbon and other soil parameters related to runoff reduction.	See procedures in Sections 5.3 and 5.4 of the CBP Expert Panel on Disconnecting runoff from Impervious Areas.
Pond Conversions to Wetlands	Establishment of native trees, shrubs, and herbaceous plants in stormwater ponds sufficient to convert them to wetlands. This may include construction of earthen shelves and islands within the existing pond footprint.	Minimum of 50% of the pond's surface area to be vegetated.
Urban Tree Canopy Expansion		

New BMPs Under Consideration	BMP Definition	BMP Design Criteria
Baltimore County		
Protecting natural land covers from development	Comparison of pollutant loads from actual land use-land cover (LULC) to pollutant loads from LULC forecasts used by the Bay Model to set the WIP III load allocations.	None required. This is a measurement of the net effect of all land conservation BMPs implemented within a permit area.

New BMPs Under Consideration	BMP Definition	BMP Design Criteria
Self Converted Wetland Ponds	Detention and extended detention ponds containing shallow marsh and/or forested wetland systems that developed naturally (were not designed and installed).	Pond designed as a dry detention or dry extended detention facility, and now: • Has evidence of wetland hydrology • Supports wetland vegetation • Is well-vegetated and not maintained as turf grass • Contains soils that are hydric or are developing hydric characteristics • Has diffuse flow patterns (e.g. sheetflow, dendritic flow)

New BMPs Under Consideration	BMP Definition	BMP Design Criteria
Dry Detention Ponds (with natural vegetation as allowable)	Dry detention ponds with non-turf vegetation and without wetland systems.	Pond designed as a dry detention pond, with vegetatation management that allows native vegetation to establish. Trees and woody vegetation must be cleared near risers, on fill embankments, and near other components that can be damaged by roots.

New BMPs Under Consideration	BMP Definition	BMP Design Criteria
Dry Extended Detention Ponds (with natural vegetation as allowable)	Dry extended detention ponds with non-turf vegetation and without wetland systems.	Pond designed as a dry extended detention pond, with vegetatation management that allows native vegetation to establish. Trees and woody vegetation must be cleared near risers, on fill embankments, and near other components that can be damaged by roots.

New BMPs Under Consideration	BMP Definition	BMP Design Criteria
CMAC	Implementation of Continuous Monitoring and Adaptive Control (CMAC) systems to optimize stormwater dwelling time for water quality and channel protection purposes.	TBD
Carroll County		
Stormwater Infiltration Trench		
Stormwater Infiltration Basin		
MDE		
Soil De-Compaction (Sub-Soiling)	Define soil decompaction as the six-inch subsoiling with amendments (e.g., compost) of a compacted, topsoiled profile. Runoff reductions are based on impact to the one year storm (e.g., 2.7 inches)	Runoff reduction (in inches) credit is based on the decrease in runoff from a topsoiled condition to a six-inch subsoiled profile. Runoff reduction varies from 0.35 inches to 1.2 inches depending on soil type.
Anne Arundel County		
Adaptively managing for a beaver enhanced landscape	Jurisdiction has in place policies/procedures to accommodate beaver movement into stream valleys, including protection of floodplains, utility, and highways coordination.	

New BMPs Under Consideration	BMP Definition	BMP Design Criteria
Remove impervious caps on alt BMPs	Rather than capping treatment at actual impervious area, allow for nutrient/sediment conversion to ISR without a cap.	
CMAC - Dry Pond Retrofits		

Notes	Determination 8/30/18
In accordance with MoCo RainScapes specifications	Montgomery County will share the existing specifications
CBP Expert Panel, pollutant reduction is a function of underlying land use	The credit will be based on the net tree count. The Accounting Guidance will keep the equivalency based on 100 trees vs. 300 trees determined by the expert panel. The expert panel's 300 tree determination incorporated an assumption of mortality while the 100 tree requirement is a net number of trees achieved through maintenance (including replanting when necessary).
CBP Expert Panel, pollutant reduction is a function of underlying land use	Same determination as above
break out stormwater filtering systems into 2 separate BMPs	To be addressed in BMP ratings

Notes	Determination 8/30/18
break out stormwater filtering systems into 2 separate BMPs	To be addressed in BMP ratings
CBP Established Efficiencies TN removal 15%-TP removal 10%-TSS removal 50% (Dry: 5%-10%-10% Ext. Det.: 20%-20%-60%)	No impervious area credit without water quality features
There are only seven years left to implement practices needed to achieve the Bay TMDL. What is the rationale for delaying or limiting MD MS4s access to the expert panel practices as options for implementation and crediting when other jurisdictions in the Bay watershed, as well as EPA, have approved them? Consider establishing a TN/TP/TSS equivalency to IA and allow all expert panels to be used by MD MS4s to achieve IA and TMDL goals.	The new Accounting Guidance will address the new BMPs approved by expert panels. The final reports allow state discretion on whether the new BMPs can be used for credit locally. BMPs must meet MD standards. For example, MD is requiring monitoring to approve CMAC. MDE will provide a spreadsheet comparing the old vs. new efficiencies.
2016 Expert Panel on the Urban Tree Canopy. (e.g. Mont.Co.DEP based its IA credits for trees on 2016 Expert Panel rec'dtns.) Other than tracking through CBP satellite imagery, local govt. tracking of net tree expansion (trees planted minus trees removed) does not appear to be addressed by the 2016 Expert Panel.	Previously addressed

Notes	Determination 8/30/18
Reforestation on pervious urban is already in the MDE 2014 Accounting Guidance, but, this needs to be updated to reflect the 2016 Expert Panel on the Urban Tree Canopy Expansion (which also addressed reforestation in certain respects).	Previously addressed
The 2016 Expert Panel on the Urban Tree Canopy did not address Riparian Forest Buffers. The 2014 Expert Panel on Riparian Forest and Grass Buffers only addressed buffers on agricultural lands, not urban lands. *As a result, there is a need for an Urban Riparian Forest Buffer practice to be examined and defined by an Expert Panel or equivalent review group. https://www.chesapeakebay.net/documents/Riparian_BMP_Panel_Report_FINAL_October_2014.pdf See also: the 2012 STAC report "The role of natural landscape features in the fate and transport of nutrients and sediment." http://www.chesapeake.org/pubs/293_2012.pdf	To be reviewed in a subcommittee

Notes	Determination 8/30/18
* Not ripe for inclusion in the Accounting guidance; Pending development of protocols for accountability and efficacy of this practice, including: 1. Defining the threat level/likelihood of development of an existing forest; 2.Additionality—does forest retention do more for stormwater? 3. Complexity of and basis for crediting—3.a. how to do it right; 3.b. Double-crediting/setting the baseline—if forest is already counted as pervious in the baseline inventory, how to ensure that taking credit for it is not double-counting? 4. Accounting for growth…need to be sure that we're not giving credits when there is a net loss due to growth.The CBP Expert Panel for the Urban Tree Canopy recommended development of BMPs that address the conservation and maintenance of existing tree canopy.	Not for inclusion in this Accounting Guidance Update
* Not ripe for inclusion in the Accounting Guidance; Pending development of protocols for accountability and efficacy of this practice - see list under above item for Forest Retention for Floodplains and Stream Buffers. The CBP Expert Panel for the Urban Tree Canopy recommended development of BMPs that address the conservation and maintenance of existing tree canopy.	Not for inclusion in this Accounting Guidance Update
* Pending development of protocols. The 2016 Expert Panel on the Urban Tree Canopy plus other data on forest quality/regenerative forest practices can be used as a starting point for establishment of this practice.	Not for inclusion in this Accounting Guidance Update

Notes	Determination 8/30/18
2018 memo (Schueler, Wood) to Urban Stormwater Work Group, (pollutant removal efficiencies). Criteria also from Montgomery County RainScapes program. IA credits are also needed. Zero credit is given for sediment removal, although the 2018 memo notes that Conservation Landscapes promote better infiltration. Runoff reduction = sediment reduction.	See Montgomery County's specifications
2016 Expert Panel on Disconnecting Imp.A.runoff into (compost)-Amended Soils. *For compost amendment to new and redeveloped/rehabilitated turf fields, we ask MDE to fully implement the Panel's rec'dtns for IA and pollutant credits; and for full pursuit of Panel's research rec'dtns. *Compost amendment to existing turf as a maintenance practice is not ripe for inclusion in the Accounting guidance; in particular, scientific research is needed on the runoff and pollutant loading reduction efficacy from compost amendment to existing turf for maintenance purposes.	MDE to determine what types of compost amendments are ready for this Accounting Guidance Update based on the 2016 Expert Panel and current local research.
Mont.Co. DEP Guidance for tree & other vegetation plantings in/around ponds. See also MD SWM Manual Chap.3 Sec.3.2 A Montgomery County Owner's Guide to Adding Plantings Around Your Stormwater Pond. Pond-to-Wetland Conversions	Could be considered under green infrastructure co-benefit
2016 Expert Panel on the Urban Tree Canopy Mont.Co.DEP bases its IA credits for trees on 2016 Expert Panel rec'dtns.	Previously addressed

Notes	Determination 8/30/18
The mid-point assessment and WIP III load allocations use a 2025 LULC baseline. This baseline was derived by forecasting LULC changes out to 2025. Thus, Maryland is being required to address pollution from future LULC change in addition to pollution from existing LULC. If land use authorities (local governments and agencies that manage land (e.g. SHA and DNR)) implement policies that keep pollution from LULC change lower than the Bay Program forecasts, they deserve credit for that. Comparing actual LULC data to the LULC forecasts will show where local LULC decisions resulted in more or less natural land cover conversion than the forecasts. Let's call these instances land use-land cover forecast discrepancies (LULCFD). The water quality impact of these LULCFDs is equal to the difference in Bay Model pollutant load (load of actual LULC - load of forecasted LULC). Overlaying these LULCFDs with MS4 permit areas shows which permittees get credit for which LULCFDs. Summing the LULCFD water quality impact across permittees gives a net water quality impact in pounds of TN, TP, and TSS. MDE alternative BMP accounting guidance converts these to acres of impervious surface restoration. Refer also to pages 13-14 of "Crediting Conservation" http://www.chesbay.us/Publications/CreditingConservationReport.pdf	Defer to Bay Program work and WIP

Notes	Determination 8/30/18
Baltimore County's self-converted wetland study found reduction efficiencies of 23.3% TN, 47.9% TP, and 60.0% TSS (average 43.7%). This is approximately equivalent to a wetland SWM BMP with 0.60" runoff depth treated (CBP expert panel stormwater treatment curve, 0.6" returns efficiencies of 28.8% TN, 45.2% TP, 57.5% TSS (average 43.8%). This is substantially above the efficiencies provided by the Chesapeake Bay Watershed Model for Dry Detention Ponds (5% TN, 10% TP, and 10% TSS) and even above the Bay Model efficiency for Dry Extended Detention Ponds (20% TN, 20% TP, and 60% TSS), suggesting that naturally developing wetlands dramatically increase pollution removal in dry detention ponds. Propose assigning these ponds to wetland category (structural treatment curve) with 0.60" runoff depth treated. This is conservative for the BMP because the 3 study ponds included one pond with low efficiencies that contained a channel running from the inflow to the outlet, likely due to interception of groundwater flows creating perennial baseflow within the pond. It is also likely to be conservative for self-converted wetland ponds that were designed to be dry extended detention, as the increased dwelling time of extended detention should increase the pollution removal efficiencies beyond what was observed in our study.	Needs additional study

Notes	Determination 8/30/18
Baltimore County's self-converted wetland study used dry detention ponds as the control group, and found reduction efficiencies of 18.5% TN, 28.8% TP, and 53.2% TSS (average 33.5%). It is similar to the Bay Model efficiencies for Dry Extended Detention Ponds (20% TN, 20% TP, 60% TSS (average 33.3%)). This is approximately equivalent to a structural SWM BMP with 0.38" runoff depth treated (CBP expert panel stormwater treatment curve, 0.38" returns efficiencies of 22.1% TN, 34.7% TP, 44.2% TSS (average 33.6%). This is substantially above the efficiencies provided by the Chesapeake Bay Watershed Model for Dry Detention Ponds (5% TN, 10% TP, and 10% TSS (average 8.3%, approximately 0.074" on the expert panel structural treatment curve)), suggesting that the inclusion of natural vegetation dramatically increases pollution removal, increasing average efficiency by 26.8% above By Model efficiency. Going from average 6.7% efficiency to average 33.66% efficiency on the Expert Panel structural treatment curves is an increase from 0.074" to 0.38" (increase of 0.306"). Propose assigning these ponds to a new BMP category, on the structural treatment curve, with 0.38" runoff depth treated. This is conservative for the BMP because the 3 control ponds included one with a rip-rap pilot channel that had partially filled in with sediment (as they all tend to do), and this pilot channel was cleared to allow gauging necessary to measure pollution removal efficiency. The efficiency of this pond was dramatically lower than the other two.	Needs additional study

Notes	Determination 8/30/18
I don't have a study of these at this time. However, efficiency should be greater than the dry detention ponds used for control in the self-converted wetland study. The Chesapeake Bay Watershed Model provides efficiencies of 20% TN, 20% TP, and 60% TSS (average 33.3%) for dry extended detention ponds. This is equivalent to 0.374" of runoff depth treated on the Expert Panel structural treatment curve. The self-converted wetland study suggests that the Bay Model efficiencies for detention ponds are very low compared to detention ponds with non-turf vegetation. Our results for dry detention ponds show that efficiencies were higher than Bay Model efficiencies by 0.306" of runoff on the structural treatment curve. If we add 0.306" to the 0.374" approximated above, we arrive at 0.68". On the expert panel structural curve, 0.68" provides efficiencies of 30.5% TN, 47.9% TP, and 61.0% TSS (46.4% average). I propose that for now, these facilities receive credit as per the Bay Model for dry extended detention ponds (20% TN, 20% TP, 60% TSS, and 0.374" for impervious restoration). Further study should be conducted on this BMP category. If literature review can show efficiencies equal to or greater than 0.68" of runoff depth treated, we create a new BMP category on the structural treatment expert panel curve and give it 0.68" runoff depth treated. If not, field studies similar to the self-converted wetland study should be conducted.	Needs additional study

Notes	Determination 8/30/18
Needs field studies to determine effectiveness. Please share if you have results from such studies.	Interim credit granted. Waiting on monitoring results to determine final credit
break out infilatration trenches and infiltration basins into 2 separate BMPs	Will break out BMPs in rankings
break out infilatration trenches and infiltration basins into 2 separate BMPs	Will break out BMPs in rankings
MDE is working with UMBC to determine credits for soil decompaction. This technique would enhance/replace the Bay Program's current credit.	Needs additional study
Use stormwater wetland efficiencies and calculate volume based on LiDAR comparisons or other survey, remote sensing techniques.	Needs additional study

Notes	Determination 8/30/18
Current rules disincentivize the treatment of high pollution/low impervious area sites.	Transition impervious area restoration credit to values more in line with CBP efficiencies.
Suggested BMP for future consideration	Previously addressed

Supplemental Notes 8/30/18
Inspection frequency requirements could potentially change as trees become established (e.g., at 1 yr, 3 yr, 5 yr, and 10 yr; every year for the first 10 years because that is when the mortality rate is the highest). Inspection frequency should be at least once every 5 years, i.e., no longer than a permit term. An additional suggestion: Instead of requiring the planting of 2" trees (which is more expensive), plant 1" trees and delay claiming credit until they grow to 2".
Additional suggestions: 1) Allow the planting of seedlings for reforestation while requiring a minimum of 1" trees for urban tree plantings. 2) Make the 1/4 acre minimum a recommendation while requiring justification for areas less than 1/4 acre (mostly applicable to the City which has smaller pockets of what could be considered forest cover). 3) Get rid of the minimum completely because in the Bay Model, every tree counts.

Supplemental Notes 8/30/18
Montgomery County stated that channel protection should be considered a benefit.
Do not use invasives (native-only is difficult in the city)

Supplemental Notes 8/30/18
Only use natives (check current guidance requirements)
Suggestions: give current tree planting credit; make it an additional credit as a co-benefit; get credit for both land use conversion and BMP; use agricultural credit; stream releaf campaign; DNR - coming out with a report on riparian buffers soon.

Supplemental Notes 8/30/18
Maintenance is an issue (negative effects of deer browsing); the burden of proof is high; could include a section in the guidance listing BMPs that were brought up by the committee for future consideration

Supplemental Notes 8/30/18

Supplemental Notes 8/30/18
New LIDAR data every 10 years.

Supplemental Notes 8/30/18
Concern over getting credit for neglect. Function needs to be addressed (e.g., does it have same storage volume; are the structural components, core, embankment, etc. in an acceptable condition. Corrugated metal pipes have a limited lifespan). These are 20-30 year old ponds. Baltimore county leaves them alone except for problem trees. Small pockets of wetlands develop if berms develop. Does not seem to affect storage capacity

Supplemental Notes 8/30/18

Supplemental Notes 8/30/18

Supplemental Notes 8/30/18
Research currently underway
Issues to consider: inspections would need to be addressed because the BMP would be transient; would require public education; benefits outweigh capital projects; add to existing efficiencies; provide credit for only when it occurs; put policies in place to incentivize letting beaver dams remain

Supplemental Notes 8/30/18

From: "Karl Berger" <kberger@mwcog.org>
Sent: Fri, 14 Dec 2018 18:04:28 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "jjoiner@frederickcountymd.gov" <jjoiner@frederickcountymd.gov>
Cc: "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Bennett, Katherine" <Katherine.Bennett@montgomerycountymd.gov>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>
Subject: Communications with MDE
Attachments: RE: Request re impervious restoration credit for stream restoration projects -- response to your question, Request to extend Phase III WIP local feedback comment period

MS4 managers,

In fulfillment of several of the to-do items from Tuesday's planning call, I sent the attached messages to Lee Currey today: one provided the response to his question re stream restoration and impervious area caps and the other requested an extension of the comment deadline on the Phase III WIP information that MDE recently distributed.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MS4 Phase I Group Response to MDE in Support of Removing Impervious Area Caps

Dec. 14, 2018

Summary:

- Stream bank erosion and channel adjustment is the single largest source of sediment and phosphorus pollution in the Chesapeake region.
- Stream restoration addresses pollution from both bank erosion and upland land use
- Impervious caps will discourage MS4 permittees from spending funds to restore degraded, polluting streams
- Stream bank erosion and channel adjustment is affected by contemporary upland land use and hydrology, but also by historical land uses, e.g. legacy sediment from agricultural operations predating urbanization. Therefore, pollution from degrading streams can exceed the pollution contributed by contemporary upland areas.
- Upland stormwater management, e.g. ESD to the MEP, is not sufficient to halt or reverse bank erosion and channel adjustment in degraded streams. Degraded streams in watersheds that are fully treated by ESD BMPs will continue to erode and contribute large sediment and phosphorus loads.

How Can a Stream Restoration Project Generate More Environmental Benefit, as Defined by Equivalent Nutrient and Sediment Reduction, Than the Conversion of All Upstream Impervious Areas to Forest?

Particularly in an urban or suburban context, stream bank erosion and channel adjustment – from zero order outfall areas to larger stream systems – have been demonstrated repeatedly to be the single largest source of sediment (and phosphorus) pollution to local waterways in the Chesapeake Region. The implementation of stream restoration projects, done right, can both arrest those watershed-derived loads, not just from upstream impervious areas, but also from turf, meadows, and other "natural" sources.

Additionally, stream restoration projects integrating effective floodplain re-connection can have the benefit of not just halting in situ sediment pollution from stream bank erosion, but also trapping and processing nutrients and sediment derived from both runoff-driven loads and upstream instream erosion higher in the watershed.

In short, nutrients and sediment in a watershed are not simply derived from impervious surfaces in the uplands, and not simply from the uplands themselves. We need to address the instream sources as well. This is most clearly demonstrated in heavily agricultural, or even forested, watersheds, where the stream condition may be sufficiently degraded as a result of historical land use practices to now serve as a massive nutrient and sediment source, even when overall watershed imperviousness may not exceed a percent or two.

As a result of better scientific understanding of the watershed position where most sediment pollution loads originate, the Chesapeake Bay Program's Watershed Model has been updated with a stream

corridor overlay. What this could eventually mean is that practices installed above the eroding streams from which this sediment is derived could end up being discounted in terms of pollution reduction effectiveness. Incentivizing work that misses the root of the problem is neither in MDE's nor our local governments' interests. An arbitrary impervious area cap does that.

How Do Impervious Caps Harm Water Quality Improvement Progress?

A real-world example of the way impervious caps stifle progress comes from Howard County. The County is spending $4.125M on a 6,000 linear-foot stream restoration in western Howard County. This is the largest stream restoration on a single property in County history. The partnerships involved have been astounding and this project has been eye opening to the agricultural community and proven to Howard County rural residents and leadership that environmental practices and farming can coexist successfully.

Other neighboring property owners are asking the County to do the same sort of work on their properties, including some of those who own property upstream. However, under the impervious cap, the County has maxed out the watershed credits at 127 impervious area credits (IAC). County staff estimate through modeling that they would actually be eligible for 155 IACs, but the watershed only contains 127 actual impervious acres. Therefore, the County cannot continue to foster these partnerships with rural land owners because funds have to be directed to other areas where they will get greater amounts of IAC per dollar spent.

In addition, the stream bank upstream of this project is seeing more erosion and degradation because of heightened rain events; however, the County cannot justify spending funds to further repair the stream because the current cap situation precludes the obtaining of additional credits. This puts the project in jeopardy and diminishes the water quality improvements it is getting on paper, when in reality we are seeing sediment, N and P wash down from upstream. Why would counties not want to fix an entire length of stream channel if they had that opportunity? Does MDE want counties to walk away from these willing partners and opportunities to improve local water quality and ecosystems?

Isn't Impervious Surface the Predominant Cause of Stream Erosion?

Impervious surfaces and the hydraulic and hydrologic changes they cause are certainly a driver of stream erosion. There's no question that concentrating stormwater flows on steep slopes and erosive soils has caused much of the legacy stream valley damage that we see throughout our jurisdictions.

However, there are at least two important factors to keep in mind:

1) The existence of vulnerable geomorphic features is often independent of contemporary land use: for example, legacy sediments deposited by agricultural land uses over many decades and even centuries. All of us see stream degradation even in the most rural, least impervious areas of our watersheds. Additionally, our current urban and suburban watersheds were once rural watersheds, afflicted by historical sedimentation, and now dually affected by a flashier hydrology;

2) Converting impervious areas to forest will reduce the hydraulic stresses on vulnerable geomorphic features, but will not eliminate those stresses. The system will continue to be in a state of disequilibrium and erosion will continue to occur. Even under full "ESD to the MEP" treatment, our streams are already on a downward trajectory. No level of upland stormwater control can completely

address their continued degradation, and the areas with opportunity to manage sufficient volumes to really reduce stress on these downstream systems are vanishingly infrequent in the current, developed landscape. The streams require direct intervention.

The Limitations of ESD to the MEP as a Stream Protection Strategy

ESD practices are highly dependent on infiltration and filtration rates. It is feasible to provide ESD to MEP on a site using roof top disconnect, sheet flow to conservation, grass swales, and other practices that do not provide any physical storage volume. This works when you are talking about the 1-year design storm of 2.5" over 24 hours. However, we are observing rainfall intensities that involve this magnitude of rainfall event occurring in a much shorter duration. These high-intensity rainfall events produce runoff rates that are too fast for some of these ESD practices to be effective.

Those ESD practices that do provide a physical volume allow for 25% of their volume to be in the media. Again, under the stress of high intensity rain events the flow rates are greater than the filtration rate for the media. Therefore, the volume in this media might as well not exist.

Also, ESD practices are typically designed to be offline with diversion structures. Those diversion structures are designed based on a peak flow rate, based on 2.5" of rainfall over 24 hours. When high intensity storm events occur, the peak flow rates are such that the diversion structures bypass some of the runoff and not all of the available volume is utilized.

For these reasons, even watersheds that could be categorized as being treated to the woods-in-good-condition standard, as defined by the 1-year storm ESD tables, probably are not truly achieving a level of runoff reduction that will protect their receiving stream; therefore, stream restoration practices should be recognized for the nutrient removal credits that they are providing.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Fri, 14 Dec 2018 17:46:52 +0000
To: "Lee Currey -MDE-" <lee.currey@maryland.gov>
Cc: "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>; "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Knapp, Les" <lknapp@mdcounties.org>
Subject: RE: Request re impervious restoration credit for stream restoration projects -- response to your question
Attachments: Response to MDE email of 12-7-2018 re impervious area caps.pdf

Lee,

The members of the Phase I MS4 group put together a response to your question in the attached file.

At this point, we have no scheduled meetings of the group with MDE staff and we are entering into the always busy time when the General Assembly is in session. Nevertheless, we would be happy to further discuss this issue with you or your staff should you so desire.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

From: Lee Currey -MDE- <lee.currey@maryland.gov>
Sent: Friday, December 07, 2018 6:58 PM
To: Karl Berger <kberger@mwcog.org>
Cc: Jennifer Smith -MDE- (jenniferm.smith@maryland.gov) <jenniferm.smith@maryland.gov>; Knapp, Les <lknapp@mdcounties.org>; Raymond Bahr -MDE- (raymond.bahr@maryland.gov) <raymond.bahr@maryland.gov>
Subject: Re: Request re impervious restoration credit for stream restoration projects.

Karl,

Thank you for the follow up. I'm reviewing a draft response which will need to go through the Secretary . We plan to provide a response letter by mid December.

Perhaps you can help me better understand the stream restoration argument. I continue to be perplexed on how a stream restoration project can generate more environmental benefit, as defined by equivalent nutrient and sediment reduction, than the conversion of all upstream impervious areas to forest which as I understand it is the definition of the alternative practice. This is especially confusing given that much of the scientific literature points to upstream impervious area and the subsequent increased runoff as the predominant cause stream erosion. Could you help me better understand the scientific underpinnings of the argument or if I am missing something?

I want to ensure we provide accurate crediting and accounting that best guides local jurisdictions to maximize environmental benefits and target projects effectively. To that end, I want to ensure there is sound science and logic to support it.

Thanks again for the email and I look forward to working with you on this.

Lee

On Fri, Dec 7, 2018 at 12:19 PM Karl Berger <kberger@mwcog.org> wrote:

> Lee,
>
> Just hoping to get an answer to the request made in this email attachment and the subsequent official letter, via MACO to Secretary Grumbles, on Nov. 16. At the least, can you tell me when MDE expects to issue a response?
>
> - Karl
>
> ---
>
> **From:** Karl Berger
> **Sent:** Monday, November 05, 2018 4:03 PM
> **To:** Lee Currey -MDE- (lee.currey@maryland.gov) <lee.currey@maryland.gov>
> **Cc:** Raymond Bahr -MDE- (raymond.bahr@maryland.gov) <raymond.bahr@maryland.gov>; Jennifer Smith -MDE- (jenniferm.smith@maryland.gov) <jenniferm.smith@maryland.gov>; Knapp, Les <lknapp@mdcounties.org>
> **Subject:** Request re impervious restoration credit for stream restoration projects.
>
> Lee,
>
> Attached is the basic text of a letter that the MACo Phase I group composed on the issue of impervious restoration credit for stream restoration projects. The final letter from MACo, which you should receive by the end of the week, will have a slightly different text, but this emailed text contains the gist of what we are requesting. Note that this text includes on the last page an example of a revised Impervious Acre Equivalency Calculation that was presented by MDE staff at an Accounting Guidance workgroup meeting.
>
> You can direct any written responses to the MS4 group through me.
>
> Karl Berger
> Principal Environmental Planner
> Metropolitan Washington Council of Governments
> 202-962-3350

--
D. Lee Currey, Director
Water and Science Administration
Maryland Department of the Environment (MDE)

Montgomery Park
1800 Washington Blvd., Ste. 4502
Baltimore, MD 21230-1718
Office: 410-537-3567
lee.currey@maryland.gov
www.mde.state.md.us
www.facebook.com/MDEnvironment
www.twitter.com/MDEnvironment

Click here to complete a three question customer experience survey.

From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Thu, 24 Jan 2019 20:01:53 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>; "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>; "Lee Currey" <lee.currey@maryland.gov>
Subject: Meeting to Discuss MEP
Attachments: Baltimore City.pdf

Kim...

The attached letter will go out in today's mail. This letter serves as the official invitation to a meeting of the Department and the large MS4's on January 29th (Tuesday) from 1:00 to 3:00 PM in the Department's lobby conference room. This meeting has been called to discuss an upcoming analysis of what constitutes maximum extent practicable with respect to the draft permit. The letter also contains other pertinent information concerning the draft permit. We look forward to meeting with you next Tuesday. Thank you!

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment
1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

Click here to complete a three question customer experience survey.

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

Ms. Kimberly L. Grove
Division Chief
DPW, Office of Compliance and Laboratories
3001 Druid Park Drive, Room 321
Baltimore, MD 21215

Dear Ms. Grove:

The Maryland Department of the Environment (Department) would like to invite you and your MS4 Phase I Large colleagues to a meeting on January 29, 2019, 1 – 3 PM, in the Aeris Conference Room, to discuss an upcoming analysis of the maximum extent practicable (MEP). The Department has enlisted the assistance of the University of Maryland, Environmental Finance Center, for coordinating several sessions with the MS4 Phase I Large jurisdictions and to develop an analytical tool for determining a MEP fiscal range for each jurisdiction that continues to advance important stormwater restoration efforts.

The Department is also seeking your feedback on the steps necessary to make a tentative determination on the MS4 permits by the end of June, 2019, and proposes the following schedule:

- January through April, 2019 -- Restoration Requirement and MEP: The Department will meet with each Phase I Large MS4 jurisdiction over the next few months to finalize the restoration requirement in each permit, incorporating an individualized MEP analysis and ensuring consistency with the Chesapeake Bay Phase III WIP.

- April through May, 2019 -- Draft Permit Template for EPA Review: Once the restoration requirement for each Phase I Large MS4 jurisdiction has been determined, the Department will finalize draft permits and forward them to EPA Region III for approval.

- May, 2019 – Specific List of BMPs and Milestones: The Department will incorporate a list of specific BMPs to be implemented in the first year of the permit and milestones for implementation during the permit term. The list of BMPs and milestones shall be submitted to the Department prior to the tentative determination, and updated in subsequent annual reports.

- June, 2019 -- Tentative Determination: The Department plans to issue tentative determination permits to MS4 Phase I Large jurisdictions by the end of June, 2019, and allow for a 90-day public comment period during which a public hearing will be held.

- December, 2019 -- Final Determination Permit: The Department plans to issue final determination permits to MS4 Phase I Large jurisdictions by the end of December, 2019.

The Department wants to thank you for all of your work in improving local water quality and toward the restoration of Chesapeake Bay during the last MS4 permit term, and looks forward to meeting with you on January 29, 2019, to discuss final drafting of the next generation MS4 permits. If you would like to discuss this further or have questions, please contact me at 410-537-3874 or by email at *lee.currey@maryland.gov*.

Sincerely,

D. Lee Currey, Director
Water and Science Administration

cc: Lynn Buhl, Assistant Secretary
Jennifer M. Smith, Program Manager, Sediment, Stormwater, Dam Safety Program

Harford County Department of Public Works

Harford County MS4 Tentative Determination Maximum Extent Practicable Analysis

September 25, 2014

This report has been prepared by the Harford County Department of Public Works in response to Maryland Department of the Environment's Tentative Determination (June 2014) to issue a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System Permit (MS4) to Harford County.

Harford County MS4 Tentative Determination
Maximum Extent Practicable Analysis

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Harford County MS4 Tentative Determination
Maximum Extent Practicable Analysis

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Harford County MS4 Tentative Determination
Maximum Extent Practicable Analysis

1. Introduction

The following report has been prepared by the Harford County Department of Public Works in response to Maryland Department of the Environment's (MDE) Tentative Determination (June 2014) to issue a National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4) permit (Draft Permit) to Harford County. Harford County has reviewed the Draft Permit to determine the maximum extent practicable (MEP) for Harford County to meet the requirements based on the County's MS4 size, the ability for the County to finance the Draft Permit, and the ability for the County to implement the Draft Permit over a five-year permit term.

This analysis is not a commitment of the funding levels proposed but a review of the maximum potential funding estimated to be available. A change in administration including a new county executive and at least two new county council members will occur in January 2015, who will be responsible for final approvals.

Specifically, the Draft Permit exceeds Harford County's MEP for the following sections of the permit as discussed in more detail below.

Table 1: Harford County Draft MS4 Permit (June 2014) Conditions Exceeding MEP

Permit Condition	Description	MEP Factor
Watershed Assessments (Part IV.E.1.a.)	Watershed assessments for the entire County	Impossible Scheduling
Watershed Restoration (Part IV.E.2.a.)	Watershed restoration for 20% of the impervious surfaces	Excessive Cost Impossible Scheduling
Restoration Plans (Part IV.E.2.b.)	Develop restoration plans within one year	Impossible Scheduling
Program Funding (Part IV.G.)	Maintain adequate program funding	Excessive Cost

2. Assumptions used to develop Harford County's MEP

Several sections of the Draft Permit are unclear and require Harford County to make reasonable assumptions in order to determine if the permit conditions are achievable and develop a response regarding our County's MEP. Some of this confusion is related to a template approach to create a "general" Phase I MS4 permit instead of drafting permit conditions specific to Harford County.

Assumption 1: Permit Coverage

The Draft Permit states that it covers discharges from the MS4, which clearly does not encompass the entire County from border to border. The entire permit should focus on the drainage to the MS4, or the MS4 service area. All other areas that drain directly to surface waters should be considered nonpoint source discharges not covered under the MS4 permit. Nonetheless, because the permit is unclear in this regard and MDE has expressed its intent for the permit to be jurisdiction-wide, we have assumed for purposes of this analysis that the entire County must be addressed for assessment and restoration. That said, Harford County believes that all of the requirements within the permit should align with the limit of permit coverage including the impervious area assessment and watershed restoration for 20% of impervious surfaces.

Harford County Draft Permit

"This permit covers all stormwater discharges from the municipal separate storm sewer system (MS4) owned or operated by Harford County, Maryland."

Assumption 2: Impervious Area Assessment

Until MDE approves Harford County's impervious surface assessment, cost estimates for the implementation of the restoration efforts are speculative. We assume MDE will approve the County's assessment based on the impervious surface figures below, but this is not a guaranteed outcome. It is inappropriate to expect a community to determine if it has the capacity to fulfill the

requirements of a permit condition that is not clearly defined prior to the issuance of the permit, especially when the condition is the most expensive part of the permit. Harford County has completed an impervious area assessment for the entire County even though we believe that the extent of permit coverage should be limited to the service area to the MS4 only. The County expressly reserves its right to object to the overly expansive interpretation of permit coverage limits that includes the entire County.

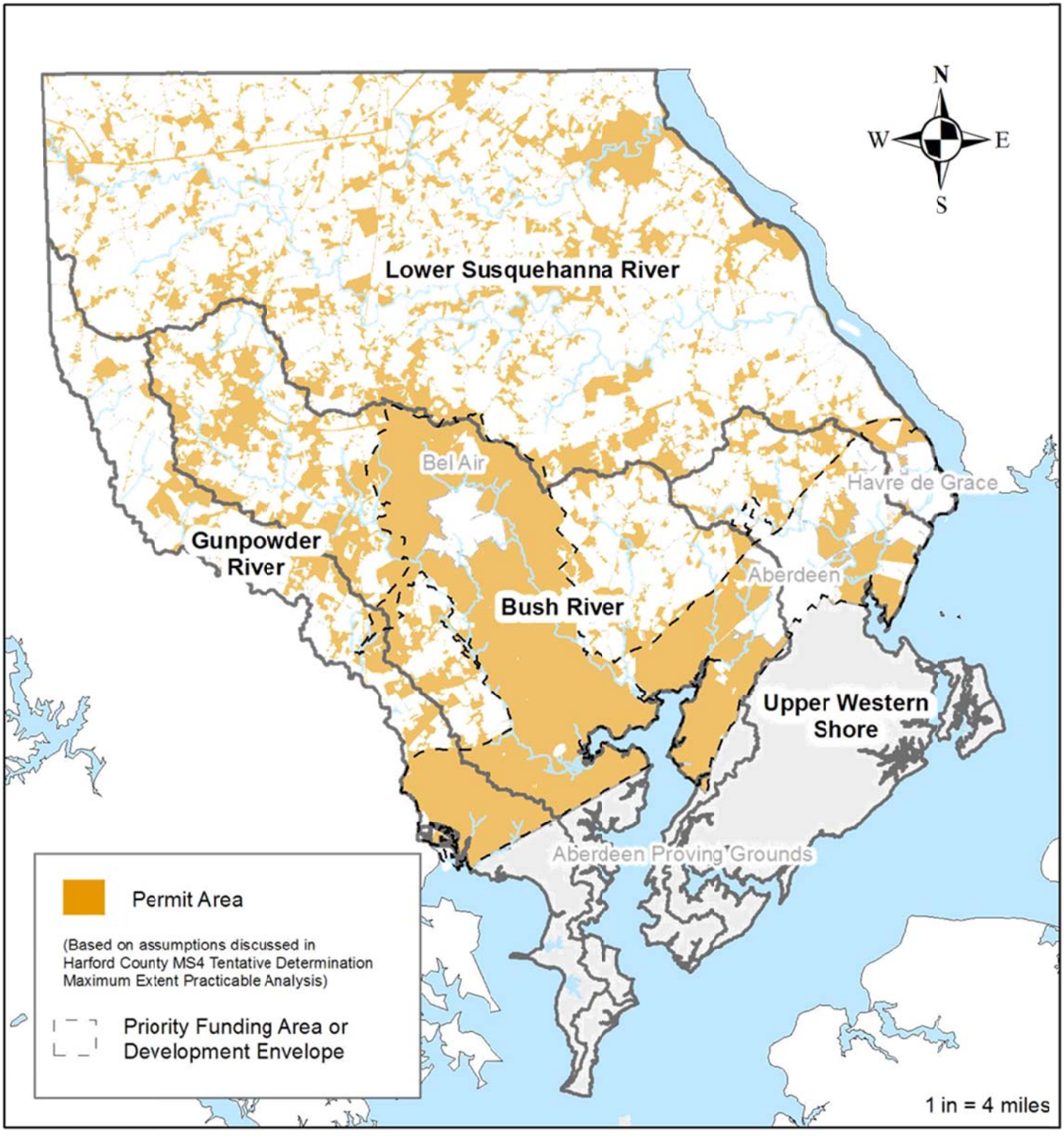
Harford County Draft Permit

"Within one year of permit issuance, Harford County shall submit an impervious surface assessment consistent with the methods described in the MDE document "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" (MDE, June 2011 or subsequent versions). Upon approval by MDE, ***this impervious surface area assessment shall serve as the baseline for the restoration efforts required in this permit.*** (Emphasis added)"

In order to develop planning level cost projections, Harford County has completed a preliminary assessment of the County's impervious surfaces based on the June 2011 document referenced above. Areas excluded from the County's impervious surface assessment include (Figure 1):

- Aberdeen Proving Grounds (covered under the Phase II MS4 permit)
- State roads (covered under a Phase I MS4 permit)
- State owned properties
- Municipalities (covered under the Phase II MS4 permit)
- Properties zoned AG with agricultural land use
- Large lot residential properties over 5 acres

Exclusions for properties covered under the recently issued industrial stormwater general NPDES permit have not been included. Restoration plans and impervious assessments to be completed by the property owners are due to MDE by December 2014. Thus, the County's projection of acreage may change as this additional information is received.



Harford County, Maryland
MS4 Permit Area

(Figure 1)

Harford County, Maryland
Department of Public Works
Watershed Management
(410) 638-3218

www.HarfordCountyMD.gov/WaterResources

Map Produced 9/2014

Based on Harford County's preliminary impervious surface assessment (Table 2), there are 9,880 acres of impervious surfaces located within Harford County, excluding those areas listed above which MDE allows the County to exclude from the MS4 permit area. Prior to 2000, development in Harford County was not required to address water quality management. Therefore, there are no reductions in impervious surface for existing stormwater management facilities.

Table 2: 2000 Harford County Impervious Surfaces[1]

Impervious Type (2000)[2]	Acres	% Total
Roads	3,000	30%
Buildings	3,000	30%
Driveways	2,200	22%
Parking Lots	1,900	18%
Completed Restoration	-220	
Total[3]	9,880	100%

[1] Excluding Aberdeen Proving Grounds, state roads, state properties, municipalities, AG land uses, and residential lots over 5 acres

[2] According to "Accounting Document" from MDE; Post-2002 development is assumed to be managed.

[3] Draft MS4 permit requires MDE approval for impervious surface assessment one year after the permit is issued.

It is important to note that nearly 70% of the impervious surfaces listed in Table 2 are privately owned. Only 300 acres of impervious surfaces are located on County-owned properties in addition to the 3,000 acres of impervious surfaces from County roads.

Assumption 3: Restoration Plans and TMDL Compliance

The Draft Permit should list specifically which restoration plans and annual TMDL assessments are required. The permit conditions are unclear and require a review of Attachment B and each

individual TMDL document. Attachment B lists approved TMDLs for Harford County, some of which do not have specific WLAs for Harford County, including the Chesapeake Bay TMDL. Because the permit term only requires that the County address TMDLs if the County's MS4 has a WLA listed, we assume restoration plans and annual TMDL assessments are not required for TMDLs without a listed WLA for the County.

Harford County Draft Permit

"Within one year of permit issuance, Harford County shall submit to MDE for approval a ***restoration plan for each stormwater WLA approved by EPA*** (Emphasis added) prior to the effective date of the permit."

Harford County Draft Permit

"Harford County shall evaluate and document its progress toward meeting ***all applicable stormwater WLAs included in EPA approved TMDLs***. (Emphasis added)"

Appendix B lists three watersheds with local TMDLs including Bynum Run (sediment), Swan Creek (nutrients), and Loch Raven Reservoir (bacteria, mercury, nutrients, sediment). Based on Harford County's review of the TMDL documents, the only local TMDLs that require a restoration plan are Bynum Run (sediment) and Loch Raven Reservoir (phosphorus) although the contribution from Harford County to Loch Raven Reservoir TMDL is less than one tenth of one percent (0.1 %).

Swan Creek TMDL Nutrients (January 28, 2002) categorizes stormwater as a load allocation with no specific numeric value assigned to Harford County. Therefore Harford County does not have an assigned stormwater WLA. Additionally, a majority of the urban development within the Swan Creek watershed is located within the City of Aberdeen. Therefore based on the permit language above, neither a restoration plan nor an annual TMDL assessment report is required for Swan Creek.

Loch Raven Reservoir TMDL Fecal Bacteria (July 24, 2009) page 47 lists Harford County with zero contribution to the WLA. Loch Raven Reservoir TMDL Mercury (December 27, 2002) page 17, Table 5 lists the allocation for the total WLA as zero and later states "Loch Raven Reservoir is located in a watershed in which the mercury impairment is dominated by nonpoint source mercury contributions (resulting from atmospheric deposition)." Therefore based on the permit language above, neither a restoration plan nor an annual TMDL assessment report is required for Loch Raven for bacteria or mercury.

The Chesapeake Bay TMDL was assigned based on river segments and was updated in 2011 for basins. There are no specific stormwater WLAs for Harford County listed. "EPA decided in October 2011 to scale back its expectations for geographic specificity due to current data and model limitations. … Analysis at the finer scale was supported by a load reduction analysis model called the Maryland Assessment and Scenario Tool, which mimics the results of the Bay watershed model." (Maryland Phase II Watershed Implementation Plan for the Chesapeake Bay TMDL, October, 2012). Stormwater WLAs have been estimated by MDE as planning level targets as listed in the MDE TMDL Data Center. Therefore based on the permit language above, neither a restoration plan nor an annual TMDL assessment report is required for Chesapeake Bay.

Assumption 4: New or Changed Requirements during the Permit Term

It is challenging for Harford County to determine an MEP for the Draft Permit when new requirements may be added or changed after the permit has been approved. Requirements added to the permit will increase the costs associated with the Draft Permit that already exceed Harford County's MEP.

Harford County Draft Permit

"The County shall submit restoration plans for subsequent TMDL WLAs ***within one year of EPA approval.*** (Emphasis added)"

An updated Accounting Document was released after the Draft Permit was issued. One significant update includes the detailed analysis now required to exclude properties within the rural areas from

the impervious area assessment. These areas should be excluded outright as the intent of the Phase I permits is to address discharges within the urban areas of the County. Requiring this level of documentation is costly and time consuming. This provision, which was added to the Accounting Document after the Draft Permit was issued, certainly demonstrates how new or additional requirements can increase the costs associated with implementation after the permit has been finalized.

Harford County Draft Permit

"By the end of this permit term, Harford County shall commence and complete the implementation of restoration effort for twenty percent of the County's impervious surface area consistent with the methodology described in the MDE document cited in PART IV.E.2.a."

The MDE dcoument cited in PART IV.E.2.a is the "Accounting for Stormwater Wasteload Allocatiosn and Imperivous Acres Treated, Guidance for National Pollutant Discharge Eliniation System Stromwater Permits" (MDE, June 2011 ***or subsequent versions***) (Emphasis added) .

3. MEP for Harford County

Based on the assumptions described above, Harford County has reviewed the Draft Permit to determine the MEP for Harford County based on the County's MS4 size, the ability for the County to finance the Draft Permit, and the ability for the County to implement the Draft Permit over a five-year permit term.

The following sections describe Harford County's MEP and recommendations for updates that will produce an individual permit for Harford County more closely aligned with the MEP. MDE's intention to create a template permit for all of the Phase I jurisdictions regardless of the size of the community or the community's resources is inappropriate.

A. MS4 Size

As of March 2014, MDE issued the final determinations to issue MS4 permits for all five large-sized communities with populations between 537,656 and 971,777 (Table 3). As a medium-sized community with a population of 244,826 (Table 3), Harford County's program capacity and availability of funding are significantly smaller than the large-sized communities. Harford County (Table 4) has less than half the population and half the total budget of Anne Arundel County (Table 3), the smallest large-sized community.

Table 3: Large-sized MS4 Community Populations and Actual Budgets for 2010

Jurisdiction	Total Population[1,2]	Population (per square mile)	Total Budget[1,3] (millions)
Montgomery County	971,777	1,900	$4,330
Baltimore County	805,029	1,300	$2,720
Prince George's County	863,420	1,700	$2,660
Baltimore City	620,961	7,800	$1,660
Anne Arundel County	537,656	1,300	$1,230

[1] Source: Maryland Manual Online; July 29, 2014

[2] Includes incorporated municipalities

[3] Total Budget includes operating expenses and capital pay-as-you-go

Table 4: Harford County Population and Actual Budget for 2010

Jurisdiction	Total Population[1,2]	Population (per square mile)	Total Budget[1,3] (millions)
Harford County	244,826	640	$590

[1] Source: Maryland Manual Online; July 29, 2014

[2] Includes incorporated municipalities

[3] Total Budget includes operating expenses and capital pay-as-you-go

The most costly condition of the Draft Permit is the watershed restoration for 20% of the impervious surfaces. MDE developed the surrogate parameter of watershed restoration for impervious surfaces as a method to quantify pollutant reductions. However, MDE has failed to consider the relationship between restoration and a County's ability to finance the program. This is clear if you compare Harford County to Montgomery County. Montgomery County's impervious surface is 2 times larger than Harford County's impervious surface, but its budget is 7 times larger (Tables 5). MDE's refusal to consider size as an aspect of MEP is illogical.

Table 5: Comparison of Impervious Surfaces and Total Budgets

Jurisdiction	Impervious Surfaces[1] (acres)	Total Budget[2,3] (millions)
Harford County	9,880	$590
Montgomery County	21,458[4,5]	$4,330

[1] Subject to MS4 Phase I coverage

[2] Source: Maryland Manual Online; July 29, 2014

[3] Total Budgets for 2010 including operating expenses and capital pay-as-you-go

[4] Montgomery County's Coordinated Implementation Strategy (January 2012)

[5] Total impervious = 25,119 acres – 3,661 acres (treated to MEP). 2,942 acres (treated to MEP) were constructed prior to 2002 when the State adopted water quality standards

Additionally, Montgomery County is able to reduce its total impervious surfaces approximately 15% for existing stormwater management facilities because it adopted water quality management prior to 2002. Harford County did not adopt water quality management until it was State mandated in 2002, and therefore no reductions in impervious surfaces can be applied for existing stormwater management facilities.

The fact that each Phase I MS4 program is in a different stage with regard to implementation has also not been considered. Montgomery County's program is arguably one of the most well-respected and successful stormwater programs in the state if not across the region. Harford County is simply not in the same position.

The Harford County Draft Permit, with the exception of a few relatively minor changes, parallels the expectations for the large-sized communities. The Phase I MS4 permits are individual permits that should be drafted with consideration for each community's specific circumstances in accordance with the MEP standard established by EPA. It is inappropriate for MDE to use a template approach to create a general Phase I MS4 permit.

B. Ability to Finance the Draft Permit

Harford County has consistently communicated to MDE that the costs associated with the Draft Permit are excessive. Planning level cost estimates calculated by Harford County are approximately $22 million per year for watershed restoration with an additional $3 million per year for the remaining requirements for the Draft Permit. Over the past five years, Harford County has dedicated, on average, $2 million per year for MS4 implementation. A ten-fold increase in costs associated with the Draft Permit is beyond Harford County's means. While Harford County recognizes the need to expand current programs associated with the Draft Permit, the costs exceed what can realistically be implemented within a five-year timeframe. Issuing the Draft Permit with the language below without consideration of Harford County's MEP would put Harford County at risk for a finding of regulatory noncompliance and vulnerable to State and Federal fines and lawsuits from third parties.

Harford County Draft Permit

"Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit."

(1) Harford County Cost Estimates to Implement the Draft Permit

The most significant costs associated with implementing the Draft Permit are those associated with the watershed restoration. The Draft Permit requires the County to complete watershed restoration for 20% of the total impervious surfaces not already restored to the MEP or 1,976 acres (20% of 9,880 acres. See Impervious Area Assessment above for more information).

In order to develop planning level cost estimates, Harford County used the Costs of Stormwater Management Practices in Maryland Counties report by Dennis King and Patrick Hagan (October 2011). Data statewide was gathered in the development of these cost estimates, generally from jurisdictions that have completed a significant number and variety of watershed restoration projects. Harford County did not participate in the study. Cost estimates for twenty four (24) different practices were developed which included pre-construction costs, land costs, construction costs, and post-construction costs. Total design and construction costs per impervious acre vary from $6,049 for street sweeping to $335,000 for new permeable pavement with a median cost per impervious acre of $55,000.

Selection of watershed restoration practices cannot be based solely on the practices with the least cost per impervious acre. Other criteria include availability of land within existing development, ease of land acquisition, permitting requirements, and technical feasibility. Additionally, not all watershed restoration practices reduce each pollutant equally. Some practices are more technically capable of reducing nitrogen than phosphorus. Therefore, in order to meet the requirements of the Draft Permit, a variety of watershed restoration practices must be selected.

Therefore, for purposes of this assessment, we have used a median cost of $55,000 per impervious acre based on the King and Hagan report to estimate the total cost to meet the Draft Permit requirement for watershed restoration for 1,976 impervious acres. This yields a total cost of $110 million over the five year permit, or $22 million per year divided equally.

(2) Availability of Harford County Revenue to Finance the Draft Permit

There are three types of public revenue potentially available to finance the requirements of the Draft Permit: income and property taxes, fees collected through a watershed restoration fund, and grants.

(a) Income and Property Taxes

For fiscal year 2015, seventy eight percent (78%) of Harford County revenues are projected to come from a combination of property and income taxes (Table 6). Over the past five years, property taxes have remained nearly constant while income taxes have averaged an annual 5% increase. Total revenues have averaged a modest 1% increase over the past five years; however, over the last two years, revenue growth has consistently trended downward, ending in a decrease of 2% during fiscal year 2015.

Table 6: Harford County Revenues[1]

Fiscal Year	Property Taxes (millions)	Income Taxes (millions)	Other Revenue[2] (millions)	Total (millions)	% Change
2015[3]	$293	$199	$136	$627	-2%
2014[3]	$289	$191	$160	$640	-3%
2013[4]	$293	$183	$182	$658	10%
2012[4]	$299	$179	$122	$600	4%
2011[4]	$295	$166	$114	$575	-3%

[1] Source: Harford County Approved Operating Budget reports

[2] Largest contributions to other revenue include recordation / transfer tax, Highways user tax, Water and Sewer user fees, licenses, and permits

[3] Projections

[4] Actuals

With only marginal increases in revenue and increased costs for operating expenses such as electricity, gasoline, fleet maintenance and health benefits, the percentage of revenue necessary to cover operating expenses has continued to increase. Therefore, revenues available for capital improvements are very limited.

Seventy eight percent (78%) of the total County budget for 2015 was allocated towards the General Fund (Table 7). Additional revenue was collected in dedicated funds for Highways, Water and Sewer, and Solid Waste.

Since fiscal year 2009, the State has reduced Harford County's share of the Highways User tax by 91%; decreasing from $14 million per year to $1.3 million per year. In order to maintain an adequate level of services, this reduction has been offset with property tax revenue. Property tax revenue for agricultural (AG) preservation is generated from transfer taxes dedicated by the State solely for AG preservation. Therefore, property tax revenue dedicated to those programs is unavailable to finance the Draft Permit.

Table 7: Harford County Projected Revenue by Fund for Fiscal Year 2015[1]

	Property Taxes (millions)	Income Taxes (millions)	Other Revenue[2] (millions)	Total (millions)
General[3]	$250	$199	$40	$488
Highways	$35	$0	$11	$46
Water & Sewer	$0	$0	$65	$65
Solid Waste	$0	$0	$14	$14
Stormwater[4,5]	$1	$0	$0	$1
AG Preservation	$6	$0	$5	$11
Parks	$0	$0	$1	$1
Other[6]	$1	$0	$0	$1
	$293	$199	$136	$627

[1] Source: Harford County 2015 Approved Annual Operating Budget

[2] Largest contributions to other revenue include recordation / transfer tax, Highways user tax, Water and Sewer user fees, licenses, and permits

[3] Agencies under the General Fund include – General Capital, Sheriff / Emergency / Fire, Harford Community College, Libraries, Board of Education

[4] Harford County Bill 13-12 became law with amendments on April 23, 2013. One amendment included collecting 10% of the $10.5 M requested, or $1.05 M. The funds collected through the Watershed Restoration Fund are supplemented by General Funds.

[5] For administrative reasons, the Watershed Restoration fees are collected on the property tax bill (It is a fee and not a tax) and listed under property taxes as a separate line item in the Approved Operating Budget Report.

[6] Other accounts for special tax districts

Prior to the adoption of the watershed restoration fee, watershed restoration projects received revenues from the General Fund which also funds public safety, schools, the community college, and libraries (Table 8). Seventy six percent (76%) of the total General Fund for 2014 was allocated towards education and public safety.

Table 8: Harford County General Fund Appropriations for Fiscal Year 2015[1]

	Appropriations (millions)	% of Total Appropriations
General Government[2]	$84	17%
Education	$239	49%
Public Safety	$96	20%
Libraries	$16	3%
Capital Improvements[3]	$5	1%
Debt Service	$49	10%
	$488	100%

[1] Source: Harford County 2015 Approved Annual Operating Budget

[2] Under General Government there are 16 County agencies, allocations to other State and local agencies such as the municipalities and the Health Department, other programs such as Handicapped Care Centers, County self-insurance, and benefits including pensions.

[3] Appropriations listed here are the County revenue portion of capital improvements or in general terms cash contributions.

For fiscal year 2015, $5.3 million is allocated for General Fund appropriations for capital improvements across the entire County (Table 9), approximately $17 million less than the estimated watershed restoration costs to implement the Draft Permit. The largest appropriation is for the required capping of the Harford Waste Disposal Center at $ 2.27million.

Table 9: Harford County General Fund Capital Improvement Appropriations for Fiscal Year 2015[1]

	Appropriations (millions)	% of Total Appropriations
General Government[2]	$1.9	35%
Solid Waste	$2.3	44%
Education	$0.3	6%
Public Safety	$0.3	6%
Libraries	$0.2	4%
Grant to SW Fund[3]	$0.3	5%
	$5.3	100%

[1] Source: Harford County 2015 Approved Annual Operating Budget; Listed in the report as pay-as-you-go or "cash" towards capital improvement projects.

[2] Under General Government there are 16 County agencies, allocations to other State and local agencies such as the municipalities and the Health Department, other programs such as Handicapped Care Centers, County self-insurance, and benefits including pensions.

[3] Harford County Bill 13-12 became law with amendments on April 23, 2013. One amendment included collecting 10% of the $10.5 M requested, or $1.05 M. The funds collected through the Watershed Restoration Fund are supplemented by General Fund.

The largest source of revenue for the General Fund is from property and income taxes. The minimal increase in revenue from these sources does not offset the very significant decrease in highways user taxes allocated to Harford County from the State. Therefore, this shortfall must be offset from the property and incomes taxes. There is significant competition for general funds between the needs of highways maintenance, public safety and education, making it challenging to finance the Draft Permit especially at a $25 million per year level.

(b) Watershed Restoration Fees

Harford County Bill 13-12 established a stormwater remediation, or watershed restoration fee with amendments on April 23, 2013. The bill was drafted by Harford County Department of Public Works to meet the requirements of Maryland House Bill 987 (2012) to fund watershed restoration.

Harford County received its tentative determination for the Draft Permit approximately one year after Maryland House Bill 987 required the Phase I MS4 permittees to establish a watershed restoration fund and nearly five years after its current permit had expired. Therefore, the County Council was unwilling to start collecting the full fee based on a Draft Permit with an approval that was not imminent in 2013.

Two of the amendments for Bill 13-12 included (1) providing only 10% of the Department of Public Works request for $10.5 million and (2) establishing a Task Force to review the fees. The amended fee, $1.05 million, does not cover the cost of the operating expenses and is supplemented by revenue from the General Fund.

The Task Force was established "to report back to the County Executive and County Council" with "recommendations on fees". The Task Force members included one person appointed by each of the seven County Council members and two County employees appointed by the County Executive. On May 1, 2014, the Task Force presented to the County Council its recommendation to collect $5.7 million in fees based on their review of similar draft permits for other Maryland Phase I communities, cost estimates developed by the Department of Public Works, and their determination of a reasonable fee. The amount recommended by the Task Force would result in a residential fee of $60 per property and a commercial fee of $6 per 500 square foot impervious surface. Legislation has not been introduced, as yet, to adopt the recommended fees.

The Task Force's recommendation for a residential fee of $60 is in alignment with the findings of a nationwide survey. In 2013, there were over 1,400 jurisdictions in 39 states collecting fees for watershed restoration (Western Kentucky University Stormwater Utility Survey; 2013). The annual average and median fee respectively are $54.84 and $45.00. To fully fund the Draft Permit through collecting fees for the watershed restoration fund, the County would have to adopt a fee that was over four times the national average, or $260 ($25 M / $5.7 M = 4.4 x $60 = $260.). This would be the second most expensive watershed restoration fee in the entire country.

According to the Maryland Department of Planning, the median household income in Harford County not only remains below the pre-recession level (in constant 2012 dollars), it also remains below 1999 levels. The unemployment rate in Harford County continues to linger around 6%;

decreasing from a high of 8% in 2010. Gasoline prices have increased 50% over pre-recession levels and residential electricity prices are rising.

Moreover, based on the work of the Task Force, a ***reasonable*** fee is more in line with $60 per year for a residential property. This level of fee would put Harford County slightly above the average fee for the U.S., and would be set at a level on par with the Bay Restoration fee (which is currently $60 per residence). We cannot ask our residents to pay a fee large than $60 per year.

(c) Grants

Over the past five years, Harford County has been awarded $1.7 million in grants. While many grants do not require a specific match, providing matching funds increases the probability of being selected for a grant award. Therefore, a revenue source to generate matching funds is necessary. Grants have become extremely competitive as a result of the increased implementation requirements for the MS4 program and the Chesapeake Bay Watershed Implementation Plan.

Table 10: Estimated Annual Availability of Traditional Grant Funding Sources

Grant	Estimated Grants Available (millions)
Chesapeake and Atlantic Coastal Bays Trust Fund[1]	$16
Chesapeake Bay Trust[2]	$5
Water Quality Revolving Loan Fund - Green Forgiveness[3]	$0.3
Chesapeake Bay Stewardship Fund[4]	$12
Non-point Source Section 319 Grants[5]	$2.5
	$35.8

[1]http://www.dnr.maryland.gov/ccs/funding/trust_fund.asp

[2]http://www.cbtrust.org/site/c.miJPKXPCJnH/b.5457271/k.C58E/Grants.htm

[3]http://www.mde.state.md.us/programs/Water/QualityFinancing/Pages/Programs/WaterPrograms/Water_Quality_Finance/index.aspx

[4]http://www.nfwf.org/chesapeake/Pages/home.aspx

[5]http://www.mde.state.md.us/programs/Water/319NonPointSource/Pages/Programs/WaterPrograms/319nps/index.aspx

There is approximately $35.8 million available annually from the traditional grant funding sources across the region (Table 10). Additional grant funding may be available for watershed restoration by 2018 from the Chesapeake Bay Restoration Fund that has focused on funding upgrading waste water treatment plans.

Availability of potential grant funds and the potential to be selected for grant awards is speculative and should not be considered a significant or reliable revenue source. Based on Harford County's past experience in receiving grant rewards and the potential availability of grant funds, Harford County estimates $2 million per year in grant funding will be available to finance the work to comply with the Draft Permit.

(3) Ability of Harford County to Borrow to Finance the Draft Permit

While it is possible to issue bonds and secure loans to finance the work required to comply with the Draft Permit, Harford County does not currently have a revenue source to make debt payments.

(a) Bonds

Harford County policy provides that "the net bonded debt is to be maintained at a level no more than 2.3% of the full base value of assessable property" and "its resulting debt service are to be kept at a level no more than 10% of total expenditures."

For fiscal year 2015, there is a debt margin of approximately $142 million with the capacity to pay approximately $6 million in additional debt service (Table 11). The limiting factor for the current bond capacity is debt service. In order to maintain an acceptable bond rating and thus minimize interest the County must pay on its debt, the County has concluded that the maximum amount the County can obtain through bond sales for the watershed restoration program is $30 million. Based

on a 20 year term (maximum time frame allowed through Harford County policy) and at 4% interest, this would result in $2.2 million in annual debt service.

Table 11: Harford County Debt Limits for 2015[1]

	Approved Debt Policies		Actual Projected Debt		Available Bonding Capacity
Net Debt[2]	2.3%	$615 M	1.8%	$472 M	$142 M
Debt Service[3]	10%	$54.5 M	8.9%	$48.6 M	$5.8 M

[1] Source: Harford County website, 2015 Approved Annual Operating Budget

[2] Percentage of Taxable Property Value = $26,734 M (2015)

[3] Percentage of Total Expenditures = $545 M (2015)

(b) Loans

Low interest rate loans are available through MDE's Water Quality Revolving Loan Fund program for projects completed on public property. According the program's Final Federal Fiscal Year 2014 Intended Use Plan, (June 2014), $130 million per year are projected for loans for the next five years. For 2014, loans were approved for fourteen projects; only two projects were not associated with waste water treatment. Based on competition with waste water and the other Phase I communities, Harford County estimates that, at best, it may be able to secure a loan for $10 million, which would result in an annual debt service of $600,000 at 2% interest through the WQRLF program.

(4) Total Available Revenue to Finance Work Under the Draft Permit

Based on the revenue currently available and the ability to secure additional revenue in the near future, the Draft Permit exceeds Harford County's MEP. Harford County estimates the total cost to implement the Draft Permit as $125 million over the five-year permit term. The maximum revenue available to finance the Draft Permit estimated over the five-year permit term, less debt service is $72.3 million (Table 12).

This represents the best case scenario assuming all of the required approvals are obtained to increase the current watershed restoration fee, selection for grant funding and loans, and approval to issue a bond. In January 2015, there will be a new County Executive and an appointed administration. There will also be at least two new members of the County Council and a new County Council president.

Table 12: Estimated Revenue Available to Implement the Harford County Draft MS4 Permit

	Revenue				Debt Service		
Year	Fees (millions)	Grants (millions)	Bonds (millions)	Loans (millions)	Bonds (millions)	Loans (millions)	Total (millions)
1	$5.7	$2.0	$0	$0	$0	$0	$7.7
2	$5.7	$2.0	$0	$0	$0	$0	$7.7
3	$5.7	$2.0	$0	$10	$0	- ($0.6)	$17.1
4	$5.7	$2.0	$30	$0	- ($2.2)	- ($0.6)	$34.9
5	$5.7	$2.0	$0	$0	- ($2.2)	- ($0.6)	$4.9
	$28.5	$10.0	$30	$10	- ($4.4)	- ($1.8)	$72.3

Over the past five years revenue from property and income tax has not increased to meet the increased operating expenses of the County. The only potential to generate additional revenue would be to increase the tax rate. Compared to the other 22 jurisdictions in Maryland, Harford County currently has the 5th highest real property tax rate, the 4th highest business property tax rate and 8th highest income tax rate. If work under the Draft Permit were funded through increases in income and property taxes, it would require a 5% increase for each.

Harford County only has the ability to issue bonds or secure loans if a revenue source is available to pay debt service. Since there are no General Funds available, the only other option to generate revenue is to collect fees through the watershed restoration fund. Assuming the County Council

implements the Task Force's recommendation of $5.7 million, the County would have the ability to issue bonds and secure loans at no more than the levels shown in Table 12.

The maximum projected net revenue is $72.3 million, considerably less than the estimated $125 million total cost to implement the Draft Permit. Based on this analysis the costs associated with Draft Permit are excessive and exceeds Harford County's MEP.

C. Ability to Implement the Draft Permit over the Five-year Permit Term

Even if funding was unlimited, certain conditions within the Draft Permit exceed the County's MEP because the schedules to implement the requirements are unrealistic and beyond the control of the County.

(1) Watershed Restoration

Watershed restoration for 20% of the County's impervious surface not already restored to the MEP is the most time consuming requirement within the Draft Permit. Restoration projects can take up to two years to design, permit and construct after the project has been determined to be a viable project. Prior to determining that a project is viable, the County must complete a watershed assessment and must approach property owners. If property owners will not cooperate, then alternative projects must be identified for review. Nearly 70% of the County impervious surfaces are located on private properties.

Harford County Draft Permit

"By the end of this permit term, Harford County shall commence and complete the implementation of restoration efforts for twenty percent of the County's impervious surface area consistent with the methodology described in the MDE document cited in PART IV.E.2.a that has not already been restored to the MEP."

Unlike facilities in some large-sized communities, stormwater management facilities in Harford County are owned and maintained by the property owners. Retrofitting existing stormwater facilities on private properties requires intensive outreach and negotiation throughout the design and construction process. Since the County does not take over ownership or maintenance for the stormwater facilities that are retrofitted, many property owners are concerned about the increased

maintenance costs associated with an upgraded stormwater management facility that generally includes new wet features and increased landscaping. Each project requires an individual agreement to outline rights of entry and negotiated conditions. Some commercial property owners also require time of year restrictions for construction. Retrofitting existing stormwater management facilities on private properties takes approximately twelve (12) months to design, permit and construct. If the project involves wetland or waterway impacts, the projects take an additional six (6) months for permitting.

Design and construction for new stormwater management facilities including ESD practices requires the same outreach and negotiation with property owners but also includes the time and expense for plat preparation and approval and long term maintenance. Projects for new stormwater management facilities take approximately eighteen (18) months to design, permit and construct.

Nearly all stream corridors in Harford County are privately owned. Unlike some large-sized communities, Harford County does not establish rights of way for stream corridors during the subdivision process. Generally, stream restoration projects require easements from at least ten (10) property owners, in some cases up to twenty five (25). Therefore, even more intensive outreach and negotiation is required during the design and construction of stream restoration projects which typically take approximately thirty (30) months to design, permit and construct. Although the County has the right to condemn property to obtain easements, condemnation requires approval by the County Council and is extremely expensive and time-consuming, requiring a year or more to complete.

Harford County does have the ability to complete both stormwater retrofits and stream restorations more quickly on County owned property. Based on previously completed projects, projects completed on County owned properties take approximately six (6) months less than on privately owned properties.

The Draft Permit requires the watershed restoration of 20% of the impervious surfaces to be completed by the end of the permit term. On average stormwater retrofit projects and stream restoration projects take approximately two (2) years to design, permit and construct on privately owned property and approximately one and a half (1½) years on County owned properties.

Therefore, a majority of the projects need to be identified and designs initiated no later than the end of the third year of the permit. Based on watershed restoration projects completed in Harford County each project averages approximately fifteen (15) impervious acres. Approximately, one hundred thirty two (132) projects would be necessary to meet the watershed restoration requirement in the Draft Permit (1,976 impervious acres / 15 impervious acres per project = 132 projects).

Dividing one hundred thirty two (132) projects over the first three (3) years of the permit would be approximately forty four (44) projects per year. For fiscal year 2014, Harford County had eleven (11) projects under design. The Draft Permit would require that the County undertake four (4) times as many design projects as it currently manages. That is an excessive program increase.

Additionally, construction of the one hundred thirty two (132) projects would occur over the last three (3) years of the permit term. To meet this permit requirement Harford County would need to bid and award construction contracts for approximately forty four (44) projects per year. Over the past five years Harford County has constructed on average two (2) projects per year. The Draft Permit would require that the County expand its construction program by over 20 times. Based on past experience with watershed restoration projects, there is currently a limited number of experienced contractors capable of completing watershed restoration projects successfully. Issuing this amount of construction work will likely lead to an influx of under-qualified contractors attempting to complete this specialized work. Completing watershed restoration correctly the first time is Harford County's priority.

(2) Watershed Assessments

Harford County Draft Permit

"By the end of the permit term, Harford County shall complete detailed watershed assessments for the entire County"

Watershed assessments are completed to systematically identify opportunities for watershed restoration. Since the design and construction for watershed restoration projects can take up to two years to complete, a majority of the assessments need to be completed within the first three years of the permit. The completion of watershed assessments for the entire County is labor and cost intensive and neglects the need to prioritize funding and resources in the watersheds with the greatest impacts from urban development. It additionally expands the coverage area of the MS4 permit outside of the designated urban areas as specified in the Phase I and Phase II rulings and outside the areas served by the County's MS4. Harford County believes we will get the best return

(in terms of environmental improvement) from our investment if we focus on the Bush River watershed.

Through our local planning efforts, over 70% of the County's population has been directed into the Priority Funding Area or the development envelope. This allows for preservation of sensitive areas within our rural districts. Impacts from impervious surfaces outside of the development envelope where the minimum residential lot size is 2 acres are much smaller than within the development envelope where building is much denser.

Table 13: Summary of Harford County Impervious Area and Population by Watershed[1]

Watershed	Area (Acres)	% of Total Impervious	% Impervious	Population[2]	Population[2] (per square mile)
Bush	76,000	52%	10%	60%	1,400
Gunpowder	24,000	15%	6%	12%	900
Lower Susquehanna	126,000	29%	3%	19%	260
Upper Western Shore	16,000	4%	8%	9%	970
	242,000	100%	6%	100%	740

[1] The table includes all properties within the County including state and federally owned properties and roadways and properties within the incorporated municipalities

[2] 2010 US Census Data

The Bush River watershed encompasses a majority of the designated urban areas. The Bush River watershed is the most densely populated watershed in the County (Table 13). It contains nearly 70% of the development envelope, 60% of the total County population, and over 50% of the total County impervious surfaces. The Bush River watershed contains nearly 7,600 acres of impervious surfaces. If funding and the speed of implementation were not a problem, this would be a sufficient amount of impervious surfaces to meet the 20% watershed restoration required in the Draft Permit, or 1,976 acres.

Conversely, the Lower Susquehanna River watershed is located completely outside of the development envelope, has the lowest population density per square mile, and lowest percent impervious surfaces. Likewise, a large majority of development within the Lower Susquehanna River watershed is agricultural. Watershed restoration for agriculture has been assigned an allocation for nutrient and sediment load reductions in the Chesapeake Bay Watershed Implementation Plan. Therefore, any watershed assessments for the Lower Susquehanna River watershed should be completed by the agricultural community and excluded from the MS4 permit.

The majority of watershed assessments must be completed during the first three years of the permit in order to identify projects for restoration. In addition to this compressed schedule, the Draft Permit has specific requirements for public participation that must be followed before an assessment can be finalized including a minimum 30 day comment period and summary of how the County addressed any material comments.

Harford County not only contends that completing watershed assessments for the entire county exceeds the County's MEP, we also contend that it extends the permit beyond the intent of focusing on urban areas. Harford County believes we will get the best return (in terms of environmental improvement) from our investment if we focus on the Bush River watershed during this permit term.

(3) Restoration Plans

Prior to issuing the Draft Permit, MDE developed watershed restoration for impervious surfaces as a surrogate parameter to quantify pollutant reductions. The inclusion of restoration plans for stormwater wasteload allocations in the Draft Permit now requires Harford County to also directly analyze pollutant load reductions. A significant amount of work is necessary to track progress for both requirements.

The intention of the restoration plans appears to replicate the Bay Watershed Implementation Plans with planning level estimates and schedules for BMP implementation and programmatic implementation. Individual project identification and cost estimates are not required within those plans. Identification of individual projects occurs during the watershed assessment phase when actual field investigations are completed. Providing that level of detail is impossible within one year of the effective date of the permit. Additionally, it is impossible to select a final date for meeting the WLAs beyond the five-year permit term. Harford County would need to speculate what additional requirements may be added to the next five-year permit term to determine its ability to finance a program of this significant a scale.

Harford County Draft Permit

"Within one year of permit issuance, Harford County shall submit to MDE for approval a restoration plan for each stormwater WLA approved by EPA prior to the effective date of the permit."

As discussed above a stormwater WLA has not been allocated to Harford County for the Bay TMDL. Harford County intends to continue developing its Phase II WIP and 2 year milestone attributed to the planning level load estimates through the County's planning team and documenting its progress through that program. Developing an enforceable restoration plan based on planning level estimates for loads is inappropriate.

4. Conclusion

The maximum amount estimated by Harford County that is available to finance the Draft Permit is $72.3 million over the five-year permit term, considerably less than the $125 million required for full implementation. The amount which the County projects will be available to implement watershed restoration is $15 million less than the total or $57.3 million.

Based on the funds available and review of the typical implementation schedules for watershed restoration projects, Harford County's MEP is 10% of impervious surfaces not already restored to the MEP (Table 14).

In addition to the following assumptions made to develop the MEP, Harford County has assumed that the requirements of the Draft Permit would become effective for the next fiscal year to begin July 1, 2015 to allow for the County to increase funding.

- Harford County's total impervious surface not restored to the MEP is 9,880 acres
- Watershed Assessments to be completed only for the Bush River watershed
- Restoration Plans and annual TMDL assessments only required for Bynum (sediments) and Loch Raven (phosphorus)
- No additional restoration plans or annual TMDL assessments will be added during this permit term
- No changes to the Accounting Document that would lower current efficiencies or credits for projects where the County has already invested funds.

The information listed in Table 14 is not a commitment of the funding levels proposed but a summary of the maximum potential funding estimated to be available. A change in administration including a new county executive and at least two new county council members will occur in January 2015. Any increase in the restoration fee, approval to issue bonds or increase in the capital or operating budget for watershed restoration will be subject to their final approvals.

Table 14: Harford County's MEP based on Available Revenue and Implementation Schedules

Fiscal Year	Design[1]		Construction[2]	
	Costs (millions)	Impervious (acres)	Costs (millions)	Impervious (acres)
2015	$3.2	195	$1.5	40
2016	$3.2	195	$1.5	40
2017	$1.9	115	$12.2	320
2018	$8.1	490	$23.8	625
2019	0	0	$1.9	50
	$16.4	995	$40.9	1075[4]

[1] 30% of $55,000 = $ 16,500 per impervious acre

[2] $55,000 - $16,500 = $38,500 per impervious acre

[3] Total watershed restoration costs $16.4 M + $40.9 M = $57.3 M; Other Draft Permit implementation costs $3 M per year; Total Draft Permit implementation costs $57.3 M + $15 M = $72.3 M; Revenue outlined in Table 11.

[4] Design projects have been initiated for 80 impervious acres; 995 (new designs) + 80 (existing designs) = 1075 / 9,880 impervious acres = 10.8%.

5. Draft Permit Revisions

The following updates to the Draft Permit are necessary to align with Harford County's MEP. Additional updates are included in Harford County's comments on the tentative determination.

Harford County MEP – Part IV.E.1.a.

"By the end of the permit term, Harford County shall complete detailed watershed assessments for the ~~entire County~~ **Bush River Watershed**"

Harford County MEP – Part IV.E.2.a.

"By the end of this permit term, Harford County shall commence and complete the implementation of restoration efforts for ~~twenty~~ ten percent of the County's impervious surface area"

Harford County MEP – Part IV.E.2.b.

"Within **two years** ~~one year~~ of permit issuance, Harford County shall submit to MDE for approval a restoration plan for ~~each~~ the stormwater WLAs approved by EPA **for Loch Raven and Bynum Run** ~~prior to the effective date of the permit~~. The County shall submit restoration plans for subsequent TMDL WLAs **during the next permit term** ~~one year of EPA approval~~. ~~Upon approval by MDE, these restoration plans will be enforceable under this permit.~~ As part of the restoration plans, Harford County shall:

i. Include ~~the final date for meeting applicable WLAs and a detailed~~ schedule for implementing all structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiation necessary for ~~meeting~~ **addressing** applicable WLAs;

ii. Provide ~~detailed~~ **planning level** cost estimates for ~~individual~~ restoration projects, programs, controls, and plan implementation;

iii. Evaluate ~~and track~~ **pollutant load reductions for** the implementation **of** restoration plans through monitoring or modeling ~~to document the progress toward meeting established benchmarks, deadlines, and stormwater WLAs~~; and

iv. **Submit for MDE approval any modifications to the approved restoration plans based on** ~~Develop~~ an ongoing, iterative process that continuously implements structural and nonstructural restoration projects, program enhancements, new and additional programs, and alternative BMPs ~~where EPA approved TMDL stormwater WLAs are not being met according to the benchmarks and deadlines established as part of the County's watershed assessments~~."

Harford County MEP Analysis

Completed September 2014

Cost to implement draft permit

- 9,880 acres impervious untreated for water quality
- 20% = 1,976 acres
- $55,000 per IA; median King & Hagan
- Total restoration cost = $110 M or $22 M per year
- Additional costs = $15 M or $2 M per year

Note – approved impervious baseline 11,094; 20% = 2,218 (2017)

Table 6: Harford County Revenues[1]

Fiscal Year	Property Taxes (millions)	Income Taxes (millions)	Other Revenue[2] (millions)	Total (millions)	% Change
2015[3]	$293	$199	$136	$627	-2%
2014[3]	$289	$191	$160	$640	-3%
2013[4]	$293	$183	$182	$658	10%
2012[4]	$299	$179	$122	$600	4%
2011[4]	$295	$166	$114	$575	-3%

[1] Source: Harford County Approved Operating Budget reports

[2] Largest contributions to other revenue include recordation / transfer tax, Highways user tax, Water and Sewer user fees, licenses, and permits

[3] Projections

[4] Actuals

Table 7: Harford County Projected Revenue by Fund for Fiscal Year 2015[1]

	Property Taxes (millions)	Income Taxes (millions)	Other Revenue[2] (millions)	Total (millions)
General[3]	$250	$199	$40	$488
Highways	$35	$0	$11	$46
Water & Sewer	$0	$0	$65	$65
Solid Waste	$0	$0	$14	$14
Stormwater[4,5]	$1	$0	$0	$1
AG Preservation	$6	$0	$5	$11
Parks	$0	$0	$1	$1
Other[6]	$1	$0	$0	$1
	$293	$199	$136	$627

[1] Source: Harford County 2015 Approved Annual Operating Budget

[2] Largest contributions to other revenue include recordation / transfer tax, Highways user tax, Water and Sewer user fees, licenses, and permits

[3] Agencies under the General Fund include – General Capital, Sheriff / Emergency / Fire, Harford Community College, Libraries, Board of Education

Table 8: Harford County General Fund Appropriations for Fiscal Year 2015[1]

	Appropriations (millions)	% of Total Appropriations
General Government[2]	$84	17%
Education	$239	49%
Public Safety	$96	20%
Libraries	$16	3%
Capital Improvements[3]	$5	1%
Debt Service	$49	10%
	$488	100%

[1] Source: Harford County 2015 Approved Annual Operating Budget

[2] Under General Government there are 16 County agencies, allocations to other State and local agencies such as the municipalities and the Health Department, other programs such as Handicapped Care Centers, County self-insurance, and benefits including pensions.

[3] Appropriations listed here are the County revenue portion of capital improvements or in general terms cash contributions.

Table 10: Estimated Annual Availability of Traditional Grant Funding Sources

Grant	Estimated Grants Available (millions)
Chesapeake and Atlantic Coastal Bays Trust Fund[1]	$16
Chesapeake Bay Trust[2]	$5
Water Quality Revolving Loan Fund - Green Forgiveness[3]	$0.3
Chesapeake Bay Stewardship Fund[4]	$12
Non-point Source Section 319 Grants[5]	$2.5
	$35.8

Note – Bay Restoration Funds now available for stormwater projects

Table 11: Harford County Debt Limits for 2015[1]

	Approved Debt Policies		Actual Projected Debt		Available Bonding Capacity
Net Debt[2]	2.3%	$615 M	1.8%	$472 M	$142 M
Debt Service[3]	10%	$54.5 M	8.9%	$48.6 M	$5.8 M

[1] Source: Harford County website, 2015 Approved Annual Operating Budget

[2] Percentage of Taxable Property Value = $26,734 M (2015)

[3] Percentage of Total Expenditures = $545 M (2015)

Note - $30 M bond for 20 year term at 4% interest - $2.2 M debt services

Exhibit 4.5

County Income Tax Rates in Calendar 2011-2019

County	CY 2011	CY 2012	CY 2013	CY 2014	CY 2015	CY 2016	CY 2017	CY 2018	CY 2019
Allegany	3.05%	3.05%	3.05%	3.05%	3.05%	3.05%	3.05%	3.05%	3.05%
Anne Arundel	2.56%	2.49%	2.56%	2.56%	2.56%	2.50%	2.50%	2.50%	2.50%
Baltimore City	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%
Baltimore	2.83%	2.83%	2.83%	2.83%	2.83%	2.83%	2.83%	2.83%	2.83%
Calvert	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	3.00%	3.00%	3.00%
Caroline	2.63%	2.63%	2.63%	2.73%	2.73%	2.73%	2.73%	2.73%	3.20%
Carroll	3.05%	3.05%	3.05%	3.04%	3.03%	3.03%	3.03%	3.03%	3.03%
Cecil	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	3.00%	3.00%
Charles	2.90%	2.90%	2.90%	3.03%	3.03%	3.03%	3.03%	3.03%	3.03%
Dorchester	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%
Frederick	2.96%	2.96%	2.96%	2.96%	2.96%	2.96%	2.96%	2.96%	2.96%
Garrett	2.65%	2.65%	2.65%	2.65%	2.65%	2.65%	2.65%	2.65%	2.65%
Harford	3.06%	3.06%	3.06%	3.06%	3.06%	3.06%	3.06%	3.06%	3.06%
Howard	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%
Kent	2.85%	2.85%	2.85%	2.85%	2.85%	2.85%	2.85%	2.85%	2.85%
Montgomery	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%
Prince George's	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%
Queen Anne's	2.85%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%
St. Mary's	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Somerset	3.15%	3.15%	3.15%	3.15%	3.15%	3.15%	3.20%	3.20%	3.20%
Talbot	2.25%	2.25%	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%
Washington	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%
Wicomico	3.10%	3.10%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%
Worcester	1.25%	1.25%	1.25%	1.25%	1.25%	1.75%	1.75%	1.75%	1.75%

Source: Office of the Comptroller

Harford County – 9th highest

Exhibit 4.1

County Real Property Tax Rates in Fiscal 2011-2019

(per $100 of assessed value)

County	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Allegany	$0.983	$0.982	$0.981	$0.980	$0.979	$0.978	$0.977	$0.976	$0.975
Anne Arundel	0.880	0.910	0.941	0.950	0.943	0.923	0.915	0.907	0.902
Baltimore City	2.268	2.268	2.268	2.248	2.248	2.248	2.248	2.248	2.248
Baltimore	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
Calvert	0.892	0.892	0.892	0.892	0.892	0.892	0.952	0.952	0.937
Caroline	0.870	0.870	0.890	0.940	0.960	0.980	0.980	0.980	0.980
Carroll	1.048	1.028	1.018	1.018	1.018	1.018	1.018	1.018	1.018
Cecil	0.915	0.940	0.991	0.991	0.991	0.991	0.991	1.041	1.041
Charles	1.026	1.067	1.121	1.205	1.205	1.205	1.205	1.205	1.205
Dorchester	0.896	0.976	0.976	0.976	0.976	0.976	0.976	0.974	1.000
Frederick	1.064	1.064	1.064	1.064	1.060	1.060	1.060	1.060	1.060
Garrett	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
Harford	1.042	1.042	1.042	1.042	1.042	1.042	1.042	1.042	1.042
Howard	1.150	1.150	1.190	1.190	1.190	1.190	1.190	1.190	1.190
Kent	1.022	1.022	1.022	1.022	1.022	1.022	1.022	1.022	1.022
Montgomery	0.915	0.959	1.003	1.021	1.008	0.999	1.038	1.013	0.993
Prince George's	1.319	1.319	1.319	1.319	1.319	1.374	1.374	1.374	1.374
Queen Anne's	0.767	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847
St. Mary's	0.857	0.857	0.857	0.857	0.857	0.852	0.852	0.848	0.848
Somerset	0.884	0.884	0.884	0.915	0.915	1.000	1.000	1.000	1.000
Talbot	0.432	0.448	0.491	0.512	0.527	0.536	0.547	0.571	0.606
Washington	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
Wicomico	0.759	0.769	0.840	0.909	0.952	0.952	0.952	0.940	0.940
Worcester	0.700	0.700	0.770	0.770	0.770	0.835	0.835	0.835	0.835

Note: The rates in Charles, Howard, Montgomery, and Prince George's counties reflect special rates for services not funded from the general county property tax rate.

Source: Department of Legislative Services

Harford County – 7th highest

Stormwater Utility Fee

- Bill 13 – 12 Introduced
  - Commercial - $7 per 500 square feet IA
  - Residential - $125 flat fee
  - Tax exempt – no fee
  - Approximately $12 M per year

- Bill 13 – 12 Approved
  - Reduced fees to 10% of proposed or approximately $1.2 M per year
  - Established a Task Force to study needs rates - $60 recommended

- Bill 14 – 36 Approved (after the MEP analysis was completed)
  - Repealed stormwater utility fee
  - Established $2 M per year from recordation fee, partially used to pay debit services for a $6 M per year allocation for bonds

Table 12: Estimated Revenue Available to Implement the Harford County Draft MS4 Permit

	Revenue				Debt Service		
Year	Fees (millions)	Grants (millions)	Bonds (millions)	Loans (millions)	Bonds (millions)	Loans (millions)	Total (millions)
1	$5.7	$2.0	$0	$0	$0	$0	$7.7
2	$5.7	$2.0	$0	$0	$0	$0	$7.7
3	$5.7	$2.0	$0	$10	$0	- ($0.6)	$17.1
4	$5.7	$2.0	$30	$0	- ($2.2)	- ($0.6)	$34.9
5	$5.7	$2.0	$0	$0	- ($2.2)	- ($0.6)	$4.9
	$28.5	$10.0	$30	$10	- ($4.4)	- ($1.8)	$72.3

Note

- $72.3 M is approximately half of the cost to finance the permit
- Actual budget is $50 M; $6 M paygo / bonds and $4 M grants

Ability to implement over 5-year permit term

- Obstacles
  - Stormwater management facilities are privately owned and maintained
  - No existing easements along stream corridors
  - Stream closure periods
- Retrofits – 12 months to design
- New stormwater facilities – 18 months
- Stream restoration – 30 months
- Amount of time needed for project management not directly proportional to size of the project
- “Issuing this amount of construction work will likely lead to an influx of under-qualified contractors attempting to complete this specialize work.”

MARYLAND PHASE I MS4 PERMITTING TELECONFERENCE

MARCH 1, 2019

The Legal Basis for and Effective Use of the "Maximum Extent Practicable" Standard

Christopher D. Pomeroy

AQUALAW

www.AquaLaw.com

The MEP Standard: CWA § 402(p)(3)(B)(iii)

"Permits for discharges from MS4s . . . shall require controls to reduce the discharge of pollutants to the ***maximum extent practicable***, including management practices, control techniques and system, engineering and design methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants."

Either MEP Is a "Real" Legal Standard, or Regulators Are Free to Order the "Impracticable"

- It is well-established that Permitting Authorities are NOT required by CWA to impose strict WQS or TMDL compliance in MS4 permits
- We think the CWA is clear, but there is basically no case law on whether Permitting Authorities may impose the "impracticable"
- To our knowledge no "beyond MEP" level of effort has ever been imposed based on CWA over MS4's objection pursued to completion of the permitting process (i.e., appeal stage)
- The leading cases on this issue are in progress:
  - Maryland MS4 Permit Appeals (4 Phase I Permits, plus Phase II GP)
  - EPA Region I Massachusetts & New Hampshire Phase II GPs

Hopefully MD, MA & NH Will Come Into Line with, Say, the NC Large Phase I MS4 Permits (Oct. 2018)

c. If subject to an approved TMDL with a NPDES MS4 regulated WLA assigned to the permittee, the permittee will be considered in compliance with the TMDL if the permittee complies with the conditions of this permit, including developing and implementing appropriate BMPs within the six minimum measures to address the permittee's MS4s NPDES regulated WLA to the maximum extent practicable (MEP). While improved water quality is the expected outcome, the permittee's obligation is to implement BMP's designed to address the NPDES MS4 regulated WLA assigned to the permittee to the maximum extent practicable (MEP). The permittee is not responsible for attaining water quality standards (WQS). The Division expects attaining WQS will only be achieved through reduction from all point and nonpoint source contributors identified in the approved TMDL.

Assuming MEP Is Confirmed as a Real Standard, the Next Question Is: How to Implement It?

- **The Maryland Court of Appeals has already told us:**
  - *"Congress established a broad requirement for MS4s. The list of required controls is not exclusive. And the purpose of the controls — reducing the discharge of pollutants — exists alongside the flexible, undefined standard "to the maximum extent practicable."*
    - MDE v. Anacostia Riverkeeper, 134 A.3d 892, 913 (Md. 2016) (emphasis added).

- **Plus, the Court of Appeals may have more to say**
  - About the meaning, scope or intent of MEP, in the course of deciding the pending Frederick County permit appeal

EPA Has Told Us "Case-by-Case" and Provided Some Considerations

(Phase II Rule, 64 Fed. Reg. 68722, 68754 (Dec. 8, 1999))

- **EPA Has Not Defined MEP**
  - Intent is for each MS4 to review on case-by-case basis

- **Considerations In Determining Your MEP**
  - Condition of receiving waters
  - Specific local concerns
  - Other aspects of comprehensive watershed plan
  - MS4 size
  - Implementation schedules
  - Ability to finance
  - Capacity to perform O&M
  - Hydrology/geology

TYPICAL GOAL OF MS4 PERMITTEE

A 5-Year Scope of Work Appropriate to the 5-Year MS4 Permit

- Practicable to Implement
- On Schedule (5-Year deadline)
- To Reduce Pollutants (to Make Progress Toward WQS)

Key MEP Categories

- **Financial Practicability / Impracticability**
  - The stormwater costs in question, plus
  - Other water quality needs
  - Other public needs
  - Consideration of the tax or rate increases needed to meet the revenue requirements

- **Other (Non-Financial)**
  - Ex: Project throughput given planning, design, permitting, financing, procurement, and construction timelines

Distinguishing Practicable from Impracticable: PARTICIPATE FULLY IN THE PROCESS

- This is a major public investment, manage it accordingly
- Invest early in determining your MEP
- Put your MEP Analysis in writing and fully justify conclusion
- Deliver Draft MEPA early in process to the agency
- Meet with the agency to present your findings
- No threats, but be clear you are fully committed to achieving a reasonable outcome
- Request more mtgs as needed to work toward consensus
- Keep escalating talks to highest State-Local levels until resolved
- Even to highest level of Executive Branch if need be
- Do everything necessary before Tentative Determination published to reach a reasonable outcome

Distinguishing Practicable from Impracticable:
USE THE FACTS & DATA – FINANCIAL MEP EXAMPLE

- Document past investments and progress, take credit
- Document increasing level of investment over time
- Develop compliance costs for Draft Permit
- Compare the past 5-year cost to the proposed cost
- Determine the tax or fee increases the State is proposing
- Discuss the State's proposed cost increase in units that normal people can understand and relate to
- Ex: $ per household (not total costs – hard to comprehend)
- Ex: XX% increase per year (what else goes up by double digits?)
- Benchmark against national studies, other comparable localities
- Distinguish reasonable numbers vs. extremes

Distinguishing Practicable from Impracticable: ADDITIONAL TECHNIQUES

- Put Stormwater In Context with Bigger Picture
  - Other clean water interests (wastewater costs)
  - Other environmental interests (open space, waste, air)
  - Other community needs (schools, roads, etc)
- Use Public Communications to Your Benefit
  - "Shine a Light" on stormwater costs and impacts
  - Use public meetings of your Board to get info out
  - Media strategies (press releases, op-eds, social media)
- Pull in Your General Assembly Delegation as Warranted
  - Facilitate or participate in high-level meetings
  - There may be other unrelated issues that create leverage

Distinguishing Practicable from Impracticable: EXTEND THE PROCESS UNTIL REASON PREVAILS

- An appeal opportunity is a Clean Water Act requirement, though it is obviously a fallback strategy for a permittee
- It is essential to strategically build the record as you go, not just to preserve this option, but to be more effective in negotiations
- I.e., if you don't build a record, the State will know you have no viable appeal strategy, so you lose leverage and consideration
- MEP Analysis is at heart of building record, so this is not hard to do
- Also, strategically consider early written communications to State
- As public bodies, also be thoughtful about your own writings (PIA)
- Written comments during official comment period are key for preserving your rights and developing the record
- Public Information Act requests should be considered to obtain internal State communications at a timely point in process
- Make friends, stick together, and achieve the best result possible

Maximum Extent Practicable
Frederick County

March 1, 2019

www.sustainablefrederickcounty.org

CWA Basis for MEP

- Clean Water Act (CWA) Section 402(p)(3)(B)(iii) establishes MEP as the legal compliance standard for MS4 permits.
- Frederick County MEP document set
  - Analysis including EPA factors plus local considerations.
    - Several embedded studies in Appendices
  - Permit and fact sheet markup
  - Separate comment letter

Structure of MEP Analysis

- Evaluation of permit for existing, new and practicable, new and impracticable tasks
- Discussion on each impracticable permit task
  - Identification of impracticable permit language
  - Impracticability evaluated using MEP elements modified from EPA
  - Recommendation on change of permit text to reflect MEP
- Ability to finance the program in its own section due to complexity
  - Current permit costs, future permit costs, MEP costs
  - MEP costs derived from studies by MFSG, B&C

Elements of EPA MEP

64 Fed. Reg. 68722, 68754 (Dec. 8, 1999)

EPA has intentionally not provided a precise definition of MEP to allow maximum flexibility in MS4 permitting. MS4s need the flexibility to optimize reductions in storm water pollutants on a location-by-location basis. EPA envisions that this evaluative process will consider such factors as

- conditions of receiving waters,
- specific local concerns, and
- other aspects included in a comprehensive watershed plan.
- Other factors may include
  - MS4 size,
  - climate,
  - implementation schedules,
  - current ability to finance the program,
  - beneficial uses of receiving water,
  - hydrology,
  - geology, and
  - capacity to perform operation and maintenance.

Elements of Frederick County MEP

- MS4 size: Improper definition of MS4 boundary
- Implementation schedules: largely CIP-driven
- Capacity to perform operations and maintenance: impracticable enforcement of dispersed micro-BMPs
- Specific local concerns: various
- Conditions of receiving waters: WQS and WLAs
- Impossibility: do “all” of something, locus of control
- Burdensomeness: juice not worth the squeeze
- Current ability to finance the program: see details

Current Ability to Finance the Program

- Affordability determined to be unhelpful.
- County developed list of candidate CIP projects from assessments to meet 20% retrofit.
- B&C evaluated cost by BMP type in King and Hagen and updated per unit costs by project phase. Added timeframes by project phase. Included maintenance costs. Projected cost and timeframes for 20%.
- Municipal And Financial Services Group conducted ratepayer analysis on permit, recommended 15% escalator based on nationwide utility study.
- County used escalator to govern the rate of implementation, establish permit cost.
- Sage Policy Group identified opportunity costs to residents.

Current Ability to Finance the Program

- Frederick County's total estimated 5-year cost to implement its previous Permit was $12,428,322.
- Brown and Caldwell estimated the full cost of the Draft Permit, including the 20% restoration requirement, to be $142,346,010.
- MEP was established at $46,959,626, FY17 dollars.
- Municipal and Financial Services Group estimated MEP cost per ratepayer at $108 in Fiscal Year 2015 and escalated to $217 per ratepayer in Fiscal Year 2020.

Current Ability to Finance the Program

Projected MEP Costs per Year of Permit

MEP Costs	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
CIP-Related Total	$2,595,847	$3,417,528	$4,615,063	$5,880,669	$7,234,520	$8,898,108
Total Operating	$2,754,043	$2,796,311	$2,602,311	$2,502,311	$2,502,311	$2,411,222
Total MS4 Expenditures	$5,349,890	$6,213,839	$7,217,374	$8,382,980	$9,736,831	$11,309,330

Conclusions

- Practicability written into CWA for MS4s
- Permit as written was impracticable and MDE did not consider.
- County communicated prior to permit issuance what elements were practicable and what elements were not.
- MEP was based on defensible third party analysis.
- County challenged permit and executed at MEP level.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Thu, 14 Mar 2019 19:02:25 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Gill, Joseph P." <JPGill@co.pg.md.us>
Cc: "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Bennett, Katherine" <Katherine.Bennett@montgomerycountymd.gov>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Janis Markusic" <pwmark02@aacounty.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>
Subject: FW: Physical Capacity MEP Analysis for NPDES MS4 Phase I Large Jurisdictions
Attachments: Physical Capacity MEP Analysis Questionnaire - for Phase I Large .pdf

Large MS4 group managers,

See email from Jennifer Smith below. Attached is the draft questionnaire re physical capacity MEP analysis to which she refers.

You will see she also is proposing a group meeting with MDE staff sometime in the next few weeks. I have asked her to give us a few dates with which to work.

I understand from Jennifer that the intent is to discuss the questionnaire at the meeting and then revise. Your responses to the final questionnaire would then be due sometime after this meeting.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

From: Jennifer M. Smith - MDE <jenniferm.smith@maryland.gov>
Sent: Thursday, March 14, 2019 11:21 AM
To: Karl Berger <kberger@mwcog.org>
Cc: Raymond Bahr -MDE- <raymond.bahr@maryland.gov>; Lee Currey -MDE- <lee.currey@maryland.gov>; Jennifer Smith -MDE- <jenniferm.smith@maryland.gov>
Subject: Physical Capacity MEP Analysis for NPDES MS4 Phase I Large Jurisdictions

Karl,

MDE has developed a draft questionnaire that we think could be used to determine or justify a "Physical Capacity MEP Analysis" for the NPDES MS4 Phase I Large jurisdictions. As we discussed in our last NPDES MS4 Phase I Large group meeting held in January 2019, MDE is interested in including in the next generation NPDES Phase I Large MS4 permit, a restoration requirement that incorporates MEP. We

believe there is an MEP for each NPDES MS4 Phase I Large jurisdiction. Attached is our first attempt at developing a questionnaire that could be completed by each Phase I Large MS4 to better understand their Physical Capacity issues that would relate to MEP. This questionnaire is based on the various discussions we have had with the jurisdictions and the Financial Assurance Plan process and builds on work that was previously completed by the Phase I jurisdictions back in August 2017.

We would like to ask Prince George's County, Montgomery County, Anne Arundel County, Baltimore County and Baltimore City to review this draft questionnaire and we would like to meet with the counties to discuss the questionnaire, any comments, questions, and/or additions they would like to include, and any other thoughts they may have on determining Physical Capacity and MEP.

Please let me know if, as the coordinator of these group discussions, you could forward this document to the counties and organize a follow up meeting with MDE sometime between now and early April.

Please feel free to call me or Ray Bahr to discuss further.

Thanks,

Jennifer

--
Jennifer M. Smith, P.E.
Program Manager
Sediment, Stormwater and Dam Safety Program
Water and Science Administration
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

410-537-3561

Physical Capacity MEP Analysis Questionnaire

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

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

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

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

5. **Provide information on contracting limitations that result in longer project implementation times. Examples: Limited qualified construction contractors; Woman owned business enterprise (WBE) or minority owned business enterprise (MBE) requirements limit available qualified construction contractors and/or engineering contractors. Describe the issue and provide the time extension that results due to the issue.**

6. **Provide a typical time frame required to obtain permits from local, State, and federal agencies for the three main BMP project classes (i.e., upland stormwater ponds, instream restoration, and alternative projects) prior to construction. Describe how these time frames affect the overall project implementation time**

frames described in Question #1. How can these time frames be reduced to help get these projects out the door faster?

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

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

9. **Provide a copy of your 5 year CIP for restoration projects (2020-2027).**

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

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

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 18 Mar 2019 15:35:05 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>
Cc: "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Bennett, Katherine" <Katherine.Bennett@montgomerycountymd.gov>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Janis Markusic" <pwmark02@aacounty.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>
Subject: RE: Physical Capacity MEP Analysis for NPDES MS4 Phase I Large Jurisdictions
Attachments: Restoration Projects 2020-2027.xlsx

Folks,

Jennifer also provided a copy of an Excel spreadsheet that accompanies the questionnaire.

p.s. I have not heard from anyone in Baltimore County or City about the two time periods that MDE offered for the proposed meeting on this issue: 2 -5 p.m. (I would say 2 – 4) on either March 27 or March 29. Please let me know asap if you can make either or both of these dates.

- Karl

From: Karl Berger
Sent: Thursday, March 14, 2019 3:02 PM
To: 'Grove, Kimberly' <Kimberly.Grove@baltimorecity.gov>; 'Robert Hirsch' <rhirsch@baltimorecountymd.gov>; 'Bubar, Patrice' <Patty.Bubar@montgomerycountymd.gov>; Stevens, Amy <amy.stevens@montgomerycountymd.gov>; 'DeHan, Jeffrey M.' <jmdehan@co.pg.md.us>; 'Erik Michelson (pwmich20@aacounty.org)' <pwmich20@aacounty.org>; 'Gill, Joseph P.' <JPGill@co.pg.md.us>
Cc: 'White, Joan' <Joan.White@baltimorecity.gov>; 'Bennett, Katherine' <Katherine.Bennett@montgomerycountymd.gov>; jgmaldonado@co.pg.md.us; 'Janis Markusic' <pwmark02@aacounty.org>; Heidi Bonnaffon <hbonnaffon@mwcog.org>; 'Knapp, Les' <lknapp@mdcounties.org>
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Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

From: Jennifer M. Smith - MDE <jenniferm.smith@maryland.gov>
Sent: Thursday, March 14, 2019 11:21 AM
To: Karl Berger <kberger@mwcog.org>
Cc: Raymond Bahr -MDE- <raymond.bahr@maryland.gov>; Lee Currey -MDE- <lee.currey@maryland.gov>; Jennifer Smith -MDE- <jenniferm.smith@maryland.gov>
Subject: Physical Capacity MEP Analysis for NPDES MS4 Phase I Large Jurisdictions

Karl,

MDE has developed a draft questionnaire that we think could be used to determine or justify a "Physical Capacity MEP Analysis" for the NPDES MS4 Phase I Large jurisdictions. As we discussed in our last NPDES MS4 Phase I Large group meeting held in January 2019, MDE is interested in including in the next generation NPDES Phase I Large MS4 permit, a restoration requirement that incorporates MEP. We believe there is an MEP for each NPDES MS4 Phase I Large jurisdiction. Attached is our first attempt at developing a questionnaire that could be completed by each Phase I Large MS4 to better understand their Physical Capacity issues that would relate to MEP. This questionnaire is based on the various discussions we have had with the jurisdictions and the Financial Assurance Plan process and builds on work that was previously completed by the Phase I jurisdictions back in August 2017.

We would like to ask Prince George's County, Montgomery County, Anne Arundel County, Baltimore County and Baltimore City to review this draft questionnaire and we would like to meet with the counties to discuss the questionnaire, any comments, questions, and/or additions they would like to include, and any other thoughts they may have on determining Physical Capacity and MEP.

Please let me know if, as the coordinator of these group discussions, you could forward this document to the counties and organize a follow up meeting with MDE sometime between now and early April.

Please feel free to call me or Ray Bahr to discuss further.

Thanks,

Jennifer

--
Jennifer M. Smith, P.E.
Program Manager
Sediment, Stormwater and Dam Safety Program
Water and Science Administration
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

410-537-3561

Click here to complete a three question customer experience survey.

Restoration Projects To Be Planned, Designed, and/or Constructed from 2020 Through 2027
[INSERT MS4 NAME]

Unrestored Urban Impervious Acres:

REST BMP ID	REST BMP TYPE[1]	BMP CLASS[1]	NUM BMP	IMP ACRES	TSS REDUCTION (lbs/year)	TP REDUCTION (lbs/year)	TN REDUCTION (lbs/year)	IMPLEMENTATION COST	IMPLEMENTATION STATUS[2]
Operational Programs[3]									
		A							
		A							
		A							
		A							
		A							
Subtotal Operations[4]			0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	$0	
Capital Projects									
Subtotal Capital			0	0	0	0	0	$0	
Other									
Subtotal Other			0	0	0	0	0	$0	
Total			**0**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**$0**	

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

Notes:
1 Use BMP types and classes from the MDE Geodatabase.

PROJECTED IMPLEMENTATION YEAR	% ISRP	TMDL PARAMETER OR WQ OBJECTIVE ADDRESSED	GENERAL COMMENTS
	#DIV/0!		
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	#DIV/0!		
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	#DIV/0!		
	#DIV/0!		

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

BMP Classification	BMP Type Code	BMP Type
Alternative Surfaces (A)		
E	AGRE	Green Roof – Extensive
E	AGRI	Green Roof – Intensive
E	APRP	Permeable Pavements
E	ARTF	Reinforced Turf
Nonstructural Techniques (N)		
E	NDRR	Disconnection of Rooftop Runoff
E	NDNR	Disconnection of Non-Rooftop Runoff
E	NSCA	Sheetflow to Conservation Areas
Micro-Scale Practices (M)		
E	MRWH	Rainwater Harvesting
E	MSGW	Submerged Gravel Wetlands
E	MILS	Landscape Infiltration
E	MIBR	Infiltration Berms
E	MIDW	Dry Wells
E	MMBR	Micro-Bioretention
E	MRNG	Rain Gardens
E	MSWG	Grass Swale
E	MSWW	Wet Swale
E	MSWB	Bio-Swale
E	MENF	Enhanced Filters
Ponds (P)		
S	PWED	Extended Detention Structure, Wet
S	PWET	Retention Pond (Wet Pond)
S	PMPS	Multiple Pond System
S	PPKT	Pocket Pond
S	PMED	Micropool Extended Detention Pond
Wetlands (W)		
S	WSHW	Shallow Marsh
S	WEDW	ED – Wetland
S	WPWS	Wet Pond – Wetland
S	WPKT	Pocket Wetland
Infiltration (I)		
S	IBAS	Infiltration Basin
S	ITRN	Infiltration Trench
Filtering Systems (F)		

S	FBIO	Bioretention
S	FSND	Sand Filter
S	FUND	Underground Filter
S	FPER	Perimeter (Sand) Filter
S	FORG	Organic Filter (Peat Filter)
S	FBIO	Bioretention
Open Channels (O)		
S	ODSW	Dry Swale
S	OWSW	Wet Swale
Other Practices (X)		
S	XDPD	Detention Structure (Dry Pond)
S	XDED	Extended Detention Structure, Dry
S	XFLD	Flood Management Area
S	XOGS	Oil Grit Separator
S	XOTH	Other
Alternative BMPs		
A	MSS	Mechanical Street Sweeping
A	VSS	Regenerative/Vacuum Street Sweeping
A	IMPP	Impervious Surface Elimination (to pervious)
A	IMPF	Impervious Surface Elimination (to forest)
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A	CBC	Catch Basin Cleaning
A	SDV	Storm Drain Vacuuming
A	STRE	Stream Restoration
A	OUT	Outfall Stabilization
A	SPSC	Regenerative Step Pool Storm Conveyance
A	SHST	Shoreline Management
A	SEPP	Septic Pumping
A	SEPD	Septic Denitrification
A	SEPC	Septic Connections to WWTP

From: "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>
Sent: Mon, 1 Apr 2019 20:00:56 +0000
To: "Karl Berger" <kberger@mwcog.org>
Cc: "Lee Currey -MDE-" <lee.currey@maryland.gov>; "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Janis Markusic" <pwmark02@aacounty.org>; "Renee Matthews -MDE-" <renee.matthews@maryland.gov>; "Debbie Daugherty -MDE-" <debbie.daugherty@maryland.gov>
Subject: Re: Request for schedule information
Attachments: MS4 MACO Phase I Large Meeting Minutes January 29 2019.docx

Hi Karl and All,

The January 29, 2019 draft MS4 Meeting Minutes are attached for your information and use. Please review and let us know at Wednesday's meeting if you have any clarifications or comments. Also, in addition to discussing MS4 physical capacity this Wednesday, we plan to share/develop a reasonable schedule with you for issuing the Tentative Determination permits.

Thank you,

Ray

Raymond P Bahr
Deputy Program Manager
Sediment, Stormwater, and Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1708
(410) 537-3545

On Thu, Mar 28, 2019 at 10:46 AM Karl Berger <kberger@mwcog.org> wrote:

> Lee et al,
>
> Before our meeting on April 3 regarding physical capacity considerations of Maximum Extent Practicable, the MS4 representatives would like to repeat a request from our last meeting on Jan. 29. Can you provide us with a schedule and a set of expectations for how the various permit-related developments will play out in 2019? These include, obviously, the timetable for issuing a tentative determination draft and then a final Phase I permit, but also for finalizing a revised Accounting Guidance document, the resolution of the stream restoration accounting issues, and any other regulatory measures that will affect our planning processes. As you

know, project implementation planning is a multi-year process that is not easily adjusted in the near term; if the new permits require us to provide lists of planned projects based on various objectives, then we need to prepare for this as soon as possible.

Karl Berger

Principal Environmental Planner

Metropolitan Washington Council of Governments

202-962-3350

MS4 Phase I Large Permits Meeting Agenda
Tuesday, January 29, 2019
1 – 3 PM, Aeris Conference Room, 1st Floor, MDE Offices
1800 Washington Blvd., Baltimore MD

1. Introductions

2. MEP Analysis Discussion

3. Tentative Determination Permit Schedule

4. Permittee Issues – 10 minutes

   - Continued need for inclusive process (Karl Berger)
   - Request for meeting with relevant staff re impervious area cap issue / MDE letter of 12/26/18 (Erik Michelson and Rob Hirsch)

5. Open Discussion

Meeting Minutes:

- **Introductions** – Lynn Buhl is leaving MDE and will be missed for her assistance with the MS4 program

- **Summary of Why We Are Here –**
  - New MS4 permit template
  - Phase I jurisdictions' permits are expiring
  - Chesapeake Bay Program and contributions from all pollutant sectors
    - Stormwater will be responsible for:
      - Providing meaningful reductions
      - Long-term commitment and reduction goals
  - Reductions necessary for local TMDLs (stormwater WLAs)
  - Incorporate opportunities for co-benefits
    - Green infrastructure
    - Climate resiliency
    - Biological uplift
  - Assess 20% impervious acre restoration requirement from prior permits
  - Explore MEP to determine restoration requirements in new permits
    - What is ambitious but makes sense

- **MEP Analysis Initiative**
  - Physical capacity
    - Staffing/training
    - Consultant community availability
    - Length of time to implement projects
      - Permitting turn-around
      - Time-of-year restrictions
    - Growing cost of infrastructure operation and maintenance
    - The Department to revisit physical capacity questions from prior MACo meetings and develop a new MS4 survey for documenting the physical capacity MEP issues
  - Fiscal capacity
    - UMD Environmental Finance Center (EFC) to assist MDE by:
      - Providing a literature review
      - Meeting with each MS4 independently
      - Proposing a set of metrics to determine MEP
      - Developing an analytical tool for calculating a range of affordability

- **Open Discussion**
  - Request that MS4 meetings be inclusive of all phase I permitttees
  - Chasing impervious acres – is this the right metric?
    - Bay TN
    - Stormwater WLAs
    - Transition from IA to WLAs

- Counties (and City) want flexibility to develop plans that make sense locally
    - Implement local restoration plans to the MEP and back-calculate IA (or other) permit metrics
- Submission of FAPs
    - Montgomery County and Baltimore City
        - Five-year projections are difficult because:
            - 20% IA restoration completed
            - New permits have not been written
        - Must show budgets and continuation of annual programs and practices
    - Prince George's, Baltimore, and Anne Arundel counties
        - Need to show completion of prior permits' 20%
        - Permit compliance with 20%: trading or consent order
- Implementation and diminishing returns
    - Land availability
    - Increasing operation and maintenance costs
- MS4 Guidance Update
    - Metric guides the restoration portfolio
    - Grandfathering/new efficiencies?
    - Incentivizing co-benefits
        - Climate resiliency
        - Green Infrastructure
        - Local benefits
    - Maximize environmental results
- BMP updates and new efficiencies
    - Department to send out SHA outfall stabilization credit update
    - Clearinghouse/link to CBP updates on MDE webpage
- Stream restoration caps
    - Each MS4 should calculate IA using drainage area caps and no drainange area caps for comparison evaluation
    - MACo requests a meeting to discuss only stream restoration

From: "Karl Berger" <kberger@mwcog.org>
Sent: Thu, 4 Apr 2019 15:25:30 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Moore, Shannon" <SMoore@FrederickCountyMD.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Jim Caldwell" <JCaldwell@howardcountymd.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Karen Wiggen" <wiggenk@charlescounty.org>
Cc: "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Bennett, Katherine" <Katherine.Bennett@montgomerycountymd.gov>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Janis Markusic" <pwmark02@aacounty.org>; "Dorsey, Donald" <DDorsey1@FrederickCountyMD.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Erica Hahn" <HahnE@charlescountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Joiner, Jeremy" <JJoiner@FrederickCountyMD.gov>
Subject: MDE's direction re new permit
Attachments: MDE new permit presentation of April 3, 2019.pdf, Physical Capacity MEP Analysis Questionnaire - for Phase I Large .pdf, Copy of Restoration Projects 2020-2027.xlsx

MD MS4 managers,

At yesterday's meeting of MDE staff with the five larger MS4s, Jennifer and Ray worked their way through the attached set of slides. (I've also attached the questionnaire re physical capacity and accompanying spreadsheet from MDE that are referenced in the slides.)

To summarize MDE's proposed new permit direction in the broadest possible terms: MDE proposes to base the new permits on a MEP determination that includes financial and physical capacity considerations unique to each permittee. The MEP determination would drive the development of a portfolio of planned projects to be implemented across the five years of the permit term. That portfolio of planned projects would, in turn, translate into specific metrics (see slide #4)) for (1) impervious area treatment, (2) reduction in total nitrogen, and (3) local water quality improvement that would reflect progress toward local TMDLs (such as sediment reduction) or other goals as proposed by the permittee. Those metrics would be enforceable even as the portfolio of planned projects shifts over the span of the permit, i.e. you wouldn't have to do the specific set of projects you identified at the start of the permit, but you would have to achieve the metrics progress that full implementation of the portfolio promised to achieve. (This explanation assumes you have achieved the ISR acreage number from your current permit; if not, that is still an enforceable metric that may mean a consent decree for an administratively continued permit.)

The above is a significant simplification of the MDE proposal that leads, I am sure, to lots and lots of questions. For the other five MS4s that were not present at the meeting, I cannot tell you not to contact MDE with these questions. However, given a very ambitious schedule that calls for tentative determination drafts for these first five permits to be issued by the end of June (see slide # 15), I'm guessing that MDE staff may not be very responsive in the short term.

I will work to schedule a debrief call with the full group in the next few weeks at which we can hopefully address some of the questions. In the meantime, I would like to discourage folks from using this thread to ask and answer questions since I think that will soon spiral into incoherence. You can call me for at least some further enlightenment. It might help for you to post questions with me that the group may want to send as a group document to MDE.

p.s. There are lots of irons in the fire. MDE staff said it would get back to us with a proposed date in the next few weeks for a meeting of the full group on the stream restoration crediting issues that we have been pushing. I would like to wait to see that date(s) before scheduling a debrief call.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

Physical Capacity MEP Analysis Questionnaire

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

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

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

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

5. **Provide information on contracting limitations that result in longer project implementation times. Examples: Limited qualified construction contractors; Woman owned business enterprise (WBE) or minority owned business enterprise (MBE) requirements limit available qualified construction contractors and/or engineering contractors. Describe the issue and provide the time extension that results due to the issue.**

6. **Provide a typical time frame required to obtain permits from local, State, and federal agencies for the three main BMP project classes (i.e., upland stormwater ponds, instream restoration, and alternative projects) prior to construction. Describe how these time frames affect the overall project implementation time**

frames described in Question #1. How can these time frames be reduced to help get these projects out the door faster?

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

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

9. **Provide a copy of your 5 year CIP for restoration projects (2020-2027).**

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

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

Restoration Projects To Be Planned, Designed, and/or Constructed from 2020 Through 2027
[INSERT MS4 NAME]

Unrestored Urban Impervious Acres:

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A	SEPP	Septic Pumping
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A	SEPC	Septic Connections to WWTP

From: "Grove, Kimberly (DPW)"
Sent: Wed, 10 Apr 2019 18:24:22 +0000
To: "Jennifer M. Smith - MDE" <jenniferm.smith@maryland.gov>
Cc: "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Karl Berger" <kberger@mwcog.org>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Janis Markusic" <pwmark02@aacounty.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>
Subject: RE: Physical capacity questionnaire

Is April 12 still a deadline for this submittal? If there are extra questions, we will need time to develop the answers.

From: Jennifer M. Smith - MDE [mailto:jenniferm.smith@maryland.gov]
Sent: Friday, April 5, 2019 3:43 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
Cc: Raymond Bahr -MDE- <raymond.bahr@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>; Karl Berger <kberger@mwcog.org>; Bennett, Katherine <kate.bennett@montgomerycountymd.gov>; Robert Hirsch <rhirsch@baltimorecountymd.gov>; Bubar, Patrice <Patty.Bubar@montgomerycountymd.gov>; Stevens, Amy <amy.stevens@montgomerycountymd.gov>; DeHan, Jeffrey M. <jmdehan@co.pg.md.us>; Erik Michelson (pwmich20@aacounty.org) <pwmich20@aacounty.org>; jgmaldonado@co.pg.md.us; Janis Markusic <pwmark02@aacounty.org>; Heidi Bonnaffon <hbonnaffon@mwcog.org>; Knapp, Les <lknapp@mdcounties.org>
Subject: Re: Physical capacity questionnaire

Kim,

Thanks for your email. Ray and I will get back to you with answers to your questions.

Jennifer

On Fri, Apr 5, 2019 at 3:27 PM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> I understand from our meeting on Wednesday that the questionnaire is being revised, including additional questions related to public perception / acceptance and other capacity obligations for stormwater management which may overlap with the restoration requirement and. I started to develop responses but had a couple questions:

- What is the difference between question 1 and 2? The gaunt chart provided in question 1 should be able to answer the first request in question 3.

- Three types of projects are listed in question 1: large upland (Chapter 3 devices); 2. Stream restoration projects; and 3. Alternative projects (tree planting). Which category would ESD projects fit in?
- Verify that the spreadsheet is meant for five years (CY 2020 to 2025).
- What is the difference between question 10 and 11? How restoration projects differ from/' all BMPs implemented under the MS4 permit"? I am assuming that all BMPs will be meeting one of the three performance metrics (IA, TN, and TSS).

Thanks,

Kimberly L. Grove, P.E.
Chief, Office of Compliance & Laboratories
Baltimore City Department of Public Works
(410) 396 - 0732 (office)
(443) 835-9272 (cell)

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Jennifer M. Smith, P.E.
Program Manager
Sediment, Stormwater and Dam Safety Program
Water and Science Administration
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

410-537-3561

From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Fri, 19 Apr 2019 14:49:02 +0000
To: "Bennett, Katherine" <Kate.Bennett@montgomerycountymd.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Karl Berger" <kberger@mwcog.org>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Stevens, Amy" <Amy.Stevens@montgomerycountymd.gov>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Janis Markusic" <pwmark02@aacounty.org>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>
Cc: "Jennifer M. Smith - MDE" <jenniferm.smith@maryland.gov>; "Raymond Bahr - MDE-" <raymond.bahr@maryland.gov>
Subject: Re: Physical capacity questionnaire
Attachments: SWM_CRedit_Calculator_010518_no_swm_example.xlsx

All;

With respect to the questions offered by Ms. Bennett in her email; please consider the following:

First question: "The Accounting Principles document includes a link to a tool that we are meant to use to calculate edge of tide TN (https://mde.maryland.gov/programs/Water/WQT/Pages/WQT_Tools_Resources.aspx). ...Is that the tool we should use, and if so, do you know when it will be available?"

Answer: The "MD Stormwater Credit Calculator" is the correct tool; and it should be available on the Department's website in the next few days. However, I have also attached it to this email for your use.

Second question: "Would you please confirm that this is the webpage referred to in the guidance, or provide a link to any other page(s) we should use?

Answer: Yes, the Department's "Maryland's NPDES Municipal Separate Storm Sewer System (MS4) Permits" is correct. Existing and future guidance updates will be posted here.

If there are any additional questions concerning these websites, please let me know. Thanks! Stew C.

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment
1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

Click here to complete a three question customer experience survey.

Nutrient Trading Credit Calculator for Urban Stormwater Management Practices
Version: 1/2/17
Maryland Department of the Environment - Water and Sciences Administration

About the Calculator

1. This calculator estimates the pollutant load reductions for stormwater management (SWM) projects intende
2. Please populate the blue cells in this worksheet with applicable project data. The calculator will subsequentl
project. Once finished, email this spreadsheet along with <<other supporting documentation>> to MD's nutrient
3. Loads are calculated in this spreadsheet using Chesapeake Bay Phase 532 watershed model No Action (No BI
Chesapeake Bay Program approved runoff reduction curves/efficiencies for SWM facilities.

BASIC PROJECT INFORMATION

Populate blue cells below with basic project information

Project Name	
County	
Address	
Lat (XX.XXXXXX)	
Long (-XX.XXXXXX)	

WATERSHED INFORMATION

Populate blue cells below with information regarding Chesapeake Bay model geography. To determine the appl
webmap at <<mde.state.md.us>>. Locate your project site and identify the segment-shed and land-river segme

Segment-shed	
Land-River Segment	

PROJECT LOAD REDUCTIONS

Populate the blue cells below in the pre and post restoration load estimate tables with project data to generate
should not change, though the breakdown between impervious and pervious drainagea area can change.

Pre-Restoration Load Estimate	
Drainage Area (Acres)	
Impervious	*Pervious*

If the following scenario applies, please populate the additional blue cells below to finish calculating the pre-res
retrofitting an existing SWM facility and at the same time altering the facility's drainage area to capture additio

Drainage Area (Acres)

Impervious	*Pervious*

Post-Restoration Load Estimate	
Drainage Area (Acres)	
Impervious	*Pervious*

EOSCredit (lbs/yr)	
TN	*TP*
#N/A	#N/A

DEL Credit (lbs/yr)	
TN	*TP*
#N/A	#N/A

***Note**: *If you need further assistance determining whether a constructed SWM facility is an RR or ST practice, pl*
http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/Pages/stormwater_design.c
Allocations and Impervious Acres Treated" document at
http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/Documents/NPDES%20MS4

d for sale on the nutrient trading market.
y generate the TN, TP, and TSS load reduction credit for the
t trading administrator as XXX.XXX@Maryland.gov.
MP) scenario loading rates and delivery factors, as well as

licable geography, locate your project on MDE's interactive
nt it is located in.

credit. Total drainage area in the pre and post scenarios

SWM			EOS Load (lbs/yr)			DEL Load (lbs/yr)		
Type*	Pe	Code	TN	TP	TSS	TN	TP	TSS
		-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

toration load: the credit generating project consists of
onal area. If this scenario does not apply, leave the blue cells

SWM	EOS Load (lbs/yr)	DEL Load (lbs/yr)

Type*	Pe	Code	TN	TP	TSS	TN	TP	TSS
		-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

Total Pre-Restoration Loads					
EOS Load (lbs/yr)			DEL Load (lbs/yr)		
TN	TP	TSS	TN	TP	TSS
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

SWM			EOS Load (lbs/yr)			DEL (lbs/yr)		
Type	Pe	Code	TN	TP	TSS	TN	TP	TSS
		-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

TSS
#N/A

TSS
#N/A

lease consult MDE's Stormwater Design Manual at
aspx, or MDE's "Accounting for Stormwater Wasteload

!%20Guidance%20August%2018%202014.pdf).

Code
None
RR
ST
Dry
Dry Extended

Description
No SWM
Runoff Reduction Practice
Stormwater Treatment Practice
Dry Detention Pond or Hydrodynamic Structure (does not meet post 2000 WQv or CPv requirements)
Extended Dry Detention Pond (does not meet post 2000 WQv or CPv requirements)

Pe
0
0.25
0.5
0.75
1
1.25
1.5
1.75
2
2.25
2.5

Code	% Reduction
None-0	0%
Dry-0	5%
Dry Extended-0	20%
RR-0.25	32%
RR-0.5	44%
RR-0.75	52%
RR-1	57%
RR-1.25	60%
RR-1.5	64%
RR-1.75	66%
RR-2	69%
RR-2.25	71%
RR-2.5	72%
ST-0.25	19%
ST-0.5	26%
ST-0.75	30%
ST-1	33%
ST-1.25	35%
ST-1.5	37%
ST-1.75	39%
ST-2	40%
ST-2.25	41%
ST-2.5	42%

Code	% Reduction
None-0	0%
Dry-0	10%
Dry Extended-0	20%
RR-0.25	38%
RR-0.5	52%
RR-0.75	60%
RR-1	66%
RR-1.25	70%
RR-1.5	74%
RR-1.75	77%
RR-2	80%
RR-2.25	82%
RR-2.5	85%
ST-0.25	29%
ST-0.5	41%
ST-0.75	47%
ST-1	52%
ST-1.25	55%
ST-1.5	58%
ST-1.75	61%
ST-2	63%
ST-2.25	65%
ST-2.5	66%

Code	% Reduction
None-0	0%
Dry-0	10%
Dry Extended-0	60%
RR-0.25	40%
RR-0.5	56%
RR-0.75	64%
RR-1	70%
RR-1.25	76%
RR-1.5	80%
RR-1.75	83%
RR-2	86%
RR-2.25	88%
RR-2.5	90%
ST-0.25	37%
ST-0.5	52%
ST-0.75	60%
ST-1	66%
ST-1.25	71%
ST-1.5	74%
ST-1.75	77%
ST-2	80%
ST-2.25	83%
ST-2.5	85%

Segment-shed
ANATF_DC
ANATF_MD
BACOH
BIGMH
BOHOH
BSHOH
C&DOH_DE
C&DOH_MD
CB1TF
CB2OH
CB3MH
CB4MH
CB5MH_MD
CHOMH1
CHOMH2
CHOOH
CHOTF
CHSMH
CHSOH
CHSTF
EASMH
ELKOH
FSBMH
GUNOH
HNGMH
LCHMH
MAGMH
MANMH
MATTF
MIDOH
NANMH
NANOH
NANTF_DE
NANTF_MD
NORTF
PATMH
PAXMH
PAXOH
PAXTF
PISTF
POCMH_MD
POCOH_MD
POCOH_VA
POCTF
POTMH_MD
POTOH1_MD

POTOH2_MD
POTOH3_MD
POTTF_DC
POTTF_MD
RHDMH
SASOH
SEVMH
SOUMH
TANMH_MD
WBRTF
WICMH
WSTMH

Land-River Segment
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A24041EM4_4740_0000
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A24043PU2_3080_3640
A24043PU2_3090_4050
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A24043PU3_3390_3730
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A24043PU6_3590_3640
A24043PU6_3600_3602
A24043PU6_3602_3730
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A24043PU6_3690_3610
A24043PU6_3730_3750
A24043PU6_3750_3752
A24043PU6_3752_4080
A24043PU6_4080_4180
A24043PU6_4180_4150
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A24045EL1_5570_0001
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A24047EL1_5660_0000
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A24047EL2_5270_0001
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A24047EL3_5971_0000
A24047EL3_5972_0000
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A24510WM0_3742_0000
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A24510WM3_4060_0001
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B24001PU1_3940_3970
B24001PU2_3140_3680
B24001PU3_3680_3890
B24001PU4_3890_3990
B24001PU4_3970_3890
B24001PU4_4440_3970
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B24021PM3_3040_3340
B24021PM4_3340_3341
B24021PM4_3341_4040
B24021PM4_4040_4410
B24021PM7_4150_4290
B24021PM7_4200_4410
B24021PM7_4290_4200
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F24001PU1_3580_3780
F24001PU2_3370_4020
F24001PU3_3680_3890
F24001PU4_3780_3930
F24001PU4_3890_3990
F24001PU4_3970_3890
F24001PU4_3990_3780

F24001PU5_3930_4170
F24001PU5_4170_4020
F24001PU6_3870_3690
F24001PU6_4020_3870
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F24003WL0_4424_0000
F24003WL0_4602_0000
F24003WM0_3961_0000
F24003WM0_3962_0000
F24003XL3_4710_0000
F24003XU2_4270_4650
F24003XU2_4480_4650
F24003XU3_4650_0001
F24005WM0_3650_0001
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F24005WM0_3742_0000
F24005WM0_3881_3880
F24005WM0_3964_0000
F24005WM0_3965_0000
F24005WM1_3660_3910
F24005WM1_3910_0001
F24005WM3_3880_4060
F24005WM3_4060_0001
F24005WU0_3540_0000
F24005WU0_3541_0000
F24005WU0_3542_0000
F24005WU0_3670_0001
F24005WU1_3350_3490
F24005WU2_3320_3480
F24005WU3_3480_3481
F24005WU3_3481_0001
F24009WL0_4772_0000
F24009XL0_4954_0000
F24009XL0_5320_0001
F24013WM0_3881_3880
F24015EU0_3010_0000
F24015EU0_3130_0000
F24015EU0_3203_0000
F24015EU0_3363_0000
F24015EU1_2982_0000
F24015SL9_2970_0000
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F24017PL0_5390_0000
F24017PL0_5391_0000
F24017PL0_5392_0000
F24017PL0_5440_0000

F24017PL0_5450_0000
F24017PL0_5580_0000
F24017PL0_5581_0000
F24017PL0_5584_0000
F24017PL0_5720_0001
F24017PL0_5860_0000
F24017PL0_5930_0000
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F24019EL0_5280_0000
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F24019EL0_5590_0000
F24019EL0_5890_0000
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F24019EM0_5260_0000
F24019EM0_5261_0000
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F24021PM3_3040_3340
F24021PM4_3340_3341
F24021PM4_3341_4040
F24021PM4_4040_4410
F24021PM7_4150_4290
F24021PM7_4200_4410
F24021PM7_4290_4200
F24023PU3_4450_4440
F24025SL2_3060_0001
F24025SL9_2970_0000
F24025WU0_3160_0000
F24025WU0_3161_0000
F24025WU0_3162_0000
F24025WU0_3163_0000
F24025WU0_3164_0000
F24025WU0_3250_0001
F24025WU0_3251_0000
F24025WU0_3252_0000
F24025WU0_3253_0000
F24025WU0_3255_0000
F24025WU0_3540_0000
F24025WU1_3330_0001
F24027XU0_4090_4270
F24029EU0_3570_0000
F24029EU0_3571_0000
F24029EU0_3725_0000
F24029EU0_4122_0000
F24029EU0_4123_0000

F24031PL1_4460_4780
F24031PL1_4540_0001
F24031PM0_4640_4820
F24031PM1_4250_4500
F24031PM1_4500_4580
F24031PM4_4040_4410
F24031PM7_4410_4620
F24031PM7_4580_4820
F24031PM7_4620_4580
F24031PM7_4820_0001
F24031XU2_4330_4480
F24033PL0_4510_0001
F24033PL0_4961_0000
F24033PL0_5070_0001
F24033PL0_5290_0000
F24033PL0_5390_0000
F24033PL1_4540_0001
F24033PL1_5060_0000
F24033PL1_5061_0000
F24033PL1_5230_0001
F24033PL2_4810_0000
F24033PL2_4811_0000
F24033PL7_4960_0000
F24033PL7_4980_0000
F24033XL1_4690_0001
F24033XL1_4691_0000
F24033XU2_4480_4650
F24035EM2_4101_0000
F24035EU0_4872_0000
F24037PL0_5980_0000
F24037PL0_5981_0000
F24037PL0_5982_0000
F24037PL0_6110_0000
F24037PL1_5910_0001
F24037WL0_5881_0000
F24037XL0_4955_0000
F24037XL0_4956_0000
F24039EL0_5890_0000
F24039EL0_5894_0000
F24039EL0_6011_0000
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F24041EU0_4550_0000
F24043PM7_4150_4290
F24043PU0_3000_3090
F24043PU0_3601_3602
F24043PU0_3611_3530
F24043PU0_3751_3752

F24043PU1_3030_3440
F24043PU1_3100_3690
F24043PU2_3080_3640
F24043PU2_3090_4050
F24043PU2_4050_4180
F24043PU3_3390_3730
F24043PU6_3440_3590
F24043PU6_3530_3440
F24043PU6_3590_3640
F24043PU6_3600_3602
F24043PU6_3602_3730
F24043PU6_3610_3530
F24043PU6_3640_3600
F24043PU6_3690_3610
F24043PU6_3730_3750
F24043PU6_3750_3752
F24043PU6_3752_4080
F24043PU6_4080_4180
F24043PU6_4180_4150
F24045EL0_5760_0000
F24510WM0_3650_0001
F24510WM0_3960_0000
F24510WM0_3961_0000
F24510WM1_3910_0001

Land-River Segment	TN DF
A24001PU0_3871_3690	0.2646
A24001PU1_3100_3690	0.2488
A24001PU1_3580_3780	0.1905
A24001PU2_3180_3370	0.0629
A24001PU2_3370_4020	0.1339
A24001PU4_3780_3930	0.2939
A24001PU4_3890_3990	0.2767
A24001PU4_3990_3780	0.2807
A24001PU5_3930_4170	0.3357
A24001PU5_4170_4020	0.3666
A24001PU6_3870_3690	0.3998
A24001PU6_4020_3870	0.3776
A24003WL0_4390_0000	1
A24003WL0_4391_0000	1
A24003WL0_4392_0000	1
A24003WL0_4393_0000	1
A24003WL0_4394_0000	1
A24003WL0_4420_0000	1
A24003WL0_4421_0000	1
A24003WL0_4422_0000	1
A24003WL0_4423_0000	1
A24003WL0_4424_0000	1
A24003WL0_4425_0000	1
A24003WL0_4600_0000	1
A24003WL0_4601_0000	1
A24003WL0_4602_0000	1
A24003WL0_4603_0000	1
A24003WL0_4770_0000	1
A24003WL0_4771_0000	1
A24003WL0_4772_0000	1
A24003WM0_3961_0000	1
A24003WM0_3962_0000	1
A24003WM0_3963_0000	1
A24003WM0_3966_0000	1
A24003WM3_4060_0001	0.6955
A24003XL3_4710_0000	1
A24003XL3_4711_0000	1
A24003XL3_4712_0000	1
A24003XL3_4713_0000	1
A24003XL3_4950_0000	1
A24003XU2_4270_4650	0.8021
A24003XU2_4480_4650	0.3764
A24003XU3_4650_0001	0.9591
A24005SL2_2910_3060	0.5741
A24005WM0_3650_0001	0.1859
A24005WM0_3740_0001	0.7467

A24005WM0_3741_0000	1
A24005WM0_3742_0000	1
A24005WM0_3743_0000	1
A24005WM0_3744_0000	1
A24005WM0_3745_0000	1
A24005WM0_3881_3880	0
A24005WM0_3964_0000	1
A24005WM0_3965_0000	1
A24005WM1_3660_3910	0.1944
A24005WM1_3910_0001	0.8088
A24005WM3_3880_4060	0.376
A24005WM3_4060_0001	0.6953
A24005WU0_3021_3020	0.0545
A24005WU0_3540_0000	1
A24005WU0_3541_0000	1
A24005WU0_3670_0001	0.7944
A24005WU0_3671_0000	1
A24005WU0_3820_0000	1
A24005WU0_3821_0000	1
A24005WU1_3350_3490	0.1625
A24005WU1_3482_0001	0.7083
A24005WU1_3490_3480	0.3232
A24005WU2_3020_3320	0.2669
A24005WU2_3320_3480	0.3189
A24005WU3_3480_3481	0.3371
A24005WU3_3481_0001	0.8879
A24009WL0_4772_0000	1
A24009WL0_4920_0000	1
A24009WL0_4921_0000	1
A24009WL0_4922_0000	1
A24009WL0_4923_0000	1
A24009WL0_4925_0000	1
A24009XL0_4954_0000	1
A24009XL0_5320_0001	0.859
A24009XL0_5341_0000	1
A24009XL0_5342_0000	1
A24009XL0_5343_0000	1
A24009XL0_5345_0000	1
A24009XL0_5346_0000	1
A24009XL0_5348_0000	1
A24009XL0_5350_0000	1
A24009XL3_4713_0000	1
A24009XL3_4950_0000	1
A24009XL3_4951_0000	1
A24009XL3_4952_0000	1
A24011EL0_4591_0000	1
A24011EL2_4590_0001	0.7797

A24011EL2_4630_0000	1
A24011EM0_4322_0000	1
A24011EM0_4323_0000	1
A24011EM0_4324_0000	1
A24011EM0_4327_0000	1
A24011EM2_3980_0001	0.5533
A24011EM2_4100_0001	0.7313
A24011EM2_4101_0000	1
A24011EM3_4320_0000	1
A24011EM3_4321_0000	1
A24011EM3_4325_0000	1
A24011EM4_4740_0000	1
A24013PM1_3120_3400	0.2312
A24013PM1_3450_3400	0.2454
A24013PM1_3710_4040	0.3658
A24013PM2_2860_3040	0.1051
A24013PM2_3400_3340	0.4452
A24013PM3_3040_3340	0.3037
A24013SL0_2831_2830	0.0603
A24013SL3_2460_2430	0.4974
A24013WM0_3881_3880	0
A24013WM1_3882_3880	0.1128
A24013WM3_3880_4060	0.3764
A24013WU0_3021_3020	0.0545
A24013WU1_3350_3490	0.1625
A24015EU0_2940_0000	1
A24015EU0_2941_0000	1
A24015EU0_2985_0000	1
A24015EU0_3010_0000	1
A24015EU0_3011_0000	1
A24015EU0_3050_0000	1
A24015EU0_3130_0000	1
A24015EU0_3131_0000	1
A24015EU0_3200_0000	1
A24015EU0_3201_0000	1
A24015EU0_3202_0000	1
A24015EU0_3203_0000	1
A24015EU0_3300_0000	1
A24015EU0_3301_0000	1
A24015EU0_3302_0000	1
A24015EU0_3360_0000	1
A24015EU0_3361_0000	1
A24015EU0_3362_0000	1
A24015EU0_3363_0000	1
A24015EU0_3364_0000	1
A24015EU1_2650_0001	0.7191
A24015EU1_2810_0001	0.789

A24015EU1_2980_0000	1
A24015EU1_2981_0000	1
A24015EU1_2982_0000	1
A24015EU1_2983_0000	1
A24015EU1_2984_0000	1
A24015SL2_2480_0001	0.6805
A24015SL9_2720_0001	0.9107
A24015SL9_2970_0000	1
A24015SL9_2971_0000	1
A24017PL0_5290_0000	1
A24017PL0_5390_0000	1
A24017PL0_5391_0000	1
A24017PL0_5392_0000	1
A24017PL0_5440_0000	1
A24017PL0_5450_0000	1
A24017PL0_5510_0001	0.6969
A24017PL0_5530_5710	0.7205
A24017PL0_5580_0000	1
A24017PL0_5581_0000	1
A24017PL0_5582_0000	1
A24017PL0_5583_0000	1
A24017PL0_5584_0000	1
A24017PL0_5585_0000	1
A24017PL0_5670_0000	1
A24017PL0_5671_0000	1
A24017PL0_5710_0001	0.9226
A24017PL0_5720_0001	0.7438
A24017PL0_5790_0000	1
A24017PL0_5791_0000	1
A24017PL0_5860_0000	1
A24017PL0_5930_0000	1
A24017PL1_5230_0001	0.4006
A24017PL2_5300_5630	0.6726
A24017PL2_5630_0001	0.9129
A24017PL2_5800_0000	1
A24017XL0_5340_0000	1
A24019EL0_4591_0000	1
A24019EL0_4592_0000	1
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A24019EL0_4892_0000	1
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A24019EL0_5280_0000	1
A24019EL0_5281_0000	1
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A24019EL0_5590_0000	1
A24019EL0_5766_0000	1
A24019EL0_5890_0000	1
A24019EL1_5150_0001	0.7074
A24019EL2_4630_0000	1
A24019EL2_4634_0000	1
A24019EM0_4322_0000	1
A24019EM0_4880_0000	1
A24019EM0_4881_0000	1
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A24019EM0_4884_0000	1
A24019EM0_4885_0000	1
A24019EM0_4886_0000	1
A24019EM0_4887_0000	1
A24019EM0_4888_0000	1
A24019EM0_4889_0000	1
A24019EM0_4890_0000	1
A24019EM0_4891_0000	1
A24019EM0_5260_0000	1
A24019EM0_5261_0000	1
A24019EM0_5263_0000	1
A24021PM1_3450_3400	0.2454
A24021PM1_3710_4040	0.3658
A24021PM2_2860_3040	0.1051
A24021PM2_3400_3340	0.4452
A24021PM3_3040_3340	0.3036
A24021PM4_3340_3341	0.4593
A24021PM4_3341_4040	0.5879
A24021PM4_4040_4410	0.6489
A24021PM7_4200_4410	0.7406
A24021PM7_4410_4620	0.7744
A24023PU1_3850_4190	0.0108
A24023PU1_3940_3970	0.0929
A24023PU1_4190_4300	0.0236
A24023PU1_4300_4440	0.1342
A24023PU2_4720_4750	0.0048
A24023PU2_4750_4450	0.0392
A24023PU3_4450_4440	0.0502
A24025SL0_2721_2720	0.7383
A24025SL2_2750_2720	0.7481
A24025SL2_2910_3060	0.5741
A24025SL2_3060_0001	0.8101
A24025SL9_2720_0001	0.9107
A24025SL9_2970_0000	1
A24025SL9_2971_0000	1

A24025WU0_3160_0000	1
A24025WU0_3161_0000	1
A24025WU0_3162_0000	1
A24025WU0_3250_0001	0.6676
A24025WU0_3251_0000	1
A24025WU0_3252_0000	1
A24025WU0_3253_0000	1
A24025WU0_3254_0000	1
A24025WU0_3540_0000	1
A24025WU1_3240_3331	0.4321
A24025WU1_3330_0001	0.836
A24025WU1_3331_3330	0.7753
A24025WU1_3482_0001	0.7083
A24025WU2_3020_3320	0.2669
A24027WM1_3882_3880	0.1128
A24027WM3_3880_4060	0.376
A24027WM3_4060_0001	0.6955
A24027XU0_4090_4270	0.7516
A24027XU0_4091_4270	0.7146
A24027XU0_4130_4070	0.0003
A24027XU2_4070_4330	0.0017
A24027XU2_4270_4650	0.8022
A24027XU2_4330_4480	0.0249
A24027XU2_4480_4650	0.3768
A24029EU0_3360_0000	1
A24029EU0_3361_0000	1
A24029EU0_3362_0000	1
A24029EU0_3363_0000	1
A24029EU0_3570_0000	1
A24029EU0_3571_0000	1
A24029EU0_3572_0000	1
A24029EU0_3573_0000	1
A24029EU0_3700_0000	1
A24029EU0_3720_0000	1
A24029EU0_3724_0000	1
A24029EU0_3725_0000	1
A24029EU0_4010_0000	1
A24029EU0_4011_0000	1
A24029EU0_4012_0000	1
A24029EU0_4013_0000	1
A24029EU0_4014_0000	1
A24029EU0_4015_0000	1
A24029EU0_4016_0000	1
A24029EU0_4120_0000	1
A24029EU0_4122_0000	1
A24029EU0_4123_0000	1
A24029EU0_4125_0000	1

A24029EU2_3520_0001	0.787
A24031PL0_4510_0001	0.3952
A24031PL1_4460_4780	0.3662
A24031PL1_4540_0001	0.9074
A24031PL1_4780_0001	0.8911
A24031PM0_4640_4820	0.3939
A24031PM1_4250_4500	0.4717
A24031PM1_4500_4580	0.7688
A24031PM4_4040_4410	0.6463
A24031PM7_4410_4620	0.7742
A24031PM7_4580_4820	0.8841
A24031PM7_4620_4580	0.8177
A24031PM7_4820_0001	0.9783
A24031XU0_4130_4070	0.0003
A24031XU2_4070_4330	0.0017
A24031XU2_4330_4480	0.0239
A24033PL0_4510_0001	0.3939
A24033PL0_4961_0000	1
A24033PL0_5070_0001	0.7277
A24033PL0_5290_0000	1
A24033PL0_5390_0000	1
A24033PL1_4540_0001	0.9074
A24033PL1_5060_0000	1
A24033PL1_5061_0000	1
A24033PL1_5230_0001	0.399
A24033PL2_4810_0000	1
A24033PL2_4811_0000	1
A24033PL2_5300_5630	0.6724
A24033PL7_4960_0000	1
A24033PL7_4980_0000	1
A24033XL0_5340_0000	1
A24033XL1_4690_0001	0.7982
A24033XL1_4691_0000	1
A24033XL3_4710_0000	1
A24033XL3_4711_0000	1
A24033XL3_4712_0000	1
A24033XL3_4713_0000	1
A24033XL3_4950_0000	1
A24033XL3_4951_0000	1
A24033XL3_4952_0000	1
A24033XU2_4330_4480	0.0231
A24033XU2_4480_4650	0.3763
A24033XU3_4650_0001	0.9593
A24035EM2_3980_0001	0.5533
A24035EM2_4100_0001	0.7313
A24035EM2_4101_0000	1
A24035EU0_3700_0000	1

A24035EU0_3720_0000	1
A24035EU0_3721_0000	1
A24035EU0_3722_0000	1
A24035EU0_3830_0001	0.7466
A24035EU0_4030_0000	1
A24035EU0_4120_0000	1
A24035EU0_4121_0000	1
A24035EU0_4122_0000	1
A24035EU0_4124_0000	1
A24035EU0_4260_0000	1
A24035EU0_4470_0000	1
A24035EU0_4471_0000	1
A24035EU0_4472_0000	1
A24035EU0_4473_0000	1
A24035EU0_4474_0000	1
A24035EU0_4475_0000	1
A24035EU0_4490_0000	1
A24035EU0_4491_0000	1
A24035EU0_4610_0000	1
A24035EU0_4872_0000	1
A24035EU2_3520_0001	0.787
A24037PL0_5510_0001	0.6969
A24037PL0_5670_0000	1
A24037PL0_5671_0000	1
A24037PL0_5672_0000	1
A24037PL0_5750_0001	0.6251
A24037PL0_5830_0001	0.7395
A24037PL0_5950_0000	1
A24037PL0_5951_0000	1
A24037PL0_5952_0000	1
A24037PL0_5960_0000	1
A24037PL0_5961_0000	1
A24037PL0_5962_0000	1
A24037PL0_5980_0000	1
A24037PL0_5981_0000	1
A24037PL0_5982_0000	1
A24037PL0_5983_0000	1
A24037PL0_6020_0000	1
A24037PL0_6060_0000	1
A24037PL0_6110_0000	1
A24037PL1_5910_0001	0.8089
A24037WL0_4924_0000	1
A24037WL0_5880_0000	1
A24037WL0_5881_0000	1
A24037XL0_4953_0000	1
A24037XL0_4955_0000	1
A24037XL0_4956_0000	1

A24037XL0_5340_0000	1
A24037XL0_5344_0000	1
A24037XL0_5347_0000	1
A24037XL0_5349_0000	1
A24039EL0_5761_0000	1
A24039EL0_5762_0000	1
A24039EL0_5763_0000	1
A24039EL0_5765_0000	1
A24039EL0_5890_0000	1
A24039EL0_5891_0000	1
A24039EL0_5892_0000	1
A24039EL0_5893_0000	1
A24039EL0_5894_0000	1
A24039EL0_6001_0000	1
A24039EL0_6002_0000	1
A24039EL0_6003_0000	1
A24039EL0_6004_0000	1
A24039EL0_6010_0000	1
A24039EL0_6011_0000	1
A24039EL1_5570_0001	0.6523
A24039EL1_6000_0001	0.6429
A24039EL3_5970_0000	1
A24039EL3_5971_0000	1
A24039EL3_5974_0000	1
A24041EM0_4324_0000	1
A24041EM0_4551_0000	1
A24041EM0_4870_0000	1
A24041EM0_4871_0000	1
A24041EM0_4874_0000	1
A24041EM0_4875_0000	1
A24041EM0_4876_0000	1
A24041EM0_4882_0000	1
A24041EM2_4101_0000	1
A24041EM4_4740_0000	1
A24041EU0_4470_0000	1
A24041EU0_4474_0000	1
A24041EU0_4475_0000	1
A24041EU0_4550_0000	1
A24041EU0_4700_0000	1
A24041EU0_4873_0000	1
A24043PM7_4150_4290	0.7254
A24043PU0_3000_3090	0.4991
A24043PU0_3601_3602	0.3525
A24043PU0_3611_3530	0.3539
A24043PU0_3751_3752	0.4115
A24043PU1_3030_3440	0.2334
A24043PU1_3100_3690	0.2488

A24043PU2_2840_3080	0.2155
A24043PU2_3080_3640	0.4555
A24043PU2_3090_4050	0.6473
A24043PU2_4050_4180	0.705
A24043PU3_2510_3290	0.2768
A24043PU3_3290_3390	0.5007
A24043PU3_3390_3730	0.551
A24043PU6_3440_3590	0.5375
A24043PU6_3530_3440	0.5333
A24043PU6_3590_3640	0.5531
A24043PU6_3600_3602	0.575
A24043PU6_3602_3730	0.6127
A24043PU6_3610_3530	0.4928
A24043PU6_3640_3600	0.5598
A24043PU6_3690_3610	0.4826
A24043PU6_3730_3750	0.6338
A24043PU6_3750_3752	0.6556
A24043PU6_3752_4080	0.6864
A24043PU6_4080_4180	0.7144
A24043PU6_4180_4150	0.7169
A24045EL0_4593_0000	1
A24045EL0_4594_0000	1
A24045EL0_4595_0000	1
A24045EL0_4596_0000	1
A24045EL0_4597_0000	1
A24045EL0_4598_0000	1
A24045EL0_4633_0000	1
A24045EL0_5040_0000	1
A24045EL0_5400_0001	0.7513
A24045EL0_5760_0000	1
A24045EL0_5761_0000	1
A24045EL0_5762_0000	1
A24045EL0_5764_0000	1
A24045EL1_5430_0001	0.7014
A24045EL1_5570_0001	0.6522
A24045EL2_4630_0000	1
A24045EL2_4634_0000	1
A24045EL2_5110_5270	0.5895
A24045EL2_5270_0001	0.682
A24047EL0_5271_0000	1
A24047EL1_5430_0001	0.7014
A24047EL1_5570_0001	0.6523
A24047EL1_5660_0000	1
A24047EL2_5110_5270	0.5895
A24047EL2_5270_0001	0.6819
A24047EL3_5870_0000	1
A24047EL3_5970_0000	1

A24047EL3_5971_0000	1
A24047EL3_5972_0000	1
A24510WM0_3650_0001	0.1859
A24510WM0_3740_0001	0.7483
A24510WM0_3741_0000	1
A24510WM0_3960_0000	1
A24510WM0_3961_0000	1
A24510WM0_3962_0000	1
A24510WM0_3964_0000	1
A24510WM1_3910_0001	0.8093
A24510WM3_4060_0001	0.6959
B24001PU1_3580_3780	0.1905
B24001PU1_3850_4190	0.0118
B24001PU1_3940_3970	0.0929
B24001PU2_3140_3680	0.0912
B24001PU3_3680_3890	0.2142
B24001PU4_3890_3990	0.2794
B24001PU4_3970_3890	0.1971
B24001PU4_4440_3970	0.1755
B24021PM1_3510_4000	0.1743
B24021PM1_4000_4290	0.425
B24021PM3_3040_3340	0.3036
B24021PM4_3340_3341	0.4593
B24021PM4_3341_4040	0.5879
B24021PM4_4040_4410	0.6489
B24021PM7_4150_4290	0.7261
B24021PM7_4200_4410	0.7406
B24021PM7_4290_4200	0.7384
F24001PU0_3871_3690	0.2633
F24001PU1_3100_3690	0.2483
F24001PU1_3580_3780	0.1924
F24001PU2_3370_4020	0.1362
F24001PU3_3680_3890	0.2194
F24001PU4_3780_3930	0.2935
F24001PU4_3890_3990	0.2766
F24001PU4_3970_3890	0.1966
F24001PU4_3990_3780	0.2837
F24001PU5_3930_4170	0.3356
F24001PU5_4170_4020	0.3669
F24001PU6_3870_3690	0.4001
F24001PU6_4020_3870	0.3778
F24003WL0_4420_0000	1
F24003WL0_4423_0000	1
F24003WL0_4424_0000	1
F24003WL0_4602_0000	1
F24003WM0_3961_0000	1
F24003WM0_3962_0000	1

F24003XL3_4710_0000	1
F24003XU2_4270_4650	0.8021
F24003XU2_4480_4650	0.3762
F24003XU3_4650_0001	0.9593
F24005WM0_3650_0001	0.1865
F24005WM0_3741_0000	1
F24005WM0_3742_0000	1
F24005WM0_3881_3880	0
F24005WM0_3964_0000	1
F24005WM0_3965_0000	1
F24005WM1_3660_3910	0.1957
F24005WM1_3910_0001	0.81
F24005WM3_3880_4060	0.3796
F24005WM3_4060_0001	0.6927
F24005WU0_3540_0000	1
F24005WU0_3541_0000	1
F24005WU0_3542_0000	1
F24005WU0_3670_0001	0.7935
F24005WU1_3350_3490	0.1639
F24005WU2_3320_3480	0.319
F24005WU3_3480_3481	0.3337
F24005WU3_3481_0001	0.8871
F24009WL0_4772_0000	1
F24009XL0_4954_0000	1
F24009XL0_5320_0001	0.8611
F24013WM0_3881_3880	0
F24015EU0_3010_0000	1
F24015EU0_3130_0000	1
F24015EU0_3203_0000	1
F24015EU0_3363_0000	1
F24015EU1_2982_0000	1
F24015SL9_2970_0000	1
F24017PL0_5290_0000	1
F24017PL0_5390_0000	1
F24017PL0_5391_0000	1
F24017PL0_5392_0000	1
F24017PL0_5440_0000	1
F24017PL0_5450_0000	1
F24017PL0_5580_0000	1
F24017PL0_5581_0000	1
F24017PL0_5584_0000	1
F24017PL0_5720_0001	0.7422
F24017PL0_5860_0000	1
F24017PL0_5930_0000	1
F24019EL0_4892_0000	1
F24019EL0_5151_0000	1
F24019EL0_5280_0000	1

F24019EL0_5283_0000	1
F24019EL0_5284_0000	1
F24019EL0_5590_0000	1
F24019EL0_5890_0000	1
F24019EM0_4886_0000	1
F24019EM0_5260_0000	1
F24019EM0_5261_0000	1
F24021PM1_3510_4000	0.1724
F24021PM1_4000_4290	0.4276
F24021PM3_3040_3340	0.3035
F24021PM4_3340_3341	0.4591
F24021PM4_3341_4040	0.5879
F24021PM4_4040_4410	0.649
F24021PM7_4150_4290	0.7262
F24021PM7_4200_4410	0.7406
F24021PM7_4290_4200	0.7391
F24023PU3_4450_4440	0.0488
F24025SL2_3060_0001	0.8082
F24025SL9_2970_0000	1
F24025WU0_3160_0000	1
F24025WU0_3161_0000	1
F24025WU0_3162_0000	1
F24025WU0_3163_0000	1
F24025WU0_3164_0000	1
F24025WU0_3250_0001	0.6679
F24025WU0_3251_0000	1
F24025WU0_3252_0000	1
F24025WU0_3253_0000	1
F24025WU0_3255_0000	1
F24025WU0_3540_0000	1
F24025WU1_3330_0001	0.8361
F24027XU0_4090_4270	0.7514
F24029EU0_3570_0000	1
F24029EU0_3571_0000	1
F24029EU0_3725_0000	1
F24029EU0_4122_0000	1
F24029EU0_4123_0000	1
F24031PL1_4460_4780	0.3682
F24031PL1_4540_0001	0.9075
F24031PM0_4640_4820	0.3937
F24031PM1_4250_4500	0.4724
F24031PM1_4500_4580	0.7701
F24031PM4_4040_4410	0.6503
F24031PM7_4410_4620	0.7746
F24031PM7_4580_4820	0.8841
F24031PM7_4620_4580	0.8177
F24031PM7_4820_0001	0.9783

F24031XU2_4330_4480	0.0247
F24033PL0_4510_0001	0.3954
F24033PL0_4961_0000	1
F24033PL0_5070_0001	0.7287
F24033PL0_5290_0000	1
F24033PL0_5390_0000	1
F24033PL1_4540_0001	0.9066
F24033PL1_5060_0000	1
F24033PL1_5061_0000	1
F24033PL1_5230_0001	0.4006
F24033PL2_4810_0000	1
F24033PL2_4811_0000	1
F24033PL7_4960_0000	1
F24033PL7_4980_0000	1
F24033XL1_4690_0001	0.8002
F24033XL1_4691_0000	1
F24033XU2_4480_4650	0.3763
F24035EM2_4101_0000	1
F24035EU0_4872_0000	1
F24037PL0_5980_0000	1
F24037PL0_5981_0000	1
F24037PL0_5982_0000	1
F24037PL0_6110_0000	1
F24037PL1_5910_0001	0.8061
F24037WL0_5881_0000	1
F24037XL0_4955_0000	1
F24037XL0_4956_0000	1
F24039EL0_5890_0000	1
F24039EL0_5894_0000	1
F24039EL0_6011_0000	1
F24041EM0_4874_0000	1
F24041EU0_4550_0000	1
F24043PM7_4150_4290	0.7257
F24043PU0_3000_3090	0.4985
F24043PU0_3601_3602	0.3511
F24043PU0_3611_3530	0.3538
F24043PU0_3751_3752	0.411
F24043PU1_3030_3440	0.232
F24043PU1_3100_3690	0.2488
F24043PU2_3080_3640	0.4553
F24043PU2_3090_4050	0.6472
F24043PU2_4050_4180	0.7058
F24043PU3_3390_3730	0.5521
F24043PU6_3440_3590	0.5383
F24043PU6_3530_3440	0.5322
F24043PU6_3590_3640	0.5533
F24043PU6_3600_3602	0.5748

F24043PU6_3602_3730	0.6112
F24043PU6_3610_3530	0.4929
F24043PU6_3640_3600	0.5597
F24043PU6_3690_3610	0.483
F24043PU6_3730_3750	0.634
F24043PU6_3750_3752	0.6552
F24043PU6_3752_4080	0.6866
F24043PU6_4080_4180	0.7145
F24043PU6_4180_4150	0.717
F24045EL0_5760_0000	1
F24510WM0_3650_0001	0.1858
F24510WM0_3960_0000	1
F24510WM0_3961_0000	1
F24510WM1_3910_0001	0.8117

Land-River Segment	TP DF
A24001PU0_3871_3690	0.4707
A24001PU1_3100_3690	0.4692
A24001PU1_3580_3780	0.469
A24001PU2_3180_3370	0.4682
A24001PU2_3370_4020	0.4691
A24001PU4_3780_3930	0.469
A24001PU4_3890_3990	0.4672
A24001PU4_3990_3780	0.4632
A24001PU5_3930_4170	0.4693
A24001PU5_4170_4020	0.4781
A24001PU6_3870_3690	0.4776
A24001PU6_4020_3870	0.4681
A24003WL0_4390_0000	1
A24003WL0_4391_0000	1
A24003WL0_4392_0000	1
A24003WL0_4393_0000	1
A24003WL0_4394_0000	1
A24003WL0_4420_0000	1
A24003WL0_4421_0000	1
A24003WL0_4422_0000	1
A24003WL0_4423_0000	1
A24003WL0_4424_0000	1
A24003WL0_4425_0000	1
A24003WL0_4600_0000	1
A24003WL0_4601_0000	1
A24003WL0_4602_0000	1
A24003WL0_4603_0000	1
A24003WL0_4770_0000	1
A24003WL0_4771_0000	1
A24003WL0_4772_0000	1
A24003WM0_3961_0000	1
A24003WM0_3962_0000	1
A24003WM0_3963_0000	1
A24003WM0_3966_0000	1
A24003WM3_4060_0001	0.2711
A24003XL3_4710_0000	1
A24003XL3_4711_0000	1
A24003XL3_4712_0000	1
A24003XL3_4713_0000	1
A24003XL3_4950_0000	1
A24003XU2_4270_4650	0.7392
A24003XU2_4480_4650	0.7394
A24003XU3_4650_0001	0.735
A24005SL2_2910_3060	0.7548
A24005WM0_3650_0001	0.2262
A24005WM0_3740_0001	0.9508

A24005WM0_3741_0000	1
A24005WM0_3742_0000	1
A24005WM0_3743_0000	1
A24005WM0_3744_0000	1
A24005WM0_3745_0000	1
A24005WM0_3881_3880	0
A24005WM0_3964_0000	1
A24005WM0_3965_0000	1
A24005WM1_3660_3910	0.6668
A24005WM1_3910_0001	0.6749
A24005WM3_3880_4060	0.2738
A24005WM3_4060_0001	0.2744
A24005WU0_3021_3020	0.0783
A24005WU0_3540_0000	1
A24005WU0_3541_0000	1
A24005WU0_3670_0001	0.935
A24005WU0_3671_0000	1
A24005WU0_3820_0000	1
A24005WU0_3821_0000	1
A24005WU1_3350_3490	0.3651
A24005WU1_3482_0001	0.8359
A24005WU1_3490_3480	0.3599
A24005WU2_3020_3320	0.3602
A24005WU2_3320_3480	0.3605
A24005WU3_3480_3481	0.3461
A24005WU3_3481_0001	0.7938
A24009WL0_4772_0000	1
A24009WL0_4920_0000	1
A24009WL0_4921_0000	1
A24009WL0_4922_0000	1
A24009WL0_4923_0000	1
A24009WL0_4925_0000	1
A24009XL0_4954_0000	1
A24009XL0_5320_0001	0.948
A24009XL0_5341_0000	1
A24009XL0_5342_0000	1
A24009XL0_5343_0000	1
A24009XL0_5345_0000	1
A24009XL0_5346_0000	1
A24009XL0_5348_0000	1
A24009XL0_5350_0000	1
A24009XL3_4713_0000	1
A24009XL3_4950_0000	1
A24009XL3_4951_0000	1
A24009XL3_4952_0000	1
A24011EL0_4591_0000	1
A24011EL2_4590_0001	0.8092

A24011EL2_4630_0000	1
A24011EM0_4322_0000	1
A24011EM0_4323_0000	1
A24011EM0_4324_0000	1
A24011EM0_4327_0000	1
A24011EM2_3980_0001	0.7596
A24011EM2_4100_0001	0.8507
A24011EM2_4101_0000	1
A24011EM3_4320_0000	1
A24011EM3_4321_0000	1
A24011EM3_4325_0000	1
A24011EM4_4740_0000	1
A24013PM1_3120_3400	0.4691
A24013PM1_3450_3400	0.4691
A24013PM1_3710_4040	0.469
A24013PM2_2860_3040	0.4691
A24013PM2_3400_3340	0.4691
A24013PM3_3040_3340	0.4703
A24013SL0_2831_2830	0.3199
A24013SL3_2460_2430	0.3856
A24013WM0_3881_3880	0
A24013WM1_3882_3880	0.2715
A24013WM3_3880_4060	0.2716
A24013WU0_3021_3020	0.0814
A24013WU1_3350_3490	0.3602
A24015EU0_2940_0000	1
A24015EU0_2941_0000	1
A24015EU0_2985_0000	1
A24015EU0_3010_0000	1
A24015EU0_3011_0000	1
A24015EU0_3050_0000	1
A24015EU0_3130_0000	1
A24015EU0_3131_0000	1
A24015EU0_3200_0000	1
A24015EU0_3201_0000	1
A24015EU0_3202_0000	1
A24015EU0_3203_0000	1
A24015EU0_3300_0000	1
A24015EU0_3301_0000	1
A24015EU0_3302_0000	1
A24015EU0_3360_0000	1
A24015EU0_3361_0000	1
A24015EU0_3362_0000	1
A24015EU0_3363_0000	1
A24015EU0_3364_0000	1
A24015EU1_2650_0001	0.7666
A24015EU1_2810_0001	0.8995

A24015EU1_2980_0000	1
A24015EU1_2981_0000	1
A24015EU1_2982_0000	1
A24015EU1_2983_0000	1
A24015EU1_2984_0000	1
A24015SL2_2480_0001	0.7857
A24015SL9_2720_0001	0.8065
A24015SL9_2970_0000	1
A24015SL9_2971_0000	1
A24017PL0_5290_0000	1
A24017PL0_5390_0000	1
A24017PL0_5391_0000	1
A24017PL0_5392_0000	1
A24017PL0_5440_0000	1
A24017PL0_5450_0000	1
A24017PL0_5510_0001	0.9506
A24017PL0_5530_5710	0.8907
A24017PL0_5580_0000	1
A24017PL0_5581_0000	1
A24017PL0_5582_0000	1
A24017PL0_5583_0000	1
A24017PL0_5584_0000	1
A24017PL0_5585_0000	1
A24017PL0_5670_0000	1
A24017PL0_5671_0000	1
A24017PL0_5710_0001	0.8919
A24017PL0_5720_0001	0.8399
A24017PL0_5790_0000	1
A24017PL0_5791_0000	1
A24017PL0_5860_0000	1
A24017PL0_5930_0000	1
A24017PL1_5230_0001	0.7268
A24017PL2_5300_5630	0.7839
A24017PL2_5630_0001	0.784
A24017PL2_5800_0000	1
A24017XL0_5340_0000	1
A24019EL0_4591_0000	1
A24019EL0_4592_0000	1
A24019EL0_4593_0000	1
A24019EL0_4598_0000	1
A24019EL0_4892_0000	1
A24019EL0_5151_0000	1
A24019EL0_5262_0000	1
A24019EL0_5280_0000	1
A24019EL0_5281_0000	1
A24019EL0_5282_0000	1
A24019EL0_5283_0000	1

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A24019EL0_5285_0000	1
A24019EL0_5590_0000	1
A24019EL0_5766_0000	1
A24019EL0_5890_0000	1
A24019EL1_5150_0001	0.9255
A24019EL2_4630_0000	1
A24019EL2_4634_0000	1
A24019EM0_4322_0000	1
A24019EM0_4880_0000	1
A24019EM0_4881_0000	1
A24019EM0_4883_0000	1
A24019EM0_4884_0000	1
A24019EM0_4885_0000	1
A24019EM0_4886_0000	1
A24019EM0_4887_0000	1
A24019EM0_4888_0000	1
A24019EM0_4889_0000	1
A24019EM0_4890_0000	1
A24019EM0_4891_0000	1
A24019EM0_5260_0000	1
A24019EM0_5261_0000	1
A24019EM0_5263_0000	1
A24021PM1_3450_3400	0.4691
A24021PM1_3710_4040	0.4691
A24021PM2_2860_3040	0.4695
A24021PM2_3400_3340	0.4695
A24021PM3_3040_3340	0.4691
A24021PM4_3340_3341	0.4693
A24021PM4_3341_4040	0.4691
A24021PM4_4040_4410	0.4691
A24021PM7_4200_4410	0.4692
A24021PM7_4410_4620	0.4698
A24023PU1_3850_4190	0.2293
A24023PU1_3940_3970	0.4692
A24023PU1_4190_4300	0.2293
A24023PU1_4300_4440	0.4697
A24023PU2_4720_4750	0.103
A24023PU2_4750_4450	0.1129
A24023PU3_4450_4440	0.1018
A24025SL0_2721_2720	0.8067
A24025SL2_2750_2720	0.8065
A24025SL2_2910_3060	0.7548
A24025SL2_3060_0001	0.7549
A24025SL9_2720_0001	0.8052
A24025SL9_2970_0000	1
A24025SL9_2971_0000	1

A24025WU0_3160_0000	1
A24025WU0_3161_0000	1
A24025WU0_3162_0000	1
A24025WU0_3250_0001	0.798
A24025WU0_3251_0000	1
A24025WU0_3252_0000	1
A24025WU0_3253_0000	1
A24025WU0_3254_0000	1
A24025WU0_3540_0000	1
A24025WU1_3240_3331	0.6754
A24025WU1_3330_0001	0.6762
A24025WU1_3331_3330	0.6737
A24025WU1_3482_0001	0.8368
A24025WU2_3020_3320	0.3607
A24027WM1_3882_3880	0.2726
A24027WM3_3880_4060	0.2696
A24027WM3_4060_0001	0.2716
A24027XU0_4090_4270	0.7388
A24027XU0_4091_4270	0.7394
A24027XU0_4130_4070	0.0204
A24027XU2_4070_4330	0.0213
A24027XU2_4270_4650	0.7392
A24027XU2_4330_4480	0.1843
A24027XU2_4480_4650	0.737
A24029EU0_3360_0000	1
A24029EU0_3361_0000	1
A24029EU0_3362_0000	1
A24029EU0_3363_0000	1
A24029EU0_3570_0000	1
A24029EU0_3571_0000	1
A24029EU0_3572_0000	1
A24029EU0_3573_0000	1
A24029EU0_3700_0000	1
A24029EU0_3720_0000	1
A24029EU0_3724_0000	1
A24029EU0_3725_0000	1
A24029EU0_4010_0000	1
A24029EU0_4011_0000	1
A24029EU0_4012_0000	1
A24029EU0_4013_0000	1
A24029EU0_4014_0000	1
A24029EU0_4015_0000	1
A24029EU0_4016_0000	1
A24029EU0_4120_0000	1
A24029EU0_4122_0000	1
A24029EU0_4123_0000	1
A24029EU0_4125_0000	1

A24029EU2_3520_0001	0.8803
A24031PL0_4510_0001	0.6543
A24031PL1_4460_4780	0.5008
A24031PL1_4540_0001	0.7711
A24031PL1_4780_0001	0.5737
A24031PM0_4640_4820	0.462
A24031PM1_4250_4500	0.4703
A24031PM1_4500_4580	0.4487
A24031PM4_4040_4410	0.4504
A24031PM7_4410_4620	0.4908
A24031PM7_4580_4820	0.4691
A24031PM7_4620_4580	0.4691
A24031PM7_4820_0001	0.4694
A24031XU0_4130_4070	0.0204
A24031XU2_4070_4330	0.0212
A24031XU2_4330_4480	0.1762
A24033PL0_4510_0001	0.6689
A24033PL0_4961_0000	1
A24033PL0_5070_0001	0.904
A24033PL0_5290_0000	1
A24033PL0_5390_0000	1
A24033PL1_4540_0001	0.7717
A24033PL1_5060_0000	1
A24033PL1_5061_0000	1
A24033PL1_5230_0001	0.7117
A24033PL2_4810_0000	1
A24033PL2_4811_0000	1
A24033PL2_5300_5630	0.7513
A24033PL7_4960_0000	1
A24033PL7_4980_0000	1
A24033XL0_5340_0000	1
A24033XL1_4690_0001	0.7974
A24033XL1_4691_0000	1
A24033XL3_4710_0000	1
A24033XL3_4711_0000	1
A24033XL3_4712_0000	1
A24033XL3_4713_0000	1
A24033XL3_4950_0000	1
A24033XL3_4951_0000	1
A24033XL3_4952_0000	1
A24033XU2_4330_4480	0.164
A24033XU2_4480_4650	0.7391
A24033XU3_4650_0001	0.7387
A24035EM2_3980_0001	0.7595
A24035EM2_4100_0001	0.8507
A24035EM2_4101_0000	1
A24035EU0_3700_0000	1

A24035EU0_3720_0000	1
A24035EU0_3721_0000	1
A24035EU0_3722_0000	1
A24035EU0_3830_0001	0.8778
A24035EU0_4030_0000	1
A24035EU0_4120_0000	1
A24035EU0_4121_0000	1
A24035EU0_4122_0000	1
A24035EU0_4124_0000	1
A24035EU0_4260_0000	1
A24035EU0_4470_0000	1
A24035EU0_4471_0000	1
A24035EU0_4472_0000	1
A24035EU0_4473_0000	1
A24035EU0_4474_0000	1
A24035EU0_4475_0000	1
A24035EU0_4490_0000	1
A24035EU0_4491_0000	1
A24035EU0_4610_0000	1
A24035EU0_4872_0000	1
A24035EU2_3520_0001	0.8804
A24037PL0_5510_0001	0.9506
A24037PL0_5670_0000	1
A24037PL0_5671_0000	1
A24037PL0_5672_0000	1
A24037PL0_5750_0001	0.8868
A24037PL0_5830_0001	0.9613
A24037PL0_5950_0000	1
A24037PL0_5951_0000	1
A24037PL0_5952_0000	1
A24037PL0_5960_0000	1
A24037PL0_5961_0000	1
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A24037PL0_5980_0000	1
A24037PL0_5981_0000	1
A24037PL0_5982_0000	1
A24037PL0_5983_0000	1
A24037PL0_6020_0000	1
A24037PL0_6060_0000	1
A24037PL0_6110_0000	1
A24037PL1_5910_0001	0.9325
A24037WL0_4924_0000	1
A24037WL0_5880_0000	1
A24037WL0_5881_0000	1
A24037XL0_4953_0000	1
A24037XL0_4955_0000	1
A24037XL0_4956_0000	1

A24037XL0_5340_0000	1
A24037XL0_5344_0000	1
A24037XL0_5347_0000	1
A24037XL0_5349_0000	1
A24039EL0_5761_0000	1
A24039EL0_5762_0000	1
A24039EL0_5763_0000	1
A24039EL0_5765_0000	1
A24039EL0_5890_0000	1
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A24039EL0_5893_0000	1
A24039EL0_5894_0000	1
A24039EL0_6001_0000	1
A24039EL0_6002_0000	1
A24039EL0_6003_0000	1
A24039EL0_6004_0000	1
A24039EL0_6010_0000	1
A24039EL0_6011_0000	1
A24039EL1_5570_0001	0.7549
A24039EL1_6000_0001	0.8327
A24039EL3_5970_0000	1
A24039EL3_5971_0000	1
A24039EL3_5974_0000	1
A24041EM0_4324_0000	1
A24041EM0_4551_0000	1
A24041EM0_4870_0000	1
A24041EM0_4871_0000	1
A24041EM0_4874_0000	1
A24041EM0_4875_0000	1
A24041EM0_4876_0000	1
A24041EM0_4882_0000	1
A24041EM2_4101_0000	1
A24041EM4_4740_0000	1
A24041EU0_4470_0000	1
A24041EU0_4474_0000	1
A24041EU0_4475_0000	1
A24041EU0_4550_0000	1
A24041EU0_4700_0000	1
A24041EU0_4873_0000	1
A24043PM7_4150_4290	0.4496
A24043PU0_3000_3090	0.4689
A24043PU0_3601_3602	0.4715
A24043PU0_3611_3530	0.4522
A24043PU0_3751_3752	0.4873
A24043PU1_3030_3440	0.4689
A24043PU1_3100_3690	0.4693

A24043PU2_2840_3080	0.4691
A24043PU2_3080_3640	0.4499
A24043PU2_3090_4050	0.4678
A24043PU2_4050_4180	0.4488
A24043PU3_2510_3290	0.505
A24043PU3_3290_3390	0.4691
A24043PU3_3390_3730	0.466
A24043PU6_3440_3590	0.4711
A24043PU6_3530_3440	0.4705
A24043PU6_3590_3640	0.4691
A24043PU6_3600_3602	0.4511
A24043PU6_3602_3730	0.451
A24043PU6_3610_3530	0.4691
A24043PU6_3640_3600	0.4691
A24043PU6_3690_3610	0.4692
A24043PU6_3730_3750	0.4511
A24043PU6_3750_3752	0.472
A24043PU6_3752_4080	0.4511
A24043PU6_4080_4180	0.469
A24043PU6_4180_4150	0.4691
A24045EL0_4593_0000	1
A24045EL0_4594_0000	1
A24045EL0_4595_0000	1
A24045EL0_4596_0000	1
A24045EL0_4597_0000	1
A24045EL0_4598_0000	1
A24045EL0_4633_0000	1
A24045EL0_5040_0000	1
A24045EL0_5400_0001	0.8536
A24045EL0_5760_0000	1
A24045EL0_5761_0000	1
A24045EL0_5762_0000	1
A24045EL0_5764_0000	1
A24045EL1_5430_0001	0.8911
A24045EL1_5570_0001	0.7577
A24045EL2_4630_0000	1
A24045EL2_4634_0000	1
A24045EL2_5110_5270	0.6876
A24045EL2_5270_0001	0.6882
A24047EL0_5271_0000	1
A24047EL1_5430_0001	0.8898
A24047EL1_5570_0001	0.7552
A24047EL1_5660_0000	1
A24047EL2_5110_5270	0.6887
A24047EL2_5270_0001	0.6885
A24047EL3_5870_0000	1
A24047EL3_5970_0000	1

A24047EL3_5971_0000	1
A24047EL3_5972_0000	1
A24510WM0_3650_0001	0.2253
A24510WM0_3740_0001	0.9112
A24510WM0_3741_0000	1
A24510WM0_3960_0000	1
A24510WM0_3961_0000	1
A24510WM0_3962_0000	1
A24510WM0_3964_0000	1
A24510WM1_3910_0001	0.6661
A24510WM3_4060_0001	0.2664
B24001PU1_3580_3780	0.4699
B24001PU1_3850_4190	0.2497
B24001PU1_3940_3970	0.469
B24001PU2_3140_3680	0.4685
B24001PU3_3680_3890	0.4691
B24001PU4_3890_3990	0.3898
B24001PU4_3970_3890	0.4691
B24001PU4_4440_3970	0.4733
B24021PM1_3510_4000	0.4691
B24021PM1_4000_4290	0.469
B24021PM3_3040_3340	0.4692
B24021PM4_3340_3341	0.4692
B24021PM4_3341_4040	0.4691
B24021PM4_4040_4410	0.469
B24021PM7_4150_4290	0.4706
B24021PM7_4200_4410	0.4692
B24021PM7_4290_4200	0.4689
F24001PU0_3871_3690	0.4096
F24001PU1_3100_3690	0.4714
F24001PU1_3580_3780	0.4754
F24001PU2_3370_4020	0.5461
F24001PU3_3680_3890	0.7273
F24001PU4_3780_3930	0.4629
F24001PU4_3890_3990	0.4592
F24001PU4_3970_3890	0.4777
F24001PU4_3990_3780	0.3908
F24001PU5_3930_4170	0.4675
F24001PU5_4170_4020	0.4684
F24001PU6_3870_3690	0.4688
F24001PU6_4020_3870	0.4634
F24003WL0_4420_0000	1
F24003WL0_4423_0000	1
F24003WL0_4424_0000	1
F24003WL0_4602_0000	1
F24003WM0_3961_0000	1
F24003WM0_3962_0000	1

F24003XL3_4710_0000	1
F24003XU2_4270_4650	0.7392
F24003XU2_4480_4650	0.7391
F24003XU3_4650_0001	0.7391
F24005WM0_3650_0001	0.1586
F24005WM0_3741_0000	1
F24005WM0_3742_0000	1
F24005WM0_3881_3880	0
F24005WM0_3964_0000	1
F24005WM0_3965_0000	1
F24005WM1_3660_3910	0.6927
F24005WM1_3910_0001	0.624
F24005WM3_3880_4060	0.2287
F24005WM3_4060_0001	0.2582
F24005WU0_3540_0000	1
F24005WU0_3541_0000	1
F24005WU0_3542_0000	1
F24005WU0_3670_0001	0.9639
F24005WU1_3350_3490	0.2755
F24005WU2_3320_3480	0.2681
F24005WU3_3480_3481	0.3787
F24005WU3_3481_0001	0.8212
F24009WL0_4772_0000	1
F24009XL0_4954_0000	1
F24009XL0_5320_0001	0.9398
F24013WM0_3881_3880	0
F24015EU0_3010_0000	1
F24015EU0_3130_0000	1
F24015EU0_3203_0000	1
F24015EU0_3363_0000	1
F24015EU1_2982_0000	1
F24015SL9_2970_0000	1
F24017PL0_5290_0000	1
F24017PL0_5390_0000	1
F24017PL0_5391_0000	1
F24017PL0_5392_0000	1
F24017PL0_5440_0000	1
F24017PL0_5450_0000	1
F24017PL0_5580_0000	1
F24017PL0_5581_0000	1
F24017PL0_5584_0000	1
F24017PL0_5720_0001	0.922
F24017PL0_5860_0000	1
F24017PL0_5930_0000	1
F24019EL0_4892_0000	1
F24019EL0_5151_0000	1
F24019EL0_5280_0000	1

F24019EL0_5283_0000	1
F24019EL0_5284_0000	1
F24019EL0_5590_0000	1
F24019EL0_5890_0000	1
F24019EM0_4886_0000	1
F24019EM0_5260_0000	1
F24019EM0_5261_0000	1
F24021PM1_3510_4000	0.5381
F24021PM1_4000_4290	0.4707
F24021PM3_3040_3340	0.4642
F24021PM4_3340_3341	0.4668
F24021PM4_3341_4040	0.4694
F24021PM4_4040_4410	0.4691
F24021PM7_4150_4290	0.4965
F24021PM7_4200_4410	0.4675
F24021PM7_4290_4200	0.4627
F24023PU3_4450_4440	0.112
F24025SL2_3060_0001	0.7415
F24025SL9_2970_0000	1
F24025WU0_3160_0000	1
F24025WU0_3161_0000	1
F24025WU0_3162_0000	1
F24025WU0_3163_0000	1
F24025WU0_3164_0000	1
F24025WU0_3250_0001	0.808
F24025WU0_3251_0000	1
F24025WU0_3252_0000	1
F24025WU0_3253_0000	1
F24025WU0_3255_0000	1
F24025WU0_3540_0000	1
F24025WU1_3330_0001	0.6721
F24027XU0_4090_4270	0.7466
F24029EU0_3570_0000	1
F24029EU0_3571_0000	1
F24029EU0_3725_0000	1
F24029EU0_4122_0000	1
F24029EU0_4123_0000	1
F24031PL1_4460_4780	0.4592
F24031PL1_4540_0001	0.7703
F24031PM0_4640_4820	0.4484
F24031PM1_4250_4500	0.4687
F24031PM1_4500_4580	0.4777
F24031PM4_4040_4410	0.4784
F24031PM7_4410_4620	0.4694
F24031PM7_4580_4820	0.4697
F24031PM7_4620_4580	0.4663
F24031PM7_4820_0001	0.4679

F24031XU2_4330_4480	0.1857
F24033PL0_4510_0001	0.636
F24033PL0_4961_0000	1
F24033PL0_5070_0001	0.9001
F24033PL0_5290_0000	1
F24033PL0_5390_0000	1
F24033PL1_4540_0001	0.7535
F24033PL1_5060_0000	1
F24033PL1_5061_0000	1
F24033PL1_5230_0001	0.727
F24033PL2_4810_0000	1
F24033PL2_4811_0000	1
F24033PL7_4960_0000	1
F24033PL7_4980_0000	1
F24033XL1_4690_0001	0.7924
F24033XL1_4691_0000	1
F24033XU2_4480_4650	0.7388
F24035EM2_4101_0000	1
F24035EU0_4872_0000	1
F24037PL0_5980_0000	1
F24037PL0_5981_0000	1
F24037PL0_5982_0000	1
F24037PL0_6110_0000	1
F24037PL1_5910_0001	0.6176
F24037WL0_5881_0000	1
F24037XL0_4955_0000	1
F24037XL0_4956_0000	1
F24039EL0_5890_0000	1
F24039EL0_5894_0000	1
F24039EL0_6011_0000	1
F24041EM0_4874_0000	1
F24041EU0_4550_0000	1
F24043PM7_4150_4290	0.4492
F24043PU0_3000_3090	0.4308
F24043PU0_3601_3602	0.4388
F24043PU0_3611_3530	0.4782
F24043PU0_3751_3752	0.47
F24043PU1_3030_3440	0.7381
F24043PU1_3100_3690	0.4684
F24043PU2_3080_3640	0.4267
F24043PU2_3090_4050	0.4686
F24043PU2_4050_4180	0.4693
F24043PU3_3390_3730	0.4862
F24043PU6_3440_3590	0.4681
F24043PU6_3530_3440	0.4435
F24043PU6_3590_3640	0.4718
F24043PU6_3600_3602	0.4685

F24043PU6_3602_3730	0.468
F24043PU6_3610_3530	0.4681
F24043PU6_3640_3600	0.4702
F24043PU6_3690_3610	0.4458
F24043PU6_3730_3750	0.4697
F24043PU6_3750_3752	0.4698
F24043PU6_3752_4080	0.4688
F24043PU6_4080_4180	0.4709
F24043PU6_4180_4150	0.4671
F24045EL0_5760_0000	1
F24510WM0_3650_0001	0.2593
F24510WM0_3960_0000	1
F24510WM0_3961_0000	1
F24510WM1_3910_0001	0.6116

Land-River Segment	TSS DF
A24001PU0_3871_3690	0.6479
A24001PU1_3100_3690	0.6479
A24001PU1_3580_3780	0.6479
A24001PU2_3180_3370	0.6479
A24001PU2_3370_4020	0.6479
A24001PU4_3780_3930	0.6479
A24001PU4_3890_3990	0.6479
A24001PU4_3990_3780	0.6479
A24001PU5_3930_4170	0.6479
A24001PU5_4170_4020	0.6479
A24001PU6_3870_3690	0.6479
A24001PU6_4020_3870	0.6479
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A24003WL0_4391_0000	1
A24003WL0_4392_0000	1
A24003WL0_4393_0000	1
A24003WL0_4394_0000	1
A24003WL0_4420_0000	1
A24003WL0_4421_0000	1
A24003WL0_4422_0000	1
A24003WL0_4423_0000	1
A24003WL0_4424_0000	1
A24003WL0_4425_0000	1
A24003WL0_4600_0000	1
A24003WL0_4601_0000	1
A24003WL0_4602_0000	1
A24003WL0_4603_0000	1
A24003WL0_4770_0000	1
A24003WL0_4771_0000	1
A24003WL0_4772_0000	1
A24003WM0_3961_0000	1
A24003WM0_3962_0000	1
A24003WM0_3963_0000	1
A24003WM0_3966_0000	1
A24003WM3_4060_0001	0.4729
A24003XL3_4710_0000	1
A24003XL3_4711_0000	1
A24003XL3_4712_0000	1
A24003XL3_4713_0000	1
A24003XL3_4950_0000	1
A24003XU2_4270_4650	1.0716
A24003XU2_4480_4650	1.0716
A24003XU3_4650_0001	1.0716
A24005SL2_2910_3060	0.7957
A24005WM0_3650_0001	0.7941
A24005WM0_3740_0001	1.5741

A24005WM0_3741_0000	1
A24005WM0_3742_0000	1
A24005WM0_3743_0000	1
A24005WM0_3744_0000	1
A24005WM0_3745_0000	1
A24005WM0_3881_3880	0
A24005WM0_3964_0000	1
A24005WM0_3965_0000	1
A24005WM1_3660_3910	1.0256
A24005WM1_3910_0001	1.0256
A24005WM3_3880_4060	0.4729
A24005WM3_4060_0001	0.4729
A24005WU0_3021_3020	0.0038
A24005WU0_3540_0000	1
A24005WU0_3541_0000	1
A24005WU0_3670_0001	1.5051
A24005WU0_3671_0000	1
A24005WU0_3820_0000	1
A24005WU0_3821_0000	1
A24005WU1_3350_3490	0.2251
A24005WU1_3482_0001	1.0627
A24005WU1_3490_3480	0.2251
A24005WU2_3020_3320	0.2251
A24005WU2_3320_3480	0.2251
A24005WU3_3480_3481	0.2251
A24005WU3_3481_0001	0.6602
A24009WL0_4772_0000	1
A24009WL0_4920_0000	1
A24009WL0_4921_0000	1
A24009WL0_4922_0000	1
A24009WL0_4923_0000	1
A24009WL0_4925_0000	1
A24009XL0_4954_0000	1
A24009XL0_5320_0001	0.9445
A24009XL0_5341_0000	1
A24009XL0_5342_0000	1
A24009XL0_5343_0000	1
A24009XL0_5345_0000	1
A24009XL0_5346_0000	1
A24009XL0_5348_0000	1
A24009XL0_5350_0000	1
A24009XL3_4713_0000	1
A24009XL3_4950_0000	1
A24009XL3_4951_0000	1
A24009XL3_4952_0000	1
A24011EL0_4591_0000	1
A24011EL2_4590_0001	1.3832

A24011EL2_4630_0000	1
A24011EM0_4322_0000	1
A24011EM0_4323_0000	1
A24011EM0_4324_0000	1
A24011EM0_4327_0000	1
A24011EM2_3980_0001	1.199
A24011EM2_4100_0001	1.5737
A24011EM2_4101_0000	1
A24011EM3_4320_0000	1
A24011EM3_4321_0000	1
A24011EM3_4325_0000	1
A24011EM4_4740_0000	1
A24013PM1_3120_3400	0.6479
A24013PM1_3450_3400	0.6479
A24013PM1_3710_4040	0.6479
A24013PM2_2860_3040	0.6479
A24013PM2_3400_3340	0.6479
A24013PM3_3040_3340	0.6479
A24013SL0_2831_2830	0.1271
A24013SL3_2460_2430	0.3917
A24013WM0_3881_3880	0
A24013WM1_3882_3880	0.4729
A24013WM3_3880_4060	0.4729
A24013WU0_3021_3020	0.0038
A24013WU1_3350_3490	0.2251
A24015EU0_2940_0000	1
A24015EU0_2941_0000	1
A24015EU0_2985_0000	1
A24015EU0_3010_0000	1
A24015EU0_3011_0000	1
A24015EU0_3050_0000	1
A24015EU0_3130_0000	1
A24015EU0_3131_0000	1
A24015EU0_3200_0000	1
A24015EU0_3201_0000	1
A24015EU0_3202_0000	1
A24015EU0_3203_0000	1
A24015EU0_3300_0000	1
A24015EU0_3301_0000	1
A24015EU0_3302_0000	1
A24015EU0_3360_0000	1
A24015EU0_3361_0000	1
A24015EU0_3362_0000	1
A24015EU0_3363_0000	1
A24015EU0_3364_0000	1
A24015EU1_2650_0001	1.1232
A24015EU1_2810_0001	1.0695

A24015EU1_2980_0000	1
A24015EU1_2981_0000	1
A24015EU1_2982_0000	1
A24015EU1_2983_0000	1
A24015EU1_2984_0000	1
A24015SL2_2480_0001	1.0483
A24015SL9_2720_0001	0.7278
A24015SL9_2970_0000	1
A24015SL9_2971_0000	1
A24017PL0_5290_0000	1
A24017PL0_5390_0000	1
A24017PL0_5391_0000	1
A24017PL0_5392_0000	1
A24017PL0_5440_0000	1
A24017PL0_5450_0000	1
A24017PL0_5510_0001	2.0926
A24017PL0_5530_5710	1.4374
A24017PL0_5580_0000	1
A24017PL0_5581_0000	1
A24017PL0_5582_0000	1
A24017PL0_5583_0000	1
A24017PL0_5584_0000	1
A24017PL0_5585_0000	1
A24017PL0_5670_0000	1
A24017PL0_5671_0000	1
A24017PL0_5710_0001	1.4374
A24017PL0_5720_0001	0.8261
A24017PL0_5790_0000	1
A24017PL0_5791_0000	1
A24017PL0_5860_0000	1
A24017PL0_5930_0000	1
A24017PL1_5230_0001	0.8389
A24017PL2_5300_5630	1.3348
A24017PL2_5630_0001	1.3348
A24017PL2_5800_0000	1
A24017XL0_5340_0000	1
A24019EL0_4591_0000	1
A24019EL0_4592_0000	1
A24019EL0_4593_0000	1
A24019EL0_4598_0000	1
A24019EL0_4892_0000	1
A24019EL0_5151_0000	1
A24019EL0_5262_0000	1
A24019EL0_5280_0000	1
A24019EL0_5281_0000	1
A24019EL0_5282_0000	1
A24019EL0_5283_0000	1

A24019EL0_5284_0000	1
A24019EL0_5285_0000	1
A24019EL0_5590_0000	1
A24019EL0_5766_0000	1
A24019EL0_5890_0000	1
A24019EL1_5150_0001	1.4756
A24019EL2_4630_0000	1
A24019EL2_4634_0000	1
A24019EM0_4322_0000	1
A24019EM0_4880_0000	1
A24019EM0_4881_0000	1
A24019EM0_4883_0000	1
A24019EM0_4884_0000	1
A24019EM0_4885_0000	1
A24019EM0_4886_0000	1
A24019EM0_4887_0000	1
A24019EM0_4888_0000	1
A24019EM0_4889_0000	1
A24019EM0_4890_0000	1
A24019EM0_4891_0000	1
A24019EM0_5260_0000	1
A24019EM0_5261_0000	1
A24019EM0_5263_0000	1
A24021PM1_3450_3400	0.6479
A24021PM1_3710_4040	0.6479
A24021PM2_2860_3040	0.6479
A24021PM2_3400_3340	0.6479
A24021PM3_3040_3340	0.6479
A24021PM4_3340_3341	0.6479
A24021PM4_3341_4040	0.6479
A24021PM4_4040_4410	0.6479
A24021PM7_4200_4410	0.6479
A24021PM7_4410_4620	0.6479
A24023PU1_3850_4190	0.2371
A24023PU1_3940_3970	0.6479
A24023PU1_4190_4300	0.2371
A24023PU1_4300_4440	0.6479
A24023PU2_4720_4750	0.1101
A24023PU2_4750_4450	0.1101
A24023PU3_4450_4440	0.1102
A24025SL0_2721_2720	0.7278
A24025SL2_2750_2720	0.7278
A24025SL2_2910_3060	0.7957
A24025SL2_3060_0001	0.7957
A24025SL9_2720_0001	0.7278
A24025SL9_2970_0000	1
A24025SL9_2971_0000	1

A24025WU0_3160_0000	1
A24025WU0_3161_0000	1
A24025WU0_3162_0000	1
A24025WU0_3250_0001	1.4408
A24025WU0_3251_0000	1
A24025WU0_3252_0000	1
A24025WU0_3253_0000	1
A24025WU0_3254_0000	1
A24025WU0_3540_0000	1
A24025WU1_3240_3331	1.0335
A24025WU1_3330_0001	1.0335
A24025WU1_3331_3330	1.0335
A24025WU1_3482_0001	1.0627
A24025WU2_3020_3320	0.2251
A24027WM1_3882_3880	0.4729
A24027WM3_3880_4060	0.4729
A24027WM3_4060_0001	0.4729
A24027XU0_4090_4270	1.0716
A24027XU0_4091_4270	1.0716
A24027XU0_4130_4070	0.0442
A24027XU2_4070_4330	0.0442
A24027XU2_4270_4650	1.0716
A24027XU2_4330_4480	0.222
A24027XU2_4480_4650	1.0716
A24029EU0_3360_0000	1
A24029EU0_3361_0000	1
A24029EU0_3362_0000	1
A24029EU0_3363_0000	1
A24029EU0_3570_0000	1
A24029EU0_3571_0000	1
A24029EU0_3572_0000	1
A24029EU0_3573_0000	1
A24029EU0_3700_0000	1
A24029EU0_3720_0000	1
A24029EU0_3724_0000	1
A24029EU0_3725_0000	1
A24029EU0_4010_0000	1
A24029EU0_4011_0000	1
A24029EU0_4012_0000	1
A24029EU0_4013_0000	1
A24029EU0_4014_0000	1
A24029EU0_4015_0000	1
A24029EU0_4016_0000	1
A24029EU0_4120_0000	1
A24029EU0_4122_0000	1
A24029EU0_4123_0000	1
A24029EU0_4125_0000	1

A24029EU2_3520_0001	1.3532
A24031PL0_4510_0001	0.2874
A24031PL1_4460_4780	0.8861
A24031PL1_4540_0001	7.1935
A24031PL1_4780_0001	0.8861
A24031PM0_4640_4820	0.6479
A24031PM1_4250_4500	0.6479
A24031PM1_4500_4580	0.6479
A24031PM4_4040_4410	0.648
A24031PM7_4410_4620	0.6479
A24031PM7_4580_4820	0.6479
A24031PM7_4620_4580	0.6479
A24031PM7_4820_0001	0.6479
A24031XU0_4130_4070	0.0442
A24031XU2_4070_4330	0.0442
A24031XU2_4330_4480	0.222
A24033PL0_4510_0001	0.2874
A24033PL0_4961_0000	1
A24033PL0_5070_0001	1.2415
A24033PL0_5290_0000	1
A24033PL0_5390_0000	1
A24033PL1_4540_0001	7.1935
A24033PL1_5060_0000	1
A24033PL1_5061_0000	1
A24033PL1_5230_0001	0.8389
A24033PL2_4810_0000	1
A24033PL2_4811_0000	1
A24033PL2_5300_5630	1.3348
A24033PL7_4960_0000	1
A24033PL7_4980_0000	1
A24033XL0_5340_0000	1
A24033XL1_4690_0001	1.5203
A24033XL1_4691_0000	1
A24033XL3_4710_0000	1
A24033XL3_4711_0000	1
A24033XL3_4712_0000	1
A24033XL3_4713_0000	1
A24033XL3_4950_0000	1
A24033XL3_4951_0000	1
A24033XL3_4952_0000	1
A24033XU2_4330_4480	0.222
A24033XU2_4480_4650	1.0716
A24033XU3_4650_0001	1.0716
A24035EM2_3980_0001	1.1858
A24035EM2_4100_0001	1.5737
A24035EM2_4101_0000	1
A24035EU0_3700_0000	1

A24035EU0_3720_0000	1
A24035EU0_3721_0000	1
A24035EU0_3722_0000	1
A24035EU0_3830_0001	1.3432
A24035EU0_4030_0000	1
A24035EU0_4120_0000	1
A24035EU0_4121_0000	1
A24035EU0_4122_0000	1
A24035EU0_4124_0000	1
A24035EU0_4260_0000	1
A24035EU0_4470_0000	1
A24035EU0_4471_0000	1
A24035EU0_4472_0000	1
A24035EU0_4473_0000	1
A24035EU0_4474_0000	1
A24035EU0_4475_0000	1
A24035EU0_4490_0000	1
A24035EU0_4491_0000	1
A24035EU0_4610_0000	1
A24035EU0_4872_0000	1
A24035EU2_3520_0001	1.3532
A24037PL0_5510_0001	2.0926
A24037PL0_5670_0000	1
A24037PL0_5671_0000	1
A24037PL0_5672_0000	1
A24037PL0_5750_0001	2.4774
A24037PL0_5830_0001	8.6706
A24037PL0_5950_0000	1
A24037PL0_5951_0000	1
A24037PL0_5952_0000	1
A24037PL0_5960_0000	1
A24037PL0_5961_0000	1
A24037PL0_5962_0000	1
A24037PL0_5980_0000	1
A24037PL0_5981_0000	1
A24037PL0_5982_0000	1
A24037PL0_5983_0000	1
A24037PL0_6020_0000	1
A24037PL0_6060_0000	1
A24037PL0_6110_0000	1
A24037PL1_5910_0001	1.9348
A24037WL0_4924_0000	1
A24037WL0_5880_0000	1
A24037WL0_5881_0000	1
A24037XL0_4953_0000	1
A24037XL0_4955_0000	1
A24037XL0_4956_0000	1

A24037XL0_5340_0000	1
A24037XL0_5344_0000	1
A24037XL0_5347_0000	1
A24037XL0_5349_0000	1
A24039EL0_5761_0000	1
A24039EL0_5762_0000	1
A24039EL0_5763_0000	1
A24039EL0_5765_0000	1
A24039EL0_5890_0000	1
A24039EL0_5891_0000	1
A24039EL0_5892_0000	1
A24039EL0_5893_0000	1
A24039EL0_5894_0000	1
A24039EL0_6001_0000	1
A24039EL0_6002_0000	1
A24039EL0_6003_0000	1
A24039EL0_6004_0000	1
A24039EL0_6010_0000	1
A24039EL0_6011_0000	1
A24039EL1_5570_0001	1.7388
A24039EL1_6000_0001	1.3567
A24039EL3_5970_0000	1
A24039EL3_5971_0000	1
A24039EL3_5974_0000	1
A24041EM0_4324_0000	1
A24041EM0_4551_0000	1
A24041EM0_4870_0000	1
A24041EM0_4871_0000	1
A24041EM0_4874_0000	1
A24041EM0_4875_0000	1
A24041EM0_4876_0000	1
A24041EM0_4882_0000	1
A24041EM2_4101_0000	1
A24041EM4_4740_0000	1
A24041EU0_4470_0000	1
A24041EU0_4474_0000	1
A24041EU0_4475_0000	1
A24041EU0_4550_0000	1
A24041EU0_4700_0000	1
A24041EU0_4873_0000	1
A24043PM7_4150_4290	0.6479
A24043PU0_3000_3090	0.6479
A24043PU0_3601_3602	0.6479
A24043PU0_3611_3530	0.648
A24043PU0_3751_3752	0.6479
A24043PU1_3030_3440	0.6479
A24043PU1_3100_3690	0.6479

A24043PU2_2840_3080	0.6479
A24043PU2_3080_3640	0.6478
A24043PU2_3090_4050	0.6479
A24043PU2_4050_4180	0.6479
A24043PU3_2510_3290	0.648
A24043PU3_3290_3390	0.6479
A24043PU3_3390_3730	0.6479
A24043PU6_3440_3590	0.6479
A24043PU6_3530_3440	0.6479
A24043PU6_3590_3640	0.6479
A24043PU6_3600_3602	0.6479
A24043PU6_3602_3730	0.6479
A24043PU6_3610_3530	0.6479
A24043PU6_3640_3600	0.6479
A24043PU6_3690_3610	0.6479
A24043PU6_3730_3750	0.6479
A24043PU6_3750_3752	0.6479
A24043PU6_3752_4080	0.6479
A24043PU6_4080_4180	0.6479
A24043PU6_4180_4150	0.6479
A24045EL0_4593_0000	1
A24045EL0_4594_0000	1
A24045EL0_4595_0000	1
A24045EL0_4596_0000	1
A24045EL0_4597_0000	1
A24045EL0_4598_0000	1
A24045EL0_4633_0000	1
A24045EL0_5040_0000	1
A24045EL0_5400_0001	1.4603
A24045EL0_5760_0000	1
A24045EL0_5761_0000	1
A24045EL0_5762_0000	1
A24045EL0_5764_0000	1
A24045EL1_5430_0001	0.7524
A24045EL1_5570_0001	1.7388
A24045EL2_4630_0000	1
A24045EL2_4634_0000	1
A24045EL2_5110_5270	0.8664
A24045EL2_5270_0001	0.8664
A24047EL0_5271_0000	1
A24047EL1_5430_0001	0.7549
A24047EL1_5570_0001	1.7391
A24047EL1_5660_0000	1
A24047EL2_5110_5270	0.8659
A24047EL2_5270_0001	0.8665
A24047EL3_5870_0000	1
A24047EL3_5970_0000	1

A24047EL3_5971_0000	1
A24047EL3_5972_0000	1
A24510WM0_3650_0001	0.7941
A24510WM0_3740_0001	1.5743
A24510WM0_3741_0000	1
A24510WM0_3960_0000	1
A24510WM0_3961_0000	1
A24510WM0_3962_0000	1
A24510WM0_3964_0000	1
A24510WM1_3910_0001	1.0256
A24510WM3_4060_0001	0.4729
B24001PU1_3580_3780	0.6479
B24001PU1_3850_4190	0.2371
B24001PU1_3940_3970	0.6479
B24001PU2_3140_3680	0.6479
B24001PU3_3680_3890	0.6479
B24001PU4_3890_3990	0.6478
B24001PU4_3970_3890	0.6479
B24001PU4_4440_3970	0.6478
B24021PM1_3510_4000	0.6479
B24021PM1_4000_4290	0.6479
B24021PM3_3040_3340	0.6479
B24021PM4_3340_3341	0.6479
B24021PM4_3341_4040	0.6479
B24021PM4_4040_4410	0.6479
B24021PM7_4150_4290	0.6479
B24021PM7_4200_4410	0.6479
B24021PM7_4290_4200	0.6479
F24001PU0_3871_3690	0.648
F24001PU1_3100_3690	0.6479
F24001PU1_3580_3780	0.6478
F24001PU2_3370_4020	0.6479
F24001PU3_3680_3890	0.6477
F24001PU4_3780_3930	0.6479
F24001PU4_3890_3990	0.6479
F24001PU4_3970_3890	0.6479
F24001PU4_3990_3780	0.6479
F24001PU5_3930_4170	0.6479
F24001PU5_4170_4020	0.6479
F24001PU6_3870_3690	0.6479
F24001PU6_4020_3870	0.6479
F24003WL0_4420_0000	1
F24003WL0_4423_0000	1
F24003WL0_4424_0000	1
F24003WL0_4602_0000	1
F24003WM0_3961_0000	1
F24003WM0_3962_0000	1

F24003XL3_4710_0000	1
F24003XU2_4270_4650	1.0716
F24003XU2_4480_4650	1.0716
F24003XU3_4650_0001	1.0716
F24005WM0_3650_0001	0.7939
F24005WM0_3741_0000	1
F24005WM0_3742_0000	1
F24005WM0_3881_3880	0
F24005WM0_3964_0000	1
F24005WM0_3965_0000	1
F24005WM1_3660_3910	1.0255
F24005WM1_3910_0001	1.0256
F24005WM3_3880_4060	0.473
F24005WM3_4060_0001	0.4729
F24005WU0_3540_0000	1
F24005WU0_3541_0000	1
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From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 29 Apr 2019 16:15:10 +0000
To: "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Janis Markusic" <pwmark02@aacounty.org>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>
Cc: "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "LaPlante, Rosanna (DPW)" <Rosanna.LaPlante@baltimorecity.gov>; "Cameron, Mark (DPW)" <Mark.Cameron@baltimorecity.gov>
Subject: FW: Agenda for Meeting 5/1/2019
Attachments: MDE 5.1.19 mtg agenda.pdf

FYI

From: Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Sent: Friday, April 26, 2019 10:53 AM
To: Karl Berger <kberger@mwcog.org>
Cc: Lee Currey <lee.currey@maryland.gov>; Suzanne Dorsey -MDE- <suzanne.dorsey1@maryland.gov>; Raymond Bahr -MDE- <raymond.bahr@maryland.gov>; ejkohler@umd.edu
Subject: Agenda for Meeting 5/1/2019

Karl...

Attached is the agenda for Wednesday's meeting with the University of Maryland Environmental Finance Center.

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment
1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

UNIVERSITY OF MARYLAND
ENVIRONMENTAL FINANCE CENTER

Preinkert Hall, Bldg. 054
College Park, MD 20742

AGENDA

DRAFT Affordability Assessment for NPDES MS4 Permits

May 1, 2019

9:30 AM – 11:30 AM

Maryland Department of Environment Aqua Conference Room

Introduction: Maryland Department of Environment – 5 mins

Context for the Assessment: Environmental Finance Center - 15 mins

Review of Affordability Assessment Data Form and Matrix: Environmental Finance Center – 30 mins

Discussion

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 17 Jun 2019 20:02:45 +0000
To: "Jennifer M. Smith - MDE" <jenniferm.smith@maryland.gov>
Cc: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Janis Markusic" <pwmark02@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "LaPlante, Rosanna (DPW)" <Rosanna.LaPlante@baltimorecity.gov>; "Cameron, Mark (DPW)" <Mark.Cameron@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Knapp, Les" <lknapp@mdcounties.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Lee Currey -MDE-" <lee.currey@maryland.gov>
Subject: RE: Schedule for Tentative Determination for NPDES MS4 Phase I Large Permit

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Jennifer,

The MS4 stormwater managers group has a number of questions about the new timetable and would like to schedule asap a joint call to discuss these questions with MDE staff. Can you propose a time (or, ideally, a couple of times) when MDE staff would be available for such a call? I'm guessing that we would need at least 90 minutes – and possibly two hours – to work through our questions.

The group can commit to providing you a list of questions ahead of the meeting and would appreciate an opportunity to discuss these with you before MDE provides a written response, if you decide to address them in that manner.

Also, the group requests that MDE open up this call to all 10 of the jurisdictional Phase Is, as most of the questions will be relevant to the medium Phase Is' permit development process.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

From: Jennifer M. Smith - MDE <jenniferm.smith@maryland.gov>
Sent: Monday, June 17, 2019 9:15 AM
To: Bennett, Katherine <kate.bennett@montgomerycountymd.gov>; Janis Markusic <pwmark02@aacounty.org>; Erik Michelson (pwmich20@aacounty.org) <pwmich20@aacounty.org>; Robert Hirsch <rhirsch@baltimorecountymd.gov>; Knapp, Les <lknapp@mdcounties.org>; Dawson, Frank <Frank.Dawson@montgomerycountymd.gov>; Bubar, Patrice <Patty.Bubar@montgomerycountymd.gov>; jgmaldonado@co.pg.md.us; Nathan Forand

<nforand@baltimorecountymd.gov>; Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>; Stevens, Amy <amy.stevens@montgomerycountymd.gov>; DeHan, Jeffrey M. <jmdehan@co.pg.md.us>; Cameron, Mark <Mark.Cameron@baltimorecity.gov>; LaPlante, Rosanna <Rosanna.LaPlante@baltimorecity.gov>; Karl Berger <kberger@mwcog.org>; Heidi Bonnaffon <hbonnaffon@mwcog.org>; William C. Merrey <wmerrey@baltimorecountymd.gov>; kgrove.baltimorecity@gmail.com
Cc: Raymond Bahr (raymond.bahr@maryland.gov) <raymond.bahr@maryland.gov>; Lee Currey -MDE- <lee.currey@maryland.gov>
Subject: RE: Schedule for Tentative Determination for NPDES MS4 Phase I Large Permit

Dear Phase I MS4 Administrator:

The Maryland Department of the Environment (Department) is updating its schedule to allow for more time prior to going to tentative determinations for the NPDES MS4 Phase I Large permits. The Department met with the U.S. Environmental Protection Agency (EPA), Region III, last Tuesday to provide them with the current permitting status in Maryland. The Department explained the new metrics, i.e., impervious acres, total nitrogen, and total phosphorus, and the maximum extent practicable (MEP) process that we are using to determine restoration requirements for this round of MS4 permits. The EPA had previously requested developing specific Bay metrics and determining MEP, so were supportive of these efforts. The EPA also mentioned that they would need 30 to 90 days to review the new permits. The Department also wishes to ensure the permits are consistent with the Chesapeake Bay's Phase III Watershed Implementation Plan (WIP) due to be completed in mid-August. Subsequently, ***the Department is planning to send final draft MS4 permits to EPA in early September 2019, and issue tentative determinations by mid- November 2019***. The Department thanks you for all of your diligent efforts in getting us to this point and will be working closely with you over the next several months to develop a smart and sensible permit that continues our progress in restoring local streams and the Chesapeake Bay.

Sincerely,

Jennifer M. Smith, P.E.
Program Manager
Sediment, Stormwater and Dam Safety Program
Water and Science Administration
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

410-537-3561

From: "Karl Berger" <kberger@mwcog.org>
Sent: Thu, 20 Jun 2019 20:27:43 +0000
To: "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>; "Jennifer M. Smith - MDE" <jenniferm.smith@maryland.gov>
Cc: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Janis Markusic" <pwmark02@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "LaPlante, Rosanna (DPW)" <Rosanna.LaPlante@baltimorecity.gov>; "Cameron, Mark (DPW)" <Mark.Cameron@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Knapp, Les" <lknapp@mdcounties.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Lee Currey -MDE-" <lee.currey@maryland.gov>
Subject: RE: Schedule for Tentative Determination for NPDES MS4 Phase I Large Permit

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Ray:

Here are the questions:

- How did the June 12 meeting with EPA go?
- Can you provide us with more specifics about EPA's response and the new timetable, such as whether EPA's review will be concurrent with or before tentative determination? It appears there will be about 60 days between sending the permits to EPA and the release of the tentative determination drafts; will that be sufficient time to respond to EPA's comments before going public?
- When will MDE meet with jurisdictions about their MEP submittals?
- When will MDE release the 2019 draft accounting guidance?
- When will MDE send an updated draft permit template?
- Will the new monitoring guidance be incorporated into the permits, or is it just guidance?
- Will MDE meet with jurisdictions before finalizing the Phase III WIP in August?
- Will MDE meet with jurisdictions about the draft permit before sending it to EPA in September?
- Does MDE agree that all work completed between during this interim between our permits will be counted toward our next permit's MEP?

- The Phase III WIP states that the Stormwater sector is expected to continue impervious restoration at a rate of 2% per year; will that change given that MDE has indicated that it will eliminate IA credit for alternative practices once the 20% is complete?

The group still thinks it would be good to discuss these questions in a call as soon as MDE staff is ready to do so. Is sometime next week a possibility? Otherwise, we probably should wait until after the July 4th holiday week, so July 8 or later.

Also, here's a reminder from the group that MDE's 4/30/19 memo on stream restoration crediting does not address all of the group's concerns regarding this issue, as communicated in a number of previous messages. As these concerns remain pertinent to the resolution of major issues, such as compliance under the exiting permit and project planning under the new permit, we request that a group call or meeting be separately scheduled to address these concerns as well.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

From: Raymond Bahr -MDE- <raymond.bahr@maryland.gov>
Sent: Thursday, June 20, 2019 1:15 PM
To: Jennifer M. Smith - MDE <jenniferm.smith@maryland.gov>
Cc: Karl Berger <kberger@mwcog.org>; Erik Michelson (pwmich20@aacounty.org) <pwmich20@aacounty.org>; Janis Markusic <pwmark02@aacounty.org>; Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>; LaPlante, Rosanna <Rosanna.LaPlante@baltimorecity.gov>; Cameron, Mark <Mark.Cameron@baltimorecity.gov>; Robert Hirsch <rhirsch@baltimorecountymd.gov>; Nathan Forand <nforand@baltimorecountymd.gov>; William C. Merrey <wmerrey@baltimorecountymd.gov>; Dawson, Frank <Frank.Dawson@montgomerycountymd.gov>; Stevens, Amy <amy.stevens@montgomerycountymd.gov>; Bennett, Katherine <kate.bennett@montgomerycountymd.gov>; Bubar, Patrice <Patty.Bubar@montgomerycountymd.gov>; DeHan, Jeffrey M. <jmdehan@co.pg.md.us>; jgmaldonado@co.pg.md.us; Knapp, Les <lknapp@mdcounties.org>; Heidi Bonnaffon <hbonnaffon@mwcog.org>; Lee Currey -MDE- <lee.currey@maryland.gov>
Subject: Re: Schedule for Tentative Determination for NPDES MS4 Phase I Large Permit

Hi Karl,

Lee is also on vacation this week.

If you can provide us with the groups' questions, I will follow-up next week on next steps.

Thank you,

Ray

On Mon, Jun 17, 2019 at 4:39 PM Jennifer M. Smith - MDE <jenniferm.smith@maryland.gov> wrote:

> Karl,
>
> I am going to defer to Ray Bahr as I will be out of the office for the next 2 weeks.
>
> Thanks,
>
> Jennifer
>
> On Mon, Jun 17, 2019 at 4:02 PM Karl Berger <kberger@mwcog.org> wrote:
>
> > Jennifer,
> >
> > The MS4 stormwater managers group has a number of questions about the new timetable and would like to schedule asap a joint call to discuss these questions with MDE staff. Can you propose a time (or, ideally, a couple of times) when MDE staff would be available for such a call? I'm guessing that we would need at least 90 minutes – and possibly two hours – to work through our questions.
> >
> > The group can commit to providing you a list of questions ahead of the meeting and would appreciate an opportunity to discuss these with you before MDE provides a written response, if you decide to address them in that manner.
> >
> > Also, the group requests that MDE open up this call to all 10 of the jurisdictional Phase Is, as most of the questions will be relevant to the medium Phase Is' permit development process.
> >
> > Karl Berger
> > Principal Environmental Planner
> > Metropolitan Washington Council of Governments
> > 202-962-3350
> >
> > **From:** Jennifer M. Smith - MDE <jenniferm.smith@maryland.gov>
> > **Sent:** Monday, June 17, 2019 9:15 AM
> > **To:** Bennett, Katherine <kate.bennett@montgomerycountymd.gov>; Janis Markusic <pwmark02@aacounty.org>; Erik Michelson (pwmich20@aacounty.org) <pwmich20@aacounty.org>; Robert Hirsch <rhirsch@baltimorecountymd.gov>; Knapp, Les <lknapp@mdcounties.org>; Dawson, Frank <Frank.Dawson@montgomerycountymd.gov>; Bubar, Patrice <Patty.Bubar@montgomerycountymd.gov>; jgmaldonado@co.pg.md.us; Nathan Forand <nforand@baltimorecountymd.gov>; Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>; Stevens, Amy <amy.stevens@montgomerycountymd.gov>; DeHan, Jeffrey M. <jmdehan@co.pg.md.us>; Cameron, Mark <Mark.Cameron@baltimorecity.gov>; LaPlante, Rosanna <Rosanna.LaPlante@baltimorecity.gov>; Karl Berger <kberger@mwcog.org>; Heidi Bonnaffon <hbonnaffon@mwcog.org>; William C. Merrey <wmerrey@baltimorecountymd.gov>;

kgrove.baltimorecity@gmail.com
Cc: Raymond Bahr (raymond.bahr@maryland.gov) <raymond.bahr@maryland.gov>; Lee Currey - MDE- <lee.currey@maryland.gov>
Subject: RE: Schedule for Tentative Determination for NPDES MS4 Phase I Large Permit

Dear Phase I MS4 Administrator:

The Maryland Department of the Environment (Department) is updating its schedule to allow for more time prior to going to tentative determinations for the NPDES MS4 Phase I Large permits. The Department met with the U.S. Environmental Protection Agency (EPA), Region III, last Tuesday to provide them with the current permitting status in Maryland. The Department explained the new metrics, i.e., impervious acres, total nitrogen, and total phosphorus, and the maximum extent practicable (MEP) process that we are using to determine restoration requirements for this round of MS4 permits. The EPA had previously requested developing specific Bay metrics and determining MEP, so were supportive of these efforts. The EPA also mentioned that they would need 30 to 90 days to review the new permits. The Department also wishes to ensure the permits are consistent with the Chesapeake Bay's Phase III Watershed Implementation Plan (WIP) due to be completed in mid-August. Subsequently, ***the Department is planning to send final draft MS4 permits to EPA in early September 2019, and issue tentative determinations by mid- November 2019***. The Department thanks you for all of your diligent efforts in getting us to this point and will be working closely with you over the next several months to develop a smart and sensible permit that continues our progress in restoring local streams and the Chesapeake Bay.

Sincerely,

Jennifer M. Smith, P.E.
Program Manager
Sediment, Stormwater and Dam Safety Program
Water and Science Administration
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

410-537-3561

--
Jennifer M. Smith, P.E.
Program Manager
Sediment, Stormwater and Dam Safety Program

Water and Science Administration
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

410-537-3561

Click here to complete a three question customer experience survey.

Click here to complete a three question customer experience survey.

From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Mon, 24 Jun 2019 18:53:41 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Subject: MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Kim....

Any idea when you will get a chance to complete this?...Stew.

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment
1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

From: "Grove, Kimberly (DPW)"
Sent: Mon, 24 Jun 2019 18:58:38 +0000
To: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Subject: RE: MEP Analysis

I've not been given a schedule yet for access to our servers. DPW staff is still in the process for getting City emails back. I only got mine back on June 19.

From: Stewart Comstock -MDE- [mailto:stewart.comstock@maryland.gov]
Sent: Monday, June 24, 2019 2:54 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
Subject: MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Kim....

Any idea when you will get a chance to complete this?...Stew.

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment
1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Mon, 24 Jun 2019 20:02:52 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Subject: Re: MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Kim...

Just checking. I know that this has been tough for you...Stew.

On Mon, Jun 24, 2019 at 2:59 PM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> I've not been given a schedule yet for access to our servers. DPW staff is still in the process for getting City emails back. I only got mine back on June 19.
>
> **From:** Stewart Comstock -MDE- [mailto:stewart.comstock@maryland.gov]
> **Sent:** Monday, June 24, 2019 2:54 PM
> **To:** Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
> **Subject:** MEP Analysis
>
> [THIS EMAIL IS FROM AN EXTERNAL SENDER]
>
> Kim....
>
> Any idea when you will get a chance to complete this?...Stew.
>
> --
>
> Stewart R. Comstock, P.E.
> Program Review Division Chief
>
> Sediment, Stormwater, & Dam Safety Program, WSA
>
> Maryland Department of the Environment
>
> 1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

Click here to complete a three question customer experience survey.

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment
1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

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From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Thu, 11 Jul 2019 13:58:51 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Subject: MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Kim...

Any updates on the status of the City's submittal?...I have a meeting with Lee Currey tomorrow and I would like to provide him with the latest info. Thanks! Stew C.

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment
1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

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From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Thu, 18 Jul 2019 20:26:41 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Subject: MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Kim...

Has there been any news on this yet?...Stew

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment
1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

From: "Grove, Kimberly (DPW)"
Sent: Fri, 19 Jul 2019 17:38:37 +0000
To: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Subject: RE: MEP Analysis

Yes, I think we have enough access to enough systems to finally put this submittal together. I'm out next week on vacation (ironically) and we will need to have some internal reviews, but I believe that I should be able to get something to your office by August 9. Will that work?

Note that since the issuance of the FAP in December 2018, at least two stream restoration projects in the Gwynns Falls watershed will probably be removed from the list due to community concerns on tree removal. It's reached the state level, so we will opt for replacement projects (same BMP type) but probably in a different watershed.

Please contact me if you have any questions.

Thanks,

Kimberly L. Grove, P.E.
Chief, Office of Compliance & Laboratories
Baltimore City Department of Public Works
(410) 396 - 0732 (office)
(443) 835-9272 (cell)

From: Stewart Comstock -MDE- [mailto:stewart.comstock@maryland.gov]
Sent: Thursday, July 18, 2019 4:27 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
Subject: MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Kim...

Has there been any news on this yet?...Stew

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment

1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

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From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Wed, 31 Jul 2019 16:44:55 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Subject: Re: Status of MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Kim...

Thanks!...I hope you enjoyed your vacation...Stew

On Wed, Jul 31, 2019 at 6:16 AM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> We are still on track for submittal by August 9. No questions at this time.

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Wednesday, July 31, 2019 12:05 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
Cc: Stewart Comstock -MDE- <stewart.comstock@maryland.gov>; Raymond Bahr -MDE- <raymond.bahr@maryland.gov>
Subject: Status of MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Hi Kim,

I hope all is well. Stew requested that I follow up with you and check on the MEP analysis. Has the City completed it's analysis and final comprehensive report? Did you have any questions on the Restoration Project Portfolio or Physical and Financial Capacity components?

Best,

Brian

--

Brian E. Cooper
Natural Resources Planner
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard | Baltimore, MD 21230-1708
410.537.3653

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Sent from Gmail Mobile

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From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 5 Aug 2019 20:23:42 +0000
To: "Janis Markusic" <pwmark02@aacounty.org>; "Ginger Ellis (PWELLI16@aacounty.org)" <PWELLI16@aacounty.org>; "pwgrif04@aacounty.org" <pwgrif04@aacounty.org>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "gengles@ccg.carr.org" <gengles@ccg.carr.org>; "bmadigan@ccg.carr.org" <bmadigan@ccg.carr.org>; "AHarding@ccgov.org" <AHarding@ccgov.org>; "Karen Wiggen" <wiggenk@charlescounty.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "buckley, christine (cmbuckley@harfordcountymd.gov)" <cmbuckley@harfordcountymd.gov>; "cslowe@howardcountymd.gov" <cslowe@howardcountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "jswauger@washco-md.net" <jswauger@washco-md.net>; "tvance@sha.state.md.us" <tvance@sha.state.md.us>; "kwilen@ccgov.org" <kwilen@ccgov.org>; "Heather Gewandter" <hgewandter@rockvillemd.gov>; "Bennett, Katherine" <Katherine.Bennett@montgomerycountymd.gov>; "Madigan, Byron" <bmadigan@carrollcountymd.gov>; "Karen Coffman" <KCoffman@sha.state.md.us>; "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>
Cc: "Jeff White -MDE-" <jeff.white@maryland.gov>; "Olivia Devereux" <Olivia.Devereux@kci.com>; "Michael Pieper" <Michael.Pieper@kci.com>
Subject: RE: MDE - MS4 local TMDL accounting meeting -- ACTION ITEMS

MD MS4 managers,

Here is what I have as the key action items from the meeting last Friday:

1. MDE (with KCI help) will develop a few case studies of sediment TMDL loadings that represent various geographies (certainly Piedmont and Coastal Plain) as well as various stages of implementation. The case studies will document different Phase 6 model approaches to quantification in comparison to the Phase 5 quantification.
    a. MDE will share the case study parameters with us so that the Phase Is can document their own potential approach to quantification.
2. These case studies will be ready in time for the next meeting on Nov. 1. MDE hopefully will share its results with the group a week or so ahead of the meeting, so that we can come better prepared for discussion. We would do the same with our approach, assuming we develop one.

p.s. If MDE has a copy of Allen Gellis' slides from the meeting, we will share those.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

From: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>
Sent: Fri, 9 Aug 2019 16:33:11 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>
Subject: Re: Status of MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Hi Kim,

Thank you for the update. We understand that no portion of the program is funded through revenue from property taxes. However, these questions help to provide a full financial picture in the MEP analysis. Questions 6c (Government's net debt divided by full market property value or FMPV), 6d (property taxes as a % of FMPV), and 6e (rate collection for annual property taxes) provide valuable information. Also, answering these questions will make the City's financial capacity spreadsheet consistent with the other large Phase Is.

Please complete these questions to the best of your ability, and indicate in the narrative and spreadsheet that the City does not fund the MS4 program through property taxes. If you would like to discuss this further, we'll be glad to do that next week when Stew returns from vacation.

Best,
Brian

On Thu, Aug 8, 2019 at 4:46 PM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> I'm still on track for submitting the portfolio and the physical capacity questionnaire, but I have one small snag for submitting the financial capacity spreadsheet. For the City of Baltimore, no portion of the MS4 program is funded by the general fund (revenue from property tax). Is it appropriate to provide the information for questions 6 c to 6e since that is not relevant to our funding source—the stormwater fee is based on impervious area, regardless of property value. I can understand the questions related to MHI, since that is related to the resident's ability to pay, but I don't think the property tax questions are relevant to Baltimore City. **Can we please omit those three questions (6c, 6d, and 6e)?**
>
> Thanks,
>
> Kimberly L. Grove, P.E.

Chief, Office of Compliance & Laboratories

Baltimore City Department of Public Works

(410) 396 - 0732 (office)

(443) 835-9272 (cell)

From: Stewart Comstock -MDE- [mailto:stewart.comstock@maryland.gov]
Sent: Wednesday, July 31, 2019 12:45 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
Subject: Re: Status of MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Kim...

Thanks!...I hope you enjoyed your vacation...Stew

On Wed, Jul 31, 2019 at 6:16 AM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> We are still on track for submittal by August 9. No questions at this time.

> **From:** Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
> **Sent:** Wednesday, July 31, 2019 12:05 PM
> **To:** Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
> **Cc:** Stewart Comstock -MDE- <stewart.comstock@maryland.gov>; Raymond Bahr -MDE- <raymond.bahr@maryland.gov>
> **Subject:** Status of MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Hi Kim,

I hope all is well. Stew requested that I follow up with you and check on the MEP analysis. Has the City completed it's analysis and final comprehensive report? Did you have any questions on the Restoration Project Portfolio or Physical and Financial Capacity components?

Best,

Brian

--

Brian E. Cooper
Natural Resources Planner
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard | Baltimore, MD 21230-1708
410.537.3653

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--
Brian E. Cooper
Natural Resources Planner
Sediment, Stormwater, and Dam Safety Program

Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard | Baltimore, MD 21230-1708
410.537.3653

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From: "Grove, Kimberly (DPW)"
Sent: Fri, 9 Aug 2019 19:54:06 +0000
To: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Cc: "Brian Cooper -MDE- (brian.cooper@maryland.gov)" <brian.cooper@maryland.gov>; "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>; "Desantis, Paul (DPW)" <Paul.Desantis@baltimorecity.gov>; "Cameron, Mark (DPW)" <Mark.Cameron@baltimorecity.gov>
Subject: RE: Status of MEP Analysis
Attachments: Baltimore City MS4 Physical Cap 8-9-19.pdf

Attached is the physical capacity questionnaire and portfolio for Baltimore City. The financial capacity report will be submitted by Monday, following the email from Brain. Please feel free to contact me if you have any questions.

Have a great weekend.

Thanks,
Kim

From: Stewart Comstock -MDE- [mailto:stewart.comstock@maryland.gov]
Sent: Wednesday, July 31, 2019 12:45 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
Subject: Re: Status of MEP Analysis

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> **Cc:** Stewart Comstock -MDE- <stewart.comstock@maryland.gov>; Raymond Bahr -MDE- <raymond.bahr@maryland.gov>
> **Subject:** Status of MEP Analysis
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Physical Capacity MEP
Analysis Questionnaire
Baltimore City

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

Gantt charts for each of the project types are provided as Attachment 1. The time frames assume that either the design will be provided using a project-specific consultant contract or using a task order for an existing on-call consultant contract. Stream restoration projects use project-specific consultant contracts; while the other project types use on-call contracts due to the cost of the design effort. Procuring an on-call contract would add another 6 to 12 months on to the schedule time frames shown in Attachment 1. The time frames also assume no delay to obtain additional funding (change orders) or financing (modifications of appropriations); this type of delay can add 3 to 24 months to the timeframe.

For category 1, large upland stormwater projects, the City's experience is limited with these types of projects. All traditional BMP projects originally proposed in the MS4 and TMDL Watershed Implementation Plan (WIP) [August 2015] were either deemed infeasible for construction or are still in the implementation phase. One large upland stormwater project was added to the WIP, but it was a wetland included in a stream restoration project contract. The best case scenario (BCS) timeline for upland projects follows the timeline provided in the WIP, which totals 3.7 years. The worst case scenario (WCS) allows for project schedule delays addressed in question 6 and totals 6.5 years, which exceeds the MS4 permit duration. The 12-month construction schedule for this project type also allows for schedule alignment with planting seasons.

For Category 2, in-stream restoration projects, the City's experience is more extensive than Category 1; however, the only completed projects were initiated prior to the implementation of the stormwater utility fee (July 2013), when the projects were interrupted pending project funding / financing. The BCS time frame for in-stream restoration projects follows the timeline provided in the WIP and totals 3.8 years, to allow for the moratorium of work in the stream during May and June. This time frame is for a stream reach length of about 0.5 miles, whereas longer reaches would require a longer construction schedule. The WCS time frame scenario allows for project schedule delays addressed in question 6, especially right-of-entry and access agreements, plus community acceptance. The WCS time frame from in-stream restoration projects totals 7 years, almost twice the BCS time frame. Two stream restoration projects from the WIP were delayed to align with sanitary sewer construction projects: one project is currently in construction and the other one is proposed for construction in 2019. Two stream restoration

projects, although performed on City-owned property, have 100% design completion but have become contentious with community and environmental advocates, who have contacted state legislators to prevent the project. More than any project type, stream restoration projects have the highest potential to remove tree canopy and thus, challenge other environmental initiatives in the City.

For Category 3, alternative projects, the time frame is provided for impervious area removal projects on City-owned land, primarily schools. Most of the design phase work is the negotiation of memorandum of understandings (MOUs) with the specific schools. This project type is typically contracted as a bundle of many project locations. Construction schedules are limited to the summer (June to August) to limit disturbance during the school year. The BCS time frame for impervious area projects follows the timeline provided in the WIP and totals 2.1 months. The WCS time frame scenario allows for project schedule delays addressed in question 6 and totals 4.4 years.

Tree planting projects are completed in partnership with Tree Baltimore. The schedule is primarily affected by planting seasons (spring / fall) and contract capacity. In 2017, Baltimore City completed a street tree inventory and has mapped all potential tree plantings in the right-of-way or on public land. The potential tree planting locations are still pending field verification, so only about 75% of the identified sites may be feasible for planting. Just like environmental site design (ESD) projects (Category 4), street tree planting requires significant coordination with and acceptance by the community for successful implementation and maintenance.

Baltimore City has added a Category 4, Environmental Site Design (ESD) projects, to this survey. Previous experience with this project type was primarily performed in Watershed 263. Like the in-stream restoration projects, the previous projects had schedule interruptions due to funding and financing issues. This project type is typically contracted as a bundle of many project locations. The planning and site selection portion of this project is longer than the other project types due to the challenges of compacted soils, accessibility, traffic patterns, and existing utilities. Typically, only one in 10 locations were identified as feasible (treating more than 0.2 acre / facility and costing less than $300,000 / acre). The ESD projects listed in the portfolio (Question 8) have been delayed to allow for financing by environmental impact bonds. The BCS time frame for ESD projects follows the timeline provided in the WIP and totals 3 years. The WCS time frame scenario allows for project schedule delays addressed in question 6 and totals 5.25 years. Although community outreach is performed at 30%, 60% and 90% milestones of design, the community input usually increases at the 60% phase and creates delays due to re-design.

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

Planning and site selection is primarily performed in-house or through a contracted program manager. The design and construction phases are typically contracted using a design-bid-build format. CIP budgets are proposed in the fall of the preceding fiscal year, with approvals of appropriations provided by mid-Spring. The CIP approval is for next fiscal year but the entire estimated appropriation and expenditure schedule for the project life cycle over the next 5 years must be shown in the proposal. In addition to the CIP schedule, the City of Baltimore usually sets utility rates on a 3-year cycle. The most recent rate adjustment has been established for FY 2020 to 2022 (July 1, 2019 to June 30, 2022). The rate adjustment is based on the revenue requirements for the level of service and associated cost of service for the stormwater utility. The stormwater utility for the City supports both the MS4 compliance and the operation and maintenance of the City's storm sewer system. The rate adjustment assumed only the capital expenditures listed in the 2018 Financial Assurance Plan, allowing for a focus to improve the storm sewer infrastructure and address flooding in the City. Any MS4 permit conditions that require additional capital projects would have to be addressed in the next rate adjustment. A Gantt chart of the schedule for CIP approval and additional CIP projects is show in Attachment 2 (using Project Type 1 time frames).

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

Procurement is primarily used for the design and construction phase. A separate contract for a program manager would not be needed for each individual project. Procurement time frames are typically 6 months for each phase but can be doubled if the bids are protested or if the project must be re-advertised because the bids exceeded the available budget. Currently, all restoration projects have used design-bid-build contracting methods. The timeframes are shown in the Gantt chart shown in Attachment 1. The City is evaluating alternative procurement methods like design-build, pay-for-performance, construction manager at risk (CMAR), and design-build-operation-maintenance DBOM contracts. Design-build contracting has been used in transportation projects and the CMAR method was used for the Headworks project. Beyond a potential reduction of at least 6 months procurement and reduction of change orders, the City is still assessing oversight requirements, risk, and land access. Alternatively, the City is also evaluating environmental banking models to address private property access.

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

During this permit cycle, 7 projects were advertised for construction. Five of those projects were stream restoration, with two combined with sanitary sewer work. The other two restoration projects were ESD projects and impervious area removal. Two (2) of the restoration projects had to be re-advertised. Although the City has implemented programs to assist small business development, most of the bids are submitted by existing contractors who do work for other City agencies. Each project advertisement received only 2 to 6 bids. There was a total of 12 unique companies that bid for all RFPs.

5. **Provide information on contracting limitations that result in longer project implementation times. Examples: Limited qualified construction contractors; Woman owned business enterprise (WBE) or minority owned business enterprise (MBE) requirements limit available qualified construction contractors and/or engineering contractors. Describe the issue and provide the time extension that results due to the issue.**

The City's Office of Boards and Commissions is responsible for pre-qualifying consultants and construction contractors. These pre-qualified consultants and construction contractors are also bidding for and performing work in other MS4 jurisdictions working on similar deadlines. Each design and construction contract requires both MBE and WBE participation. The City has encountered the trend of multiple bids on the same contract using the same MBE or WBE vendors, limiting the experience and exposure for small businesses development.

Two of the bids received to date for restoration projects have had to be re-advertised because the bid exceeded the budget by more than 20% and the lowest bidder did not submit fully completed paperwork. Re-advertisements and subsequent negotiations can add up to 6 months to the time frame.

The City has attempted to include provisions of liquidated damages on restoration contracts to ensure completion by a specific deadline (end of permit); however, this approach increased the cost of the bid submittal and substantially limited the vendors submitting bids. In other City contracts with a specified, regulated deadline (like the modified consent decree for the sanitary sewers), the bids have been protested, unbalanced, and significantly exceeding the available budget (up to 100%). Given the regulatory constraints, the City has been forced to accept some of the bids with an unintended consequence of the making the regulatory obligation significantly more expensive, in addition to compromising other capital projects.

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

The time frame impacts for obtaining permits and other technical plan review approvals are shown in the following table:

Permit / Review	Project Type				Time Frame Impact
	1	2	3	4	
State revolving loan fund (SRF) review (MDE)	X	X	X	X	Adds about 2 to 3 months at 30% (PER), 60%, 90%, bid and final
Right of Entry Agreement (City)	X	X		X	Adds 6 to 18 months. Condemnation process can add another 24 months.
ROW permitting, including review by other utilities (City)			X	X	Can add up to 3 months, but conducted concurrent with SWM/ESC process.
Joint Permit for floodplain / wetland (MDE/ USACE)	X	X			Can add up to 6 months but is usually conducted concurrent with SWM/ESC process. Improved with MDE streamlined process.
Floodplain Management (City)		X			Up to 6 months, although is usually concurrent with the joint permit process.
Forest Conservation Act (FCA)	X	X			Can add up to 18 months, especially if project is on City owned land. Usually is conducted concurrent
Stormwater Management / Erosion and Sediment Control (SWM/ESC) (City)	X	X	X	X	Adds 2 to 3 months at 30, 60, and 90 % design phase. Final approval is pending FEMA, JPA, ROE, NPDES and FCA approvals.
Maryland NPDES General Construction Permit (MDE)	X	X	X	X	Concurrent with SWM/ ESC process.

Suggestions for reducing the time frame is as follows:

- State revolving loan funds
    - Reduce requirements for the (Preliminary Engineering Design Report). These types of projects don't lend themselves to PER as alternatives analysis. It's an extra step that is added. Alternatives analysis should be similar in consideration as JPA for stream restoration projects.
    - Reduce the number of reviews during the design phase or else decrease the effort (time required) for reviewing the final and bid documents.
- Right of entry agreements
    - Add more resources to DOT to complete appraisals.
    - Initiate communication with property owners during the planning phase, instead of waiting until the 30% design milestone. This may increase the duration of the planning phase but it could also identify challenges earlier in the project life cycle.
    - Evaluate riparian rights policies, regardless of property ownership.

    - Process can include railroad coordination, but these locations should be avoided.
- Floodplain management
    - Improved coordination with Joint Permit Application process.
    - Delays were encountered with Jones Falls and potential revision of mapping of floodplain.
    - After construction there is another 6 months to a year for final approval: Conditional Letter of Map Revision (CLOMAR) requirements. Stream is assessed again to verify actual flood level.
- Forest Conservation Act
    - Process is subject to community input.
    - Finalize policy on invasive management and tree mitigation

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

A low-hanging fruit project would be one that is:

- cost-effective ($ / impervious surface restoration or $ / lb pollutant removal);
- located on City-owned land with no other competing use (utilities, traffic or planned recreation);
- has minimal maintenance needs; and
- poses no risk to community aesthetics.

Baltimore City has no low-hanging fruit projects. The City owns less than 6% of the impervious area outside of the right-of-way and most of that land contains public service buildings or is used for active recreation. The clayey soils and development density reduce the types of traditional and ESD projects which could be installed. The elaborate storm sewer system includes over 52,000 inlets connected to 1,100 miles of pipe within 82 square miles of land, limiting interception and thus treatment opportunities for stormwater runoff. The development density also requires significant community outreach and collaboration throughout the implementation and maintenance phases of the project.

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

The spreadsheet is submitted as the Project Portfolio. Per the FY 2018 MS4 Annual Report, Baltimore City achieved the 20% impervious surface restoration (ISR) requirement through the implementation of capital projects, so the City does not have any unmet obligations from the previous permit. Although operational efficiencies for street sweeping are anticipated with the installation of street signs and subsequent parking enforcement, plus the installation of inlet screens, no additional proposed restoration is proposed for the next permit, to be conservative and allow the City time to analyze the impacts of the program enhancements.
As noted in the 2018 Financial Assurance Plan, projects from the WIP which were still feasible but not completed by FY 2019 would be considered as proposed restoration for the next permit; however, the stream restoration projects and alternative projects are no longer applicable to the impervious area metric. Since that submittal, one traditional structural project (retro-fit of existing pond) was determined to be infeasible for expansion due to surrounding land uses (new utility by BGE). Additionally, two stream restoration projects have been put on hold due to community acceptance challenges (see Question 1).

9. Provide a copy of your 5 year CIP for restoration projects (2020-2027).

The 5-year CIP for restoration projects is shown in Attachment 3, but the appropriations for many of the projects listed in the project portfolio had appropriations approved prior to FY 2020.

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

The operating budget for annual restoration projects is included as Attachment 4.

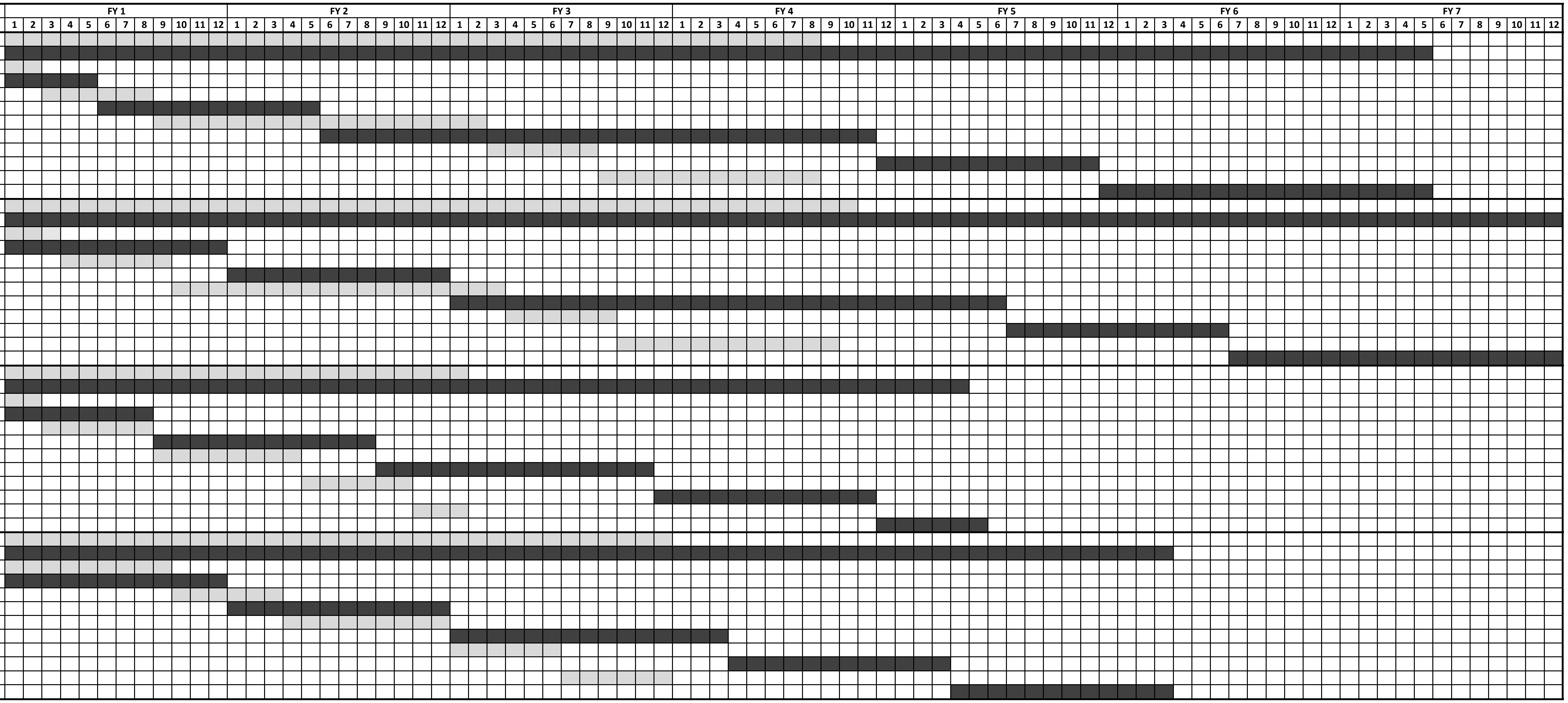
11. **Provide a copy of your operating and maintenance budget for all BMPs implemented under the MS4 permit? (FY2019)**

The operating budget for annual restoration projects is included as Attachment 4.

Attachment 1

Gantt Chart for Typical Project Types

Description	Start	Dur (mon)
Type 1 - Large BMP	**M 1 FY 1**	**44**
	M 1 FY 1	***77***
Planning / site selection (internal)	M 1 FY 1	2
	M 1 FY 1	*5*
Design contracting (consultant)	M 3 FY 1	6
	M 6 FY 1	*12*
Design implementation (includes permitting)	M 9 FY 1	18
	M 6 FY 2	*30*
Construction contracting (contractor and consultant)	M 3 FY 3	6
	M 12 FY 4	*12*
Construction implementation	M 9 FY 3	12
	M 12 FY 5	*18*
Type 2- Stream Restoration Projects	**M 1 FY 1**	**45**
	M 1 FY 1	***84***
Planning / coordination (internal)	M 1 FY 1	3
	M 1 FY 1	*12*
Design contracting (consultant)	M 3 FY 1	6
	M 1 FY 2	*12*
Design implementation (includes permitting)	M 9 FY 1	18
	M 1 FY 3	*30*
Construction contracting (contractor and consultant)	M 4 FY 3	6
	M 7 FY 5	*12*
Construction implementation (allows moratorium)	M 10 FY 3	12
	M 7 FY 6	*18*
Type 3- Alternative Projects (IA Removal)	**M 1 FY 1**	**25**
	M 1 FY 1	***53***
Planning / coordination (internal)	M 1 FY 1	2
	M 1 FY 1	*8*
Design contracting (consultant)	M 3 FY 1	6
	M 9 FY 1	*12*
Design implementation (includes permitting)	M 9 FY 1	8
	M 9 FY 2	*15*
Construction contracting (contractor and consultant)	M 5 FY 2	6
	M 12 FY 3	*12*
Construction implementation (allows moratorium)	M 11 FY 2	3
	M 12 FY 4	*6*
Type 4- ESD Projects	**M 1 FY 1**	**36**
	M 1 FY 1	***63***
Planning / coordination (internal)	M 1 FY 1	9
	M 1 FY 1	*12*
Design contracting (consultant)	M 3 FY 1	6
	M 9 FY 1	*12*
Design implementation (includes permitting)	M 9 FY 1	9
	M 9 FY 2	*15*
Construction contracting (contractor and consultant)	M 5 FY 2	6
	M 12 FY 3	*12*
Construction implementation (allows moratorium)	M 11 FY 2	6
	M 12 FY 4	*12*

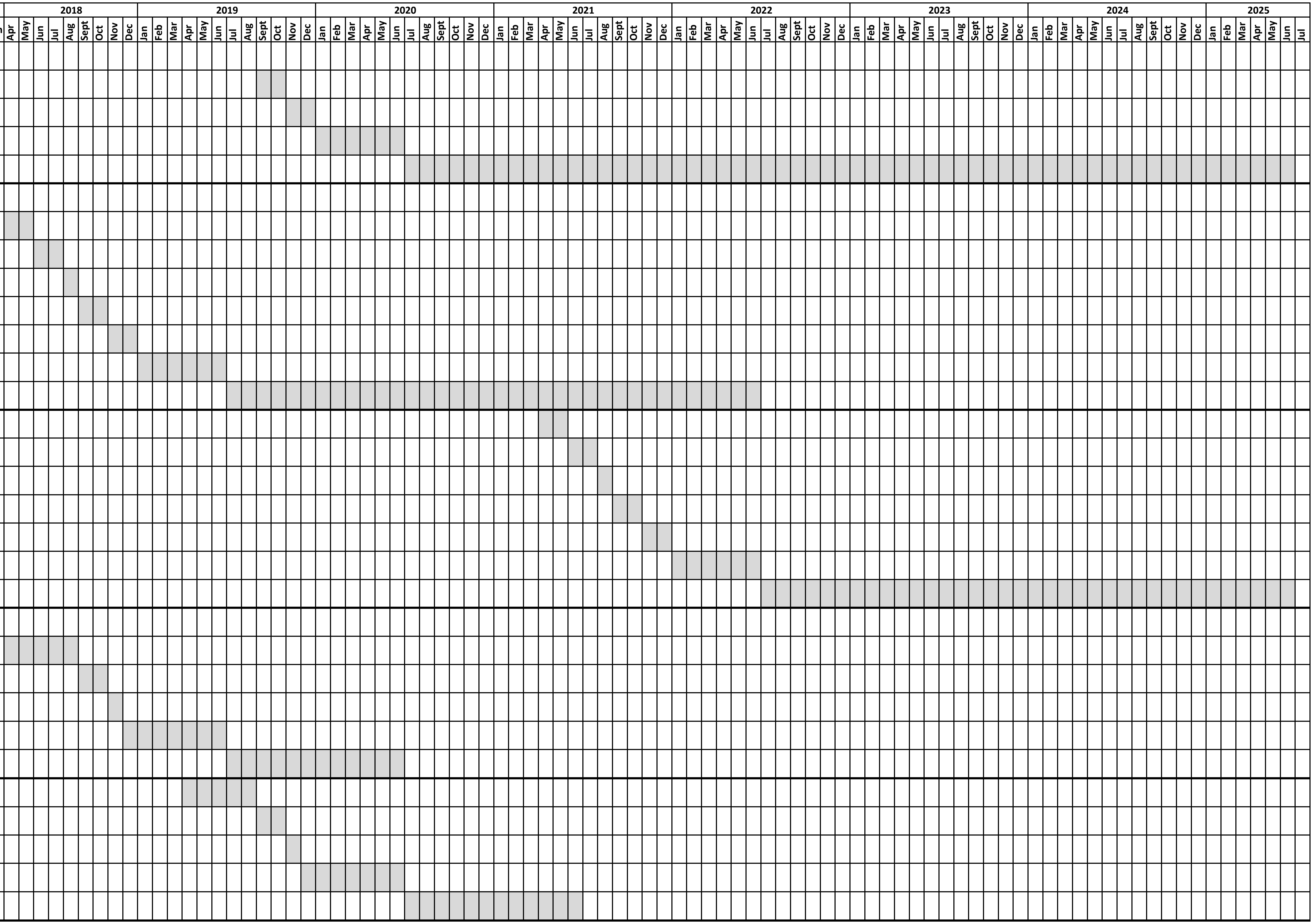


Noted

▨ Best Case Scenario (BCS) time frame

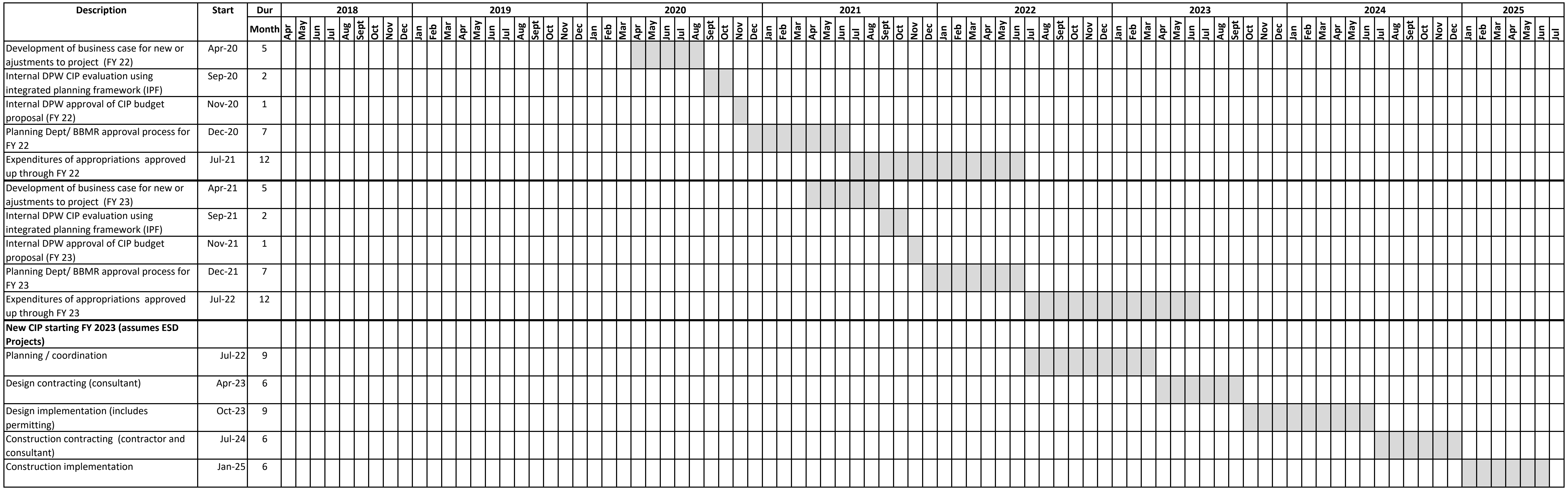
■ Worst Case Scenario (WCS) time frame

Description	Start	Dur Month
MS4 Permit		
Final draft from MDE to EPA (includes EPA review)	Sep-19	2
Tentative Determination (includes 30 day public comment period)	Nov-19	2
Public comment response (includes EPA review) and final determination	Jan-20	6
5-year permit period (FY 20 to 24)	Jul-20	60
Rate Adjustments		
Identify new projects / enhanced programs (LOS/ COS) for FY 20 to 22	Apr-18	2
Analysis of COS using financial model, include debt service analysis	Jun-18	2
Determine revenue requirement, internal DPW approval	Aug-18	1
Develop rate study to support rate adjustment	Sep-18	2
BOE approval (includes public comment period and outreach)	Nov-18	2
Customer communications of approved rate for FY 2020 to 2022	Jan-19	6
Implementation of new rate for FY 2020 to 2022	Jul-19	36
Identify new projects / enhanced programs (LOS/ COS) for FY 23 to 25	Apr-21	2
Analysis of COS using financial model, include debt service analysis	Jun-21	2
Determine revenue requirement, internal DPW approval	Aug-21	1
Develop rate study to support rate adjustment	Sep-21	2
BOE approval (includes public comment period and outreach)	Nov-21	2
Customer communications of approved rate for FY 2023 to 2025	Jan-22	6
Implementation of new rate for FY 2023 to 2025	Jul-22	36
Capital Budget Planning and Approval		
Development of business case for new or ajustments to project (FY 20)	Apr-18	5
Internal DPW CIP evaluation using integrated planning framework (IPF)	Sep-18	2
Internal DPW approval of CIP budget proposal (FY 20)	Nov-18	1
Planning Dept/ BBMR approval process for FY 20	Dec-18	7
Expenditures of appropriations approved up through FY 20	Jul-19	12
Development of business case for new or ajustments to project (FY 21)	Apr-19	5
Internal DPW CIP evaluation using integrated planning framework (IPF)	Sep-19	2
Internal DPW approval of CIP budget proposal (FY 21)	Nov-19	1
Planning Dept/ BBMR approval process for FY 21	Dec-19	7
Expenditures of appropriations approved up through FY 21	Jul-20	12



Attachment 2

Gantt Chart Permitting and CIP Schedules



Description	Start	Dur Month
Development of business case for new or ajustments to project (FY 22)	Apr-20	5
Internal DPW CIP evaluation using integrated planning framework (IPF)	Sep-20	2
Internal DPW approval of CIP budget proposal (FY 22)	Nov-20	1
Planning Dept/ BBMR approval process for FY 22	Dec-20	7
Expenditures of appropriations approved up through FY 22	Jul-21	12
Development of business case for new or ajustments to project (FY 23)	Apr-21	5
Internal DPW CIP evaluation using integrated planning framework (IPF)	Sep-21	2
Internal DPW approval of CIP budget proposal (FY 23)	Nov-21	1
Planning Dept/ BBMR approval process for FY 23	Dec-21	7
Expenditures of appropriations approved up through FY 23	Jul-22	12
New CIP starting FY 2023 (assumes ESD Projects)		
Planning / coordination	Jul-22	9
Design contracting (consultant)	Apr-23	6
Design implementation (includes permitting)	Oct-23	9
Construction contracting (contractor and consultant)	Jul-24	6
Construction implementation	Jan-25	6

Amounts in Thousands

525-006 Basin Inlets

Description: Design and implement prioritized areas identified in the open channel database plan required under the NPDES Permit for stormwater.
Location: Citywide

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
657 MDOT-County Transportation Revenue Bond	0	-351	0	0	0	0	0	-351
Total	**0**	**-351**	**0**	**0**	**0**	**0**	**0**	**-351**

525-034 ER-4121|Herring Run 84" Water Main Stream Restoration

Description: Stabilize stream bank and eroded sections of stream and protect 84" water main.

Location: Herring Run

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
305 Stormwater Revenue Bonds	2,484	1,200	0	0	0	0	0	3,684
Total	**2,484**	**1,200**	**0**	**0**	**0**	**0**	**0**	**3,684**

525-044 ER 4137|Lower Stony Run Reach 3 Repair

Description: Evaluate and repair approximately 900 linear feet of stream length.

Location: Lower Stony Run

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
305 Stormwater Revenue Bonds	0	0	1,739	0	0	0	0	1,739
405 Stormwater Utility Funds	652	0	156	0	0	0	0	808
Total	**652**	**0**	**1,895**	**0**	**0**	**0**	**0**	**2,547**

Amounts in Thousands

525-051 ER-4076|Large Debris Collection System 5

Description: Debris collector will collect floatable waste and organic debris in stream to remove from the inner harbor. Installation of device will assist in meeting goals for MS4 permit and Trash TMDL.
Location: TBD

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
305 Stormwater Revenue Bonds	0	0	0	0	0	0	216	216
405 Stormwater Utility Funds	0	0	0	0	0	540	168	708
610 State Water Quality Revolving Loan Fund	0	0	0	0	0	0	1,944	1,944
Total	**0**	**0**	**0**	**0**	**0**	**540**	**2,328**	**2,868**

525-052 ER-4077|Large Debris Collection System 6

Description: Debris collector will collect floatable waste and organic debris in stream to remove from the inner harbor. Installation of device will assist in meeting goals for MS4 permit and Trash TMDL.
Location: TBD

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
305 Stormwater Revenue Bonds	0	0	0	0	0	0	216	216
405 Stormwater Utility Funds	0	0	0	0	0	540	168	708
610 State Water Quality Revolving Loan Fund	0	0	0	0	0	0	1,944	1,944
Total	**0**	**0**	**0**	**0**	**0**	**540**	**2,328**	**2,868**

Amounts in Thousands

525-053 ER-4079|Large Debris Collection System 8

Description: Debris collector will collect floatable waste and organic debris in stream to remove from the inner harbor. Installation of device will assist in meeting goals for MS4 permit and Trash TMDL.
Location: TBD

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
305 Stormwater Revenue Bonds	0	0	0	0	0	0	0	0
405 Stormwater Utility Funds	0	0	0	0	0	0	540	540
610 State Water Quality Revolving Loan Fund	0	0	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**0**	**540**	**540**

525-054 ER-4080|Large Debris Collection System 9

Description: Debris collector will collect floatable waste and organic debris in stream to remove from the inner harbor. Installation of device will assist in meeting goals for MS4 permit and Trash TMDL.
Location: TBD

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
305 Stormwater Revenue Bonds	0	0	0	0	0	0	0	0
405 Stormwater Utility Funds	0	0	0	0	0	0	540	540
610 State Water Quality Revolving Loan Fund	0	0	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**0**	**540**	**540**

Amounts in Thousands

525-055 ER-4096|Large Debris Collection System 10

Description: Debris collector will collect floatable waste and organic debris in stream to remove from the inner harbor. Installation of device will assist in meeting goals for MS4 permit and Trash TMDL.

Location: TBD

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
305 Stormwater Revenue Bonds	0	0	0	0	0	0	0	0
405 Stormwater Utility Funds	0	0	0	0	0	0	540	540
610 State Water Quality Revolving Loan Fund	0	0	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**0**	**540**	**540**

525-056 Facility Greening Project 14

Description: The ultimate goal for this project is to treat urban runoff and help meet the City's MS-4 permit requirement by removing pavement, meeting total maximum daily loads (TMDL's) for pollution and reducing nutrients and sediments.

Location: TBD

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
405 Stormwater Utility Funds	0	0	0	81	161	0	0	242
610 State Water Quality Revolving Loan Fund	0	0	0	0	583	0	0	583
Total	**0**	**0**	**0**	**81**	**744**	**0**	**0**	**825**

Amounts in Thousands

525-057 ER-4055|Urgent Need Stream Repair 2

Description: City is required to maintain streams from previous restoration projects by the City and USACE in order to maintain our credits under the MS4 permit. Study conducted by USFWS on previous restorations identified a number of areas that need to be repaired.
Location: Citywide

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
305 Stormwater Revenue Bonds	0	0	0	214	432	1,941	1,742	4,329
Total	**0**	**0**	**0**	**214**	**432**	**1,941**	**1,742**	**4,329**

525-058 Facility Greening Project 15

Description: The ultimate goal for this project is to treat urban runoff and help meet the City's MS-4 permit requirement by removing pavement, meeting total maximum daily loads (TMDL's) for pollution and reducing nutrients and sediments.
Location: TBD

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
405 Stormwater Utility Funds	0	0	0	0	81	161	0	242
610 State Water Quality Revolving Loan Fund	0	0	0	0	0	583	0	583
Total	**0**	**0**	**0**	**0**	**81**	**744**	**0**	**825**

Amounts in Thousands

525-059 Facility Greening Project 16

Description: The ultimate goal for this project is to treat urban runoff and help meet the City's MS-4 permit requirement by removing pavement, meeting total maximum daily loads (TMDL's) for pollution and reducing nutrients and sediments.
Location: Facility Greening Project 16

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
405 Stormwater Utility Funds	0	0	0	0	81	161	0	242
610 State Water Quality Revolving Loan Fund	0	0	0	0	0	583	0	583
Total	**0**	**0**	**0**	**0**	**81**	**744**	**0**	**825**

525-995 Biddison Run Stream Restoration

Description: This de-appropriation will make old, unused funds available for a new purpose. The project is now being funded with stormwater utility revenue.
Location: Biddison Run Stream Upstream of Moravia Road

Impact on FY 2020 Operating Budget : 0

Source of Funds	Appr. to date	2020	2021	2022	2023	2024	2025	Total
657 MDOT-County Transportation Revenue Bond	0	-141	0	0	0	0	0	-141
Total	**0**	**-141**	**0**	**0**	**0**	**0**	**0**	**-141**

Attachment 4
Annual Restoration and Maintenance

Service 661: Public Right-Of-Way Cleaning

Priority Outcome: Quality of Life **Agency: Public Works**

Service Description: This service cleans public rights-of-ways and clears debris away from storm drains to protect water quality. Activities include Street and Alley Cleaning, Mechanical Sweeping Operations, Cleaning of Business Districts, Marine Operations, and Graffiti Removal.

	Fiscal 2017 Actual		Fiscal 2018 Budget		Fiscal 2019 Recommended	
Fund	Dollars	Positions	Dollars	Positions	Dollars	Positions
General	$17,531,836	210	$16,330,539	172	$17,767,400	172
Stormwater	$3,294,023	-	$5,119,514	36	$5,184,904	36
Special	$380,125	9	$400,000	3	$400,000	3
TOTAL	$21,205,984	219	$21,850,053	211	$23,352,304	211

PERFORMANCE MEASURES

Type	Measure	FY14 Actual	FY15 Actual	FY16 Actual	FY17 Target	FY17 Actual	FY18 Target	FY19 Target
Output	# of miles swept	100,726	101,667	111,625	*120,000*	107,222	*130,000*	*130,000*
Output	# of service requests completed (alleys, streets, lots, graffiti)	83,710	73,757	70,968	*70,000*	97,496	*71,000*	*85,000*
Effectiveness	% of alley cleaning service requests closed on time	90%	58%	61%	*70%*	63%	*80%*	*85%*
Effectiveness	% of service requests escalated	1.28%	0.78%	0.60%	*0.50%*	0.37%	*0.40%*	*0.40%*
Outcome	% of citizens rating the city's cleanliness excellent or good	20%	20%	N/A	*25%*	N/A	*30%*	*35%*

• Truck driver retention challenges, resident parking issues, and delayed expansion in the Central District were factors that contributed to the fewer number of miles swept in Fiscal 2017 versus Fiscal 2016.
• The percentage of alley cleaning service requests closed on time indicates whether the quadrants closed dirty alley service requests within seven days or not; in Fiscal 2017, performance increased over Fiscal 2016, but high driver turnover contributed to missing this performance target.
• In Fiscal 2017, the percentage of service requests escalated dropped to 0.37%; the Bureau has tightened its quality control checks by instituting second level reviews and strict before and after pictures of work done with the street address inserted.

MAJOR BUDGET ITEMS

• In Fiscal 2018, a General Fund transfer bill shifted funding from various agencies to education and youth programs, reducing new funding for high-capacity trash cans in business districts by $300K. This adjustment is reflected for Fiscal 2019; $300K remains in the budget over Fiscal 2017 for this initiative.

CHANGE TABLE-GENERAL FUND

FISCAL 2018 ADOPTED BUDGET	**$16,330,539**
Changes with service impacts	
Decrease funding for high-capacity trash cans in business districts	(300,000)
Adjustments with no service impact	
Salary Adjustment	123,904
Adjustment for pension cost allocation	27,252
Adjustment for health benefit costs	(309,035)
Adjustment for City fleet rental and repair charges	1,688,756
Change in allocation for workers' compensation expense	12,370
Change in inter-agency transfer credits	4,002
Increase in employee compensation and benefits	120,611
Increase in contractual services expenses	50,913
Increase in operating supplies and equipment	18,088
FISCAL 2019 RECOMMENDED BUDGET	**$17,767,400**

AGENCY: 6100 Public Works
SERVICE: 661 Public Right-of-Way Cleaning

SERVICE BUDGET SUMMARY

		Actual FY 2017	Budgeted FY 2018	Recommended FY 2019	Change In Budget
	EXPENDITURES BY OBJECT:				
0	Transfers	-13,206	173,988	177,990	4,002
1	Salaries	8,668,315	8,265,736	8,564,404	298,668
2	Other Personnel Costs	3,832,168	3,831,171	3,474,879	-356,292
3	Contractual Services	7,313,551	7,417,603	9,044,040	1,626,437
4	Materials and Supplies	721,955	1,037,418	1,058,086	20,668
5	Equipment - $4,999 or less	144,167	87,154	89,159	2,005
7	Grants, Subsidies and Contributions	539,034	1,036,983	943,746	-93,237
	TOTAL OBJECTS	**$21,205,984**	**$21,850,053**	**$23,352,304**	**$1,502,251**
	EXPENDITURES BY ACTIVITY:				
2	Casino Support-Cleaning Waterways	49,701	0	150,000	150,000
3	Marine Operations	859,014	1,382,812	1,841,954	459,142
8	Cleaning of Business Districts	2,485,606	2,357,968	2,290,920	-67,048
13	Street & Alley Cleaning	11,890,711	11,957,704	12,971,759	1,014,055
14	Mechanical Sweeping Operation	4,900,127	5,119,514	5,184,904	65,390
15	Casino Support-Sanitation Staffing	330,424	400,000	250,000	-150,000
22	Graffiti Removal	690,401	632,055	662,767	30,712
	TOTAL ACTIVITIES	**$21,205,984**	**$21,850,053**	**$23,352,304**	**$1,502,251**
	EXPENDITURES BY FUND:				
	General	17,531,836	16,330,539	17,767,400	1,436,861
	Stormwater Utility	3,294,023	5,119,514	5,184,904	65,390
	Special	380,125	400,000	400,000	0
	TOTAL FUNDS	**$21,205,984**	**$21,850,053**	**$23,352,304**	**$1,502,251**

AGENCY: 6100 Public Works
SERVICE: 661 Public Right-of-Way Cleaning

SERVICE SALARIES AND WAGES FOR PERMANENT FULL-TIME FUNDED POSITIONS

			FY 2018 Budget	FY 2019 Projected	Changes		Recommended FY 2019 Budget	
Class Code	Position Class Title	Grade	Number	Amount	Number	Amount	Number	Amount
General Fund								
1	**Permanent Full-time**							
33212	OFFICE SUPPORT SPECIALIST II	075	3	101,642	0	0	3	101,642
33213	OFFICE SUPPORT SPECIALIST III	078	5	186,720	0	0	5	186,720
33562	STOREKEEPER II	080	1	33,272	0	0	1	33,272
52931	LABORER (HOURLY)	482	99	3,320,159	-8	-268,295	91	3,051,864
52932	LABORER CREW LEADER I	486	2	67,783	0	0	2	67,783
53811	SOLID WASTE WORKER	485	0	0	7	219,289	7	219,289
53814	SOLID WASTE LEAD WORKER	434	9	400,287	0	0	9	400,287
53815	SOLID WASTE SUPERVISOR	089	4	216,459	0	0	4	216,459
53816	SOLID WASTE SUPERINTENDENT	923	2	144,126	0	0	2	144,126
53818	ASSISTANT CHF, SOLID WASTE DIV	931	1	95,977	0	0	1	95,977
54411	MOTOR VEHICLE DRIVER I (HOURLY	487	17	594,795	0	0	17	594,795
54412	MOTOR VEHICLE DRIVER II (HRLY)	490	12	449,412	1	37,451	13	486,864
54437	DRIVER I	424	12	423,147	0	0	12	423,147
54513	MARINE EQUIPMENT OPERATOR I	427	2	65,332	-1	-32,666	1	32,666
54514	MARINE EQUIPMENT OPERATOR II	430	3	121,530	1	40,510	4	162,040
	Total 1 Permanent Full-time		**172**	**6,220,641**	**0**	**-3,711**	**172**	**6,216,931**
Stormwater Utility Fund								
1	**Permanent Full-time**							
31110	OPERATIONS OFFICER II	927	1	52,296	-1	-52,296	0	0
31114	OPERATIONS MANAGER I	939	0	0	1	83,856	1	83,856
33213	OFFICE SUPPORT SPECIALIST III	078	1	40,882	0	0	1	40,882
53813	MECHANICAL SWEEPER OPERATOR	491	28	1,112,746	0	0	28	1,112,746
53814	SOLID WASTE LEAD WORKER	434	2	79,268	0	0	2	79,268
53815	SOLID WASTE SUPERVISOR	089	2	116,375	0	0	2	116,375
53816	SOLID WASTE SUPERINTENDENT	923	1	60,690	0	0	1	60,690
54437	DRIVER I	424	1	36,249	0	0	1	36,249
	Total 1 Permanent Full-time		**36**	**1,498,506**	**0**	**31,560**	**36**	**1,530,066**
Special Fund								
1	**Permanent Full-time**							
52941	LABORER	423	2	63,912	0	0	2	63,912
54422	MOTOR VEHICLE DRIVER II	430	1	34,994	0	0	1	34,994
	Total 1 Permanent Full-time		**3**	**98,906**	**0**	**0**	**3**	**98,906**
	Total All Funds		**211**	**7,818,053**	**0**	**27,849**	**211**	**7,845,903**

Service 674: Surface Water Management

Priority Outcome: Quality of Life **Agency: Public Works**

Service Description: This service provides for the protection, enhancement, and restoration of watersheds within the City of Baltimore and the Chesapeake Bay tributaries through water quality management and compliance measures mandated by the EPA and the Clean Water Act. This service maintains 1,146 miles of storm drain pipe, 52,438 inlets, 27,561 manholes, 1,709 outfalls, 4 stormwater pumping stations, and 5 debris collectors.

	Fiscal 2017 Actual		Fiscal 2018 Budget		Fiscal 2019 Recommended	
Fund	Dollars	Positions	Dollars	Positions	Dollars	Positions
Federal	-	-	$100,000	-	$100,000	-
Stormwater	$14,895,871	101	$20,971,822	105	$21,310,064	109
Wastewater	$1,280,416	17	$1,641,018	17	$1,765,498	17
Water	$411,888	3	$565,357	3	$556,969	3
State	-	-	$300,000	-	$300,000	-
TOTAL	$16,588,175	121	$23,578,197	125	$24,032,531	129

PERFORMANCE MEASURES

Type	Measure	FY14 Actual	FY15 Actual	FY16 Actual	FY17 Target	FY17 Actual	FY18 Target	FY19 Target
Output	% construction sites inspected/2 weeks	80%	90%	74%	*95%*	74%	*95%*	*85%*
Output	Impervious area (acres) treated/year (construction initiated by City)	125	0	0	*200*	44	*500*	*10*
Effectiveness	# of inlets routinely cleaned on quarterly basis	20	30	420	*1,000*	1,092	*1,000*	*1,600*
Outcome	% Stormwater Management and Erosion and Sediment Control (SWM/ESC) Plans Review responses within 14 days	30%	25%	13%	*40%*	16%	*45%*	*45%*
Outcome	Miles/year of inventory completed for small pipes for illicit connection	3	4	1	*10*	0	*10*	*0*

• The percentage of construction sites inspected every two weeks is highly contingent on the number of construction projects occurring simultaneously; there has been a trend of increased development/construction projects in Fiscal 2016 and Fiscal 2017. Increased staffing and the use of tablets for routine inspections has started to improve efficiency in pollultion source tracking.
• The impervious area (acres) treated/year varies yearly per the Capital Improvement Program, stormwater fee revenue, and the ability to obtain debt service; there is a regulatory mandate to restore 20% of the City's untreated impervious area.
• The number of inlets routinely cleaned on a quarterly basis has steadily increased due to community outreach, education, and code enforcement for little reduction; Cityworks software has also been used to facilitate the scheduling and tracking of performance of inlet cleaning. Inlets choked with trash and woody debris lead to flooding, poor aesthetics, and attract rats within storm inlet structures.

MAJOR BUDGET ITEMS

• The recommended funding for this service defunds two existing Stormwater Utility Fund positions and funds six additional positions per the operational needs of the service in Fiscal 2019.
• This service will increase debt service by $1.1M for $41M in revenue bonds for stormwater management projects in Fiscal 2019.
• 138 projects will control runoff from 930 acres of impervious area, including 14 stream restorations, 107 environmental site designs, 15 impervious area removals, and 2 stormwater quality ponds. Of these 138 projects, 4 have been completed, 3 projects are under construction, and 131 projects are under design.

AGENCY: 6100 Public Works
SERVICE: 674 Surface Water Management

SERVICE BUDGET SUMMARY

		Actual FY 2017	Budgeted FY 2018	Recommended FY 2019	Change In Budget
	EXPENDITURES BY OBJECT:				
0	Transfers	872,118	816,445	594,107	-222,338
1	Salaries	5,707,927	7,534,704	7,634,135	99,431
2	Other Personnel Costs	2,485,607	2,681,591	2,681,698	107
3	Contractual Services	3,173,177	6,581,116	5,883,989	-697,127
4	Materials and Supplies	271,716	445,964	432,096	-13,868
5	Equipment - $4,999 or less	176,589	94,715	196,117	101,402
6	Equipment - $5,000 and over	312,787	582,493	655,200	72,707
7	Grants, Subsidies and Contributions	324,748	263,036	277,480	14,444
8	Debt Service	3,263,506	4,578,133	5,677,709	1,099,576
	TOTAL OBJECTS	**$16,588,175**	**$23,578,197**	**$24,032,531**	**$454,334**
	EXPENDITURES BY ACTIVITY:				
1	Maintenance & Repair of Stormwater Systems	5,498,081	5,872,213	5,983,135	110,922
2	Waterway Maintenance	476,189	750,865	738,356	-12,509
3	Water Quality Monitoring and Inspections	1,475,366	2,013,164	2,124,361	111,197
4	Watershed Liaison	241,293	958,461	985,265	26,804
5	Surface Water Engineering	1,568,382	1,017,177	1,000,599	-16,578
6	Administration	2,212,587	3,016,004	3,455,285	439,281
7	Flood Warning	54,695	75,000	76,725	1,725
8	Debt Service	3,263,506	4,578,133	4,088,820	-489,313
9	Plans Review	1,551,584	2,097,306	2,307,723	210,417
11	Environmental Affairs section	28,862	180,645	185,673	5,028
26	Transfers	77,884	0	0	0
31	Preventive Maintenance	23,772	1,952,000	2,000,000	48,000
32	Maintenance Information	115,974	835,361	836,589	1,228
33	Planning and Analysis	0	231,868	250,000	18,132
	TOTAL ACTIVITIES	**$16,588,175**	**$23,578,197**	**$24,032,531**	**$454,334**
	EXPENDITURES BY FUND:				
	Wastewater Utility	1,280,416	1,641,018	1,765,498	124,480
	Water Utility	411,888	565,357	556,969	-8,388
	Stormwater Utility	14,895,871	20,971,822	21,310,064	338,242
	Federal	0	100,000	100,000	0
	State	0	300,000	300,000	0
	TOTAL FUNDS	**$16,588,175**	**$23,578,197**	**$24,032,531**	**$454,334**

AGENCY: 6100 Public Works
SERVICE: 674 Surface Water Management

SERVICE SALARIES AND WAGES FOR PERMANENT FULL-TIME FUNDED POSITIONS

			FY 2018 Budget	FY 2019 Projected	Changes		Recommended FY 2019 Budget	
Class Code	Position Class Title	Grade	Number	Amount	Number	Amount	Number	Amount
Wastewater Utility Fund								
1	**Permanent Full-time**							
33213	OFFICE SUPPORT SPECIALIST III	078	1	41,971	0	0	1	41,971
42213	PUBLIC WORKS INSPECTOR III	092	1	60,340	0	0	1	60,340
71212	POLLUTION CONTROL ANALYST II	089	5	263,580	0	0	5	263,580
71213	POLLUTION CONTROL ANALYST III	093	3	220,580	0	0	3	220,580
72111	ENGINEER I	927	2	136,272	0	0	2	136,272
72711	ENGINEERING ASSOCIATE I	087	2	91,071	0	0	2	91,071
72712	ENGINEERING ASSOCIATE II	089	2	106,496	0	0	2	106,496
72713	ENGINEERING ASSOCIATE III	092	1	63,440	0	0	1	63,440
	Total 1 Permanent Full-time		**17**	**983,750**	**0**	**0**	**17**	**983,750**
Water Utility Fund								
1	**Permanent Full-time**							
71212	POLLUTION CONTROL ANALYST II	089	1	64,071	0	0	1	64,071
71213	POLLUTION CONTROL ANALYST III	093	1	72,209	0	0	1	72,209
71215	POLLUTION CONTROL ANALYST SUPV	927	1	83,856	0	0	1	83,856
	Total 1 Permanent Full-time		**3**	**220,136**	**0**	**0**	**3**	**220,136**
Stormwater Utility Fund								
1	**Permanent Full-time**							
10233	WWW DIVISION MANAGER II	942	1	115,974	0	0	1	115,974
31111	OPERATIONS OFFICER III	929	1	89,058	0	0	1	89,058
31312	ADMINISTRATIVE ANALYST II	923	0	0	1	89,058	1	89,058
31754	GRANTS PROCUREMENT OFFICER	904	1	67,626	0	0	1	67,626
33187	GIS ANALYST	927	3	200,879	0	0	3	200,879
33212	OFFICE SUPPORT SPECIALIST II	075	2	65,738	0	0	2	65,738
33213	OFFICE SUPPORT SPECIALIST III	078	1	36,521	0	0	1	36,521
42211	PUBLIC WORKS INSPECTOR I	084	1	37,741	0	0	1	37,741
42212	PUBLIC WORKS INSPECTOR II	087	4	187,408	0	0	4	187,408
42213	PUBLIC WORKS INSPECTOR III	092	2	128,826	0	0	2	128,826
42221	CONSTRUCTION PROJECT SUPV I	923	0	0	1	63,240	1	63,240
42255	ENVIRONMENTAL INSPECTION SUPV	090	1	55,632	-1	-55,632	0	0
42911	INSPECTOR TRAINEE	073	0	0	2	57,362	2	57,362
52221	MASON I	429	3	113,192	0	0	3	113,192
52225	MASON SUPERVISOR	087	1	57,334	0	0	1	57,334
52931	LABORER (HOURLY)	482	27	890,946	0	0	27	890,946
52932	LABORER CREW LEADER I	486	2	74,338	0	0	2	74,338
52943	LABORER CREW LEADER II	429	4	165,676	0	0	4	165,676
53513	UTILITIES INSTALLER REPAIR III	428	2	74,315	0	0	2	74,315
53515	UTILITIES INSTALLER REPAIR S I	082	3	134,166	0	0	3	134,166
53516	UTILITIES INSTALLER REPAIR SII	087	1	51,996	0	0	1	51,996
53523	GENL SUPT UTILITIES MAINT REP	927	1	67,932	0	0	1	67,932
53562	UTILITY INVESTIGATOR	087	1	42,131	0	0	1	42,131
54411	MOTOR VEHICLE DRIVER I (HOURLY	487	9	319,009	0	0	9	319,009
54412	MOTOR VEHICLE DRIVER II (HRLY)	490	3	123,951	0	0	3	123,951
54431	HEAVY EQUIPMENT OPERATOR I	429	1	38,885	0	0	1	38,885
54432	HEAVY EQUIPMENT OPERATOR II	433	3	126,480	0	0	3	126,480
71216	POLLUTION CONTROL PROGRAM ADMI	936	1	86,802	0	0	1	86,802
72111	ENGINEER I	927	8	568,792	1	71,099	9	639,891
72113	ENGINEER II	929	7	553,364	-1	-79,052	6	474,312

AGENCY: 6100 Public Works
SERVICE: 674 Surface Water Management

SERVICE SALARIES AND WAGES FOR PERMANENT FULL-TIME FUNDED POSITIONS

			FY 2018 Budget	FY 2019 Projected	Changes		Recommended FY 2019 Budget	
Class Code	Position Class Title	Grade	Number	Amount	Number	Amount	Number	Amount
72115	ENGINEER SUPERVISOR	936	3	277,032	0	0	3	277,032
72712	ENGINEERING ASSOCIATE II	089	2	109,731	0	0	2	109,731
72713	ENGINEERING ASSOCIATE III	092	1	51,800	0	0	1	51,800
74136	CITY PLANNER I	923	0	0	1	78,966	1	78,966
74137	CITY PLANNER II	927	1	75,174	0	0	1	75,174
90000	NEW POSITION	900	4	213,368	0	0	4	213,368
	Total 1 Permanent Full-time		**105**	**5,201,817**	**4**	**225,041**	**109**	**5,426,858**
	Total All Funds		**125**	**6,405,703**	**4**	**225,041**	**129**	**6,630,744**

From: "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>
Sent: Fri, 9 Aug 2019 20:01:11 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Brian Cooper -MDE- (brian.cooper@maryland.gov)" <brian.cooper@maryland.gov>; "Desantis, Paul (DPW)" <Paul.Desantis@baltimorecity.gov>; "Cameron, Mark (DPW)" <Mark.Cameron@baltimorecity.gov>
Subject: Re: Status of MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Got it, Thanks Kim.

Have a good weekend,

Ray

Raymond P Bahr
Deputy Program Manager
Sediment, Stormwater, and Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1708
(410) 537-3545

On Fri, Aug 9, 2019 at 3:54 PM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> Attached is the physical capacity questionnaire and portfolio for Baltimore City. The financial capacity report will be submitted by Monday, following the email from Brain. Please feel free to contact me if you have any questions.
>
> Have a great weekend.
>
> Thanks,
>
> Kim
>
> **From:** Stewart Comstock -MDE- [mailto:stewart.comstock@maryland.gov]
> **Sent:** Wednesday, July 31, 2019 12:45 PM
> **To:** Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
> **Subject:** Re: Status of MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Kim...

Thanks!...I hope you enjoyed your vacation...Stew

On Wed, Jul 31, 2019 at 6:16 AM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> We are still on track for submittal by August 9. No questions at this time.
>
> **From:** Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
> **Sent:** Wednesday, July 31, 2019 12:05 PM
> **To:** Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
> **Cc:** Stewart Comstock -MDE- <stewart.comstock@maryland.gov>; Raymond Bahr -MDE- <raymond.bahr@maryland.gov>
> **Subject:** Status of MEP Analysis
>
> [THIS EMAIL IS FROM AN EXTERNAL SENDER]
>
> Hi Kim,
>
> I hope all is well. Stew requested that I follow up with you and check on the MEP analysis. Has the City completed it's analysis and final comprehensive report? Did you have any questions on the Restoration Project Portfolio or Physical and Financial Capacity components?
>
> Best,
>
> Brian

--

Brian E. Cooper
Natural Resources Planner
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard | Baltimore, MD 21230-1708
410.537.3653

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Sent from Gmail Mobile

Click here to complete a three question customer experience survey.

Click here to complete a three question customer experience survey.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Wed, 14 Aug 2019 00:48:19 +0000
To: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Bubar, Patrice" <Patty.Bubar@montgomerycountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen Wiggen" <wiggenk@charlescounty.org>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Janis Markusic" <pwmark02@aacounty.org>; "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "'Knapp, Les'" <lknapp@mdcounties.org>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "Joiner, Jeremy" <JJoiner@FrederickCountyMD.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "Lowe, Christine" <cslowe@howardcountymd.gov>; "Erica Hahn" <HahnE@charlescountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>
Subject: FW: Meeting on Wednesday
Attachments: MS4 MACO Phase I Meeting Agenda August 14 2019.docx

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Folks,

See email re the meeting tomorrow from Jennifer Smith.

Apparently, we have to use the Blue lot.

Also, will be in the lobby level meeting rooms.

- Karl

From: Jennifer M. Smith - MDE <jenniferm.smith@maryland.gov>
Sent: Tuesday, August 13, 2019 5:18 PM
To: Karl Berger <kberger@mwcog.org>; Lee Currey -MDE- <Lee.currey@maryland.gov>
Cc: Raymond Bahr -MDE- <raymond.bahr@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: Meeting on Wednesday

Karl,

Attached is a proposed meeting agenda for tomorrow's MS4 Phase I permit meeting. Please also note the new parking restrictions for our building.

The BLUE LOT WEST Entrance is located on Washington Boulevard. Visitors are to use the Blue Lot for parking and enter via the left lane of the entrance to access the call button for admittance.

Once parked, access to the building from the Blue Lot is through the pedestrian tunnel. Visitors are to use the call box located at the entrance of the tunnel to obtain building access.

Please forward to your contacts who plan to attend. Thanks,

Jennifer

On Mon, Aug 12, 2019 at 12:37 PM Karl Berger <kberger@mwcog.org> wrote:

Jennifer, Ray:

I have gotten confirmations from 9 of the 10 local MS4s (no Charles) for the meeting on Wednesday, in many cases with 2 or more attendees, so it will be a big crowd.

I have not thought about an agenda. I assume MDE staff will do most of the talking and will address our list of questions from back in June.

- How did the June 12 meeting with EPA go?
- Can you provide us with more specifics about EPA's response and the new timetable, such as whether EPA's review will be concurrent with or before tentative determination? It appears there will be about 60 days between sending the permits to EPA and the release of the tentative determination drafts; will that be sufficient time to respond to EPA's comments before going public?
- When will MDE meet with jurisdictions about their MEP submittals?
- When will MDE release the 2019 draft accounting guidance?
- When will MDE send an updated draft permit template?
- Will the new monitoring guidance be incorporated into the permits, or is it just guidance?

- Will MDE meet with jurisdictions before finalizing the Phase III WIP in August?

- Will MDE meet with jurisdictions about the draft permit before sending it to EPA in September?

- Does MDE agree that all work completed between during this interim between our permits will be counted toward our next permit's MEP?

- The Phase III WIP states that the Stormwater sector is expected to continue impervious restoration at a rate of 2% per year; will that change given that MDE has indicated that it will eliminate IA credit for alternative practices once the 20% is complete?

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

--

Jennifer M. Smith, P.E.
Program Manager
Sediment, Stormwater and Dam Safety Program
Water and Science Administration
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

410-537-3561

MS4 Phase I Permits Meeting Agenda
Wednesday, August 14, 2019
11 – 1 PM, Aeris Conference Room, MDE Offices
1800 Washington Blvd., Baltimore MD

1. Introductions

2. Closing out of Current Permit

    i. Updates to Impervious Acre Accounting

3. Next Generation Phase I Large Permit

    i. New Permit Metrics
    ii. Accounting Guidance 2019 Update
    iii. MEP Applications and Analysis

4. Next Generation Phase I Large Permit Schedule

From: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>
Sent: Fri, 16 Aug 2019 18:18:56 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Raymond Bahr" <raymond.bahr@maryland.gov>; "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>
Subject: Re: Missing items in MEP Analysis
Attachments: Baltimore City.pdf, Accounting Principles.pdf, Restoration Project Portfolio.xlsx, UPDATED Restoration Portfolio Guidance 4-4-2019.pdf, Recommendations on Evaluating Financial Capacity as Part of an MEP Analysis_final 5_17_2019.docx, BCity MEP Cover Letter_5_17_2019.pdf

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Hi Kim,

That's OK. Please find attached the letters, guidance documents, and template spreadsheet that may be used for completing the portfolio and comprehensive MEP report.

Let us know if you have any questions?
Brian

On Fri, Aug 16, 2019 at 12:44 PM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> I thought I did have the right form. Let's be safe, please send me the spreadsheet that you want me to use.

> **From:** Stewart Comstock -MDE- [mailto:stewart.comstock@maryland.gov]
> **Sent:** Friday, August 16, 2019 12:15 PM
> **To:** Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
> **Cc:** Brian Cooper -MDE- <brian.cooper@maryland.gov>; Raymond Bahr <raymond.bahr@maryland.gov>; Jennifer Smith -MDE- <jenniferm.smith@maryland.gov>
> **Subject:** Missing items in MEP Analysis
>
> [THIS EMAIL IS FROM AN EXTERNAL SENDER]
>
> Kim...
>
> We need the "MEP Narrative" (combined physical/financial), the completed (to the best of your ability recognizing that what is provided will end up in the Fact Sheet), and the list of projects. This last item was provided to us, but not in the format

requested. If you did not receive the original package with the spreadsheet, let me know. Thanks! Stew C.

--

Stewart R. Comstock, P.E.
Program Review Division Chief

Sediment, Stormwater, & Dam Safety Program, WSA

Maryland Department of the Environment

1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

Click here to complete a three question customer experience survey.

--
Brian E. Cooper
Natural Resources Planner
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard | Baltimore, MD 21230-1708
410.537.3653

Click here to complete a three question customer experience survey.

Part IV. Recommendations on Evaluating Financial Capacity as Part of an MEP Analysis

Evaluating the financial capacity of a local jurisdiction to perform all stormwater services, is an important factor in determining the maximum extent practicable (MEP) level of implementation for Phase I Large municipal separate storm sewer system (MS4) permittees. A jurisdiction's financial capacity can be informed by characterizing the economic conditions of the community, estimating the per household municipal costs and expenditures, and characterizing the financial wherewithal of its government to pay for stormwater-related services. MDE recognizes that each Phase I Large MS4 jurisdiction is unique in its socioeconomic makeup and how stormwater programs are funded. Generally, sources of revenue used to pay for stormwater-related services include a combination of a dedicated fee or utility; general property and income tax revenues; grants and loans; and bond sales. The ability of a jurisdiction to adequately manage these funding sources is critical to the level of stormwater services provided. The data gathered in the Financial Capacity Analysis (FCA) spreadsheet and the narrative responses to the questions below will help each jurisdiction describe its MEP for performing stormwater-related services; economic status and its ability to afford these services; and its capacity to generate funds for these services.

It is recommended that each jurisdiction first complete the FCA spreadsheet. Then, the Department suggests that each jurisdiction answer the following questions that provide important local context regarding its FCA data and MEP analysis.

1. **What was the prior per household municipal cost of stormwater services and restoration activities for a jurisdiction's residents?**

   This first set of calculations in the FCA spreadsheet can be used to describe the municipal cost per household for stormwater-related services provided to the residential community in the past five years. Including the past and planned restoration costs and the costs of infrastructure maintenance and repair, inspection and education programs allows the jurisdiction to account for various costs - both capital and operational. These calculations can help characterize the relationship between these costs and residential household income.

   a. **What was the estimated annual municipal cost of providing stormwater-related management services to residential customers?**

      The five-year average annual cost of providing the full range of stormwater-related services can be compared to the median household income (MHI) of the community. The MHI provides a middle value of all the income ranges in a community. As the middle value, the MHI represents the income for at least half of the households.[1]

[1] U.S. Census Bureau. 2017. "American Community Survey and Puerto Rico Community Survey 2017 Subject Definitions" at pp. 86. Accessed at https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2017_ACSSubjectDefinitions.pdf?#

While percent of MHI may be a good indicator for communities that are homogeneous in income, each MS4 jurisdiction has unique income distributions. Capturing information on lower income brackets can help "tease out" the impacts of stormwater service costs on lower income households. The U.S. Census Bureau developed a Supplemental Poverty Measure (SPM) and determined that "At the national level, for a two-adult, two-child household in 2010, the SPM income threshold was set at $24,343."[2] Based on this, the FCA spreadsheet uses an income of $25,000/year, which represents the upper bound of the low income brackets, as a surrogate to provide information on this income group. While this does not reflect all lower income households, it is a good starting point for this analysis. Information collected in question 2c. below can be used to further characterize stormwater-related services on low income residents.

b. What is the estimated annual cost of the stormwater remediation fee to residential customers?

A similar analysis can be performed using just the stormwater remediation fee to isolate the annual cost of this revenue-generating mechanism for providing stormwater services to residential customers. The five-year average annual cost of the stormwater fee can be compared to MHI. This information can be used to help characterize the relative cost of stormwater remediation fee per household. For jurisdictions where the stormwater remediation fee covers only a portion of the total costs of stormwater related services, additional costs may be incurred by each household.

MDE recommends determining whether the stormwater remediation fee paid by each household disproportionately impacts lower income households. MDE recommends using the income of $25,000/year to represent the upper bound of the lower low income bracket.

c. What was the annual cost of the impervious surface restoration plan (ISRP) to residential customers?

Using the total cost of the ISRP during the previous permit term, the average annual cost can be compared to the MHI. Again, MDE recommends determining whether the stormwater remediation fee paid by each household disproportionately impacts lower income households. In addition, the percent of MHI for stormwater remediation fee can be compared to past ISRP spending.

[2] U.S. Conference of Mayors, American Water Works Association and Water Environment Federation. 2013. "Affordability Assessment Tool for Federal Water Mandates" at pp 19. Accessed at http://www.mayors.org/urbanwater/media/2013/0529-report-WaterAffordability.pdf."

d. What is the projected annual cost of the proposed restoration portfolio to residential customers?

Using the projected total cost of the proposed restoration portfolio, the average annual cost can be compared to the MHI. Again, MDE recommends determining whether the proposed restoration portfolio cost that may be paid by each household disproportionately impacts lower income households. The percent of MHI for stormwater remediation fee can be compared to the projected cost of the restoration portfolio. Additionally, the percent of MHI for the previous permit term's ISRP can be compared to the percent of MHI for the proposed restoration portfolio.

2. How do socioeconomic factors characterize the economic health of a jurisdiction? Are there indications that there are vulnerable populations in a jurisdiction that need to be considered?

Information on income distribution in a jurisdiction can be used to determine if lower income populations are disproportionately impacted by the costs of stormwater services. Household income statistics are broken down in the Census Data to help with this evaluation. While this low income indicator is important, many jurisdictions have programs to reduce the cost of these stormwater services.

a. How does the percent unemployed compare to the national average?

The percent unemployed shows the total number of unemployed people in a community.[3] This percentage can be compared to the national average reported in the American Community Survey (ACS) to help characterize the socioeconomic conditions of a jurisdiction. An unemployment percentage of greater than 1% above the national average is a local economic indicator that helps to show how stormwater costs may impact the unemployed. This 1% parameter comes from the U.S. Environmental Protection Agency's 1997 "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development"[4] (hereafter referred to as EPA's CSO Guidance).

b. How does the MHI compare to the national average?

Although the MHI does not specifically represent impacts of costs on lower income residents, comparing the MHI to the national average shows the overall earning capacity in a jurisdiction and provides additional information on the economic conditions of the residential community. According to the EPA's CSO Guidance, if the MHI of the community is more than 25% below the national average, the community would be considered economically vulnerable.

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[3] U.S. Census Bureau. 2017. "American Community Survey and Puerto Rico Community Survey 2017 Subject Definitions" at pp. 66. Accessed at https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2017_ACSSubjectDefinitions.pdf?#

[4] U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

c. What is the percentage of individuals below the poverty level and how does it compare to the national average?

The U.S. Census Bureau uses family size and income thresholds to determine estimates for the percentage of families and people whose income is below the poverty level.[5] This information can be used to describe the percentage of individuals in a jurisdiction that are below the poverty level compared to the national average. Percentages greater than 1% above the national average may indicate that a jurisdiction has a greater number of residents in poverty.

d. Are there any methods in place to reduce the annual cost of public stormwater-related services? Is a method in place to reduce the annual cost of stormwater-related services for low income residential customers?

Based on the answers in questions 1a, 1b, 1c, and 1d of this document, the costs on low income residents for providing stormwater-related services may be a large percentage of household income. Using the answers to questions 2a and 2c of this document, as well as the calculated cost for stormwater-related services on low income residents, describe all methods in place to reduce the cost on vulnerable populations. Additionally, have fee reduction requests from low income households impacted water or stormwater service revenues?

3. What is the financial capacity of a jurisdiction to borrow additional funds for stormwater-related management programs?

The ability of a jurisdiction to borrow additional funds can provide further information on how stormwater-related cost represents the community's MEP. The General Obligation (GO) and revenue bond ratings as well as the net debt as a percentage of full market property value (FMPV) all indicate how a jurisdiction fares in reference to debt. Known as debt burden, this information can characterize a jurisdiction's ability to issue additional debt to finance stormwater-related services.

a. Does the GO bond rating indicate a strong borrowing capacity?

GO bond ratings represent the ability of a jurisdiction to repay its debt. GO bond debt is paid by revenue from taxes (usually local property taxes). Revenue from the sale of GO bonds are the primary long-term debt funding mechanism of a community.[6] Moody's ratings of Aaa, Aa, and A, or Standard & Poor's ratings of AAA, AA, and A indicate a financially stable jurisdiction.

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[5] U.S. Census Bureau. 2016. "How the Census Bureau Measures Poverty". Accessed at https://www.census.gov/topics/income-poverty/poverty/about.html

[6] U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." at pp. 21. Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

b. Does the revenue bond rating indicate a strong borrowing capacity?

Revenue bond ratings reflect the financial conditions and management of a jurisdiction. These bonds are repaid from revenue generated from user or service fees.[7] Moody's ratings of Aaa, Aa, and A, or Standard & Poor's ratings of AAA, AA, and A indicate a financially stable jurisdiction.

c. Have either one of the bond ratings impacted past borrowing capacity and is there a potential for impacts to future borrowing?

A strong borrowing capacity will indicate a jurisdiction's ability to sufficiently borrow funds to pay for stormwater-related services. A weaker borrowing capacity will show a jurisdiction may be limited in the ability to increase debt to fund additional projects. Based on the bond ratings, jurisdictions should explain how borrowing during the previous permit term was impacted by bond ratings. The jurisdiction should also explain how borrowing during the next permit term could be impacted by current bond ratings.

d. Net debt as a percentage of FMPV?

Net debt is debt repaid by property taxes. The FMPV is the price a willing buyer would pay for real property and in this context it represents the full market value of real property in the jurisdiction. The calculated net debt as a percentage of FMPV provides a measurement of the debt burden on residents. It accounts for all debt issued by the jurisdiction and can be compared to a benchmark found in EPA's CSO Guidance to serve as an indicator of financial stability.

4. How great is the tax burden on existing properties within the community?

Financial management indicators help determine how great the tax burden is on existing properties within the community. These indicators can show whether a jurisdiction has a relatively high or low tax rate, which would indicate potential for concern if additional fees are added.

e. What is the property tax revenue collection rate and does it indicate a large amount of contributions from the tax base?

The property tax revenue collection rate serves as a measurement of tax collection system performance and residents' acceptance of tax levels.[8] The rate can be compared to an EPA CSO Guidance benchmark to indicate performance. A collection rate above 98% would be indicative of strong performance. A poor collection rate would be indicative of a tax structure that is burdensome on the residential population of the jurisdiction.

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[7] U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." at pp. 21. Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

[8] U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." at pp. 34. Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

f. Do the property tax revenues as a percentage of FMPV indicate that additional fees would cause an increased strain on the community?

The property tax revenues as a percentage of FMPV can be used to characterize the financial ability of a jurisdiction to support debt.[9] This comparison also provides information on how effective the local government is in providing services. A value below 2% indicates a financially strong community.

[9] U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." at pp. 32. Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

REFERENCES

U.S. Census Bureau. 2016. "How the Census Bureau Measures Poverty". Accessed at https://www.census.gov/topics/income-poverty/poverty/about.html

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U.S. Conference of Mayors, American Water Works Association and Water Environment Federation. 2013. "Affordability Assessment Tool for Federal Water Mandates". Accessed at http://www.mayors.org/urbanwater/media/2013/0529-report-WaterAffordability.pdf."

U.S. Environmental Protection Agency. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development". Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

Maryland Department of the Environment
Municipal Separate Storm Sewer System (MS4) Permit
Stormwater Restoration Accounting Principles
April 10, 2019

The Maryland Department of the Environment (Department) is including three surrogate restoration metrics in soon to be reissued MS4 permits. These metrics are: 1) an impervious acre metric to ensure the continued implementation of upland best management practices (BMPs); 2) a total nitrogen (TN) metric to ensure significant progress toward Chesapeake Bay restoration; and 3) total suspended solids (TSS) or other locally chosen metrics to ensure progress toward local water quality priorities. Each of these metrics is described further below along with its associated accounting principles.

Impervious Acre Metric is for accounting upland Stormwater Management BMPs that provide impervious acre treatment and are described in Chapters 3 and 5 of *Maryland's Stormwater Management Manual (Manual)*. The impervious acre metric is determined from three BMP variables; drainage area, impervious acres, and the rainfall depth managed. Impervious acres in the drainage area are considered managed 100% when one inch of rainfall is captured and treated with the water quality BMPs found in the *Manual*. When less than one inch, or more than one inch, of rainfall is captured and treated, the impervious acre credits may be determined in accordance with the Department's *MS4 Accounting Guidance for Waste Load Allocations and Impervious Acre Credit (Guidance).*

Total Nitrogen (TN) Metric is for accounting Chesapeake Bay urban restoration practices that remove TN, and associated Bay nutrients and sediments, as approved by the Chesapeake Bay Program (CBP). These include all of the BMPs found in the *Manual*, i.e., structural practices (ST) and runoff reduction practices (RR), plus street sweeping, catch basin cleaning, tree planting, stream restoration, shoreline management, floating wetlands, and illicit discharge detection and elimination, among other approved practices. The TN removal efficiencies shall be calculated in accordance with the CBP's expert panel reports and a delivery factors based on the BMP's proximity to the Bay.

Delivery factors indicate how much of an edge-of-stream load reduction is realized at the Chesapeake Bay edge-of-tide. To make these calculations easier for jurisdictions, MDE has developed BMP specific calculators for its nutrient trading program that perform these calculations automatically. These calculators can be found at:

https://mde.maryland.gov/programs/Water/WQT/Pages/WQT_Tools_Resources.aspx.

Users merely have to input geographic information for their project and other project specific data, such as land-use acres being treated and specifications for the BMP being used, and the calculators will automatically generate the load reduction credit.

Total Suspended Solids (TSS) Metric is for accounting BMPs and operational programs that improve TSS in local water quality, and the pollutants associated with TSS, e.g., total phosphorus (TP), metals, and other toxins. The TSS removal efficiencies shall be calculated in accordance with the CBP's expert panel reports, but without the Bay's delivery ratio, i.e., the edge-of-stream load. Local jurisdictions may also propose other local metrics based on local water quality priorities, e.g., trash, bacteria, PCBs.

In addition to these three new MS4 Permit metrics and accounting principles, jurisdictions will need guidance on how to account for impervious acre restoration requirements that were not met under their previous permits, equivalent impervious acres that were met through approved trading mechanisms, and annual BMPs that were used to meet the 20 % restoration requirement. Guidance on all three of these scenarios is provided below.

BMP Implementation to meet the 20% MS4 Impervious Acre restoration requirement from the previous MS4 permit term will need to be included in each jurisdiction's portfolio and MEP analysis. The Department's final review of each jurisdiction's impervious acre restoration submittal will determine the remaining impervious acres needed, if any, for MS4 permit compliance. The Department's analysis will be based on the *Guidance* and the CBP's phase 5 model calibration. Each MS4 will need to show in its BMP portfolio and MEP analysis, the BMPs that will be implemented to meet the remaining impervious acre requirement from its prior MS4 permit. To ensure compliance with the prior MS4 permit, all BMP impervious acre calculations shall be consistent with the *Guidance* and CBP's phase 5 model calibration.

BMP Implementation to Replace MS4 Trading that was used to meet 20% restoration requirement will need to be included in each jurisdiction's portfolio and MEP analysis. The Department's final review of each jurisdiction's impervious acre restoration submittal, and the equivalent impervious acres traded for, will determine the impervious acres that need to be replaced with urban stormwater BMPs during the upcoming MS4 permit term. The Department's analysis will be based on the *Guidance* and the CBP's phase 5 model calibration. An MS4 will need to show in its BMP portfolio and MEP analysis, the BMPs that will be implemented to replace the EIA that were included as a trade during the prior permit term. To ensure compliance with the prior MS4 permit, BMP implementation, all BMP impervious acre calculations shall be consistent with the *Guidance* and CBP's phase 5 model calibration.

Annual BMPs Implemented during the Previous MS4 Permits to meet the 20% impervious acre restoration requirement will need to be maintained or replaced under the new MS4 permit. For street sweeping, the same number of miles will need to be swept annually, and for catch-basin cleaning, the same number of catchments will need to be cleaned annually to remain in compliance with current MS4 permit restoration requirements. Likewise, the annual number of septic system pump-outs will need to be maintained under the new MS4 permit. Jurisdictions may also choose to replace annual BMPs with more long-term urban practices. To ensure consistency with the prior MS4 permit's requirements, any annual BMP conversions to perennial practices shall be consistent with the *Guidance* and CBP's phase 5 model calibration.

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

April 12, 2019

Kimberly L. Grove
Division Chief
DPW, Office of Compliance and Laboratories
3001 Druid Park Drive, Room 321
Baltimore, MD 21215

Dear Ms. Grove:

The Maryland Department of the Environment (Department) would like to consider a maximum extent practicable (MEP) determination as part of the development of the restoration requirement for the fifth generation National Pollutant Discharge Elimination (NPDES) municipal separate storm sewer system (MS4) Phase I permit. In an effort to ensure water quality goals and permit requirements are met to the greatest extent possible, the Department, in partnership the Phase I regulated community and the University of Maryland Environmental Finance Center, has developed a set of metrics that can be used to inform what is MEP for each Phase I large jurisdiction. As we have discussed, the Department's approach to determining MEP incorporates three aspects: Financial Capacity Analysis, Physical Capacity Analysis, and Restoration Project Portfolio. The first step in this process is to develop the Restoration Project Portfolio and complete the Physical Capacity Questionnaire (attached).

The Restoration Project Portfolio includes the list of projects or best management practices (BMPs) a jurisdiction plans to implement over the next five-year permit term. It is an extension of the Financial Assurance Plan (FAP) submittal, extended out to calendar year 2027 with estimated load reductions of total nitrogen (TN) and total suspended solids (TSS), and a local total maximum daily load (TMDL) component added. This information should be more specific for the first reporting year but may be more generalized for the remaining reporting years. The portfolio should include obligations remaining from the current permit including water quality trades that must be replaced with BMPs and annual practices that must be continued. The portfolio should include projects that will be planned, designed, and completed within the next five-year time frame and include projects that may not be completed until the following permit term. Projects in the Restoration Project Portfolio shall include an additional level of restoration over any obligations remaining from the previous permit. The Restoration Project Portfolio should represent each jurisdiction's priorities with respect to stormwater management and should include projects that provide important co-benefits. The completed portfolio will be used to determine MEP.

The Physical Capacity portion of the MEP analysis includes information provided as responses to a questionnaire. The purpose of this questionnaire is to provide the Department with detailed information and examples to explain what limitations exist outside of financial capacity that impact MEP. This information will help to describe the physical limitations that will impact the ability to do more than what is included in the jurisdiction's portfolio. The answers to the

questionnaire are meant to help explain why the Restoration Project Portfolio represents the most a jurisdiction can achieve within a five-year time frame considering various physical limitations on procurement, budget approvals, availability of contractors, project scheduling, permitting limitations, and project complexity. The Physical Capacity questionnaire is included as an attachment to this letter.

In addition, the Department has provided information on the next NPDES MS4 Phase I permit accounting principles to calculate the restoration credits of the projects proposed in the Restoration Project Portfolio. The next generation NPDES MS4 Phase I permit will include a restoration requirement that includes three metrics: impervious acres treated, TN load reduction, and TSS load reduction. Please find attached detailed information on the next generation MS4 accounting principles. Directions have also been provided in the attached documents for preparing the Restoration Portfolio, the Physical Capacity Questionnaire, and on populating the Restoration Project Portfolio spreadsheet.

The Department would like to complete the determination of MEP for each Phase I Large MS4 jurisdiction by mid-June 2019. As a first step, please complete the Restoration Project Portfolio and Physical Capacity Questionnaire by May 15 - 30, 2019. The Department will follow up with information on preparing the Financial Capacity Analysis and information on submitting a final MEP narrative to put all of the MEP data into local context. Please contact me or Raymond Bahr at 410-537-3543 if you have any questions or require further clarification.

Sincerely,

Jennifer M. Smith, Manager
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration

Enclosures

cc: D. Lee Currey, Director, Water and Science Administration
Raymond P. Bahr, Deputy Program Manager, SSDS

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

Kimberly L. Grove
Division Chief
DPW, Office of Compliance and Laboratories
3001 Druid Park Drive, Room 321
Baltimore, MD 21215

MAY 17 2019

Dear Ms. Grove:

The Maryland Department of the Environment (Department), in developing fifth generation National Pollutant Discharge Elimination (NPDES) Phase I Large municipal separate storm sewer system (MS4) permits, is requesting individual maximum extent practicable (MEP) determinations from each regulated jurisdiction. The Department, in partnership with the Phase I Large MS4s and the University of Maryland Environmental Finance Center, has developed an MEP process based on three fundamental components: Restoration Project Portfolio, Physical Capacity, and Financial Capacity. Information requests regarding the Restoration Project Portfolio and Physical Capacity have been sent under prior Department correspondence. This letter discusses the final step in this process, determining the Financial Capacity component, and how to combine all 3 components into one final MEP Report for submission to the Department.

Attached is a Financial Capacity Analysis (FCA) spreadsheet for collecting important local stormwater fiscal information. The FCA spreadsheet includes three categories: the cost of stormwater-related services in relation to household income; key socio-economic parameters; and financial capacity indicators. These data can be obtained easily from Census Bureau information, permittee gathered cost data, and Maryland property tax assessment data. Also attached are *Part III. Instructions for Completing the Financial Capacity Spreadsheet,* and *Part IV. Recommendations on Evaluating Financial Capacity as part of an MEP Analysis.*

The Department requests that each jurisdiction combine information from the Restoration Project Portfolio, Physical Capacity, and Financial Capacity components in to one comprehensive MEP Report. The Report shall include a narrative on all three components that explains why the Restoration Project Portfolio represents the most that a jurisdiction can achieve during its five-year permit term. For example, the answers to the Physical Capacity questionnaire, e.g., budget approvals, availability of contractors, project scheduling, permitting limitations, and the information provided in the FCA spreadsheet, e.g., median household incomes, socio-economic limitations, bond ratings, debt services, should provide the local data and context for determining a Restoration Project Portfolio MEP.

The Department would like to complete its MEP determination for each Phase I Large MS4 jurisdiction by mid-June 2019. In order to help the Department meet this schedule, please complete the Restoration Project Portfolio, Physical Capacity questionnaire, FCA spreadsheet, and the final MEP Report by May 30, 2019. If you have any questions, or need further clarification, contact me at jenniferm.smith@maryland.gov, or raymond.bahr@maryland.gov, or by phone at 410-537-3543.

Sincerely,

Jennifer M. Smith, Manager
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration

Enclosures

cc: D. Lee Currey, Director, Water and Science Administration
Raymond P. Bahr, Deputy Program Manager, SSDS

Part I. Instructions for Completing Restoration Project Portfolios

As part of the new MS4 Phase I permit development process, the Maryland Department of the Environment (Department) set out to determine what is the maximum extent practicable (MEP) for a permit term restoration requirement. Part of the analysis requires the completion of a proposed Restoration Project Portfolio, detailing restoration projects to be planned, designed, and/or constructed during and after the next permit term. Doing so allows each jurisdiction the flexibility to develop a portfolio of best management practices (BMPs) based on local priorities. To assist jurisdictions in completing the restoration portfolio, the Department offers the Excel workbook, "Restoration Project Portfolio.xlsx". Specific reporting requirements are summarized below.

DESCRIPTION OF REQUIREMENTS

Complete the provided spreadsheet for restoration projects to be planned, designed, and/or under construction from the end of the 4th generation permit through 2027. These projects can be annual BMPs (including water quality trading credits) and capital projects. This restoration portfolio acts as an extension of the recent FAP submittal; thus, proposed activities for the next five years can include those practices reported in the 2018 Financial Assurance Plan. However, the Department requests that the portfolio identify nutrient and sediment reductions as well as the local concerns that would be addressed. This information should be more specific for the first reporting year but may be more generalized for the remaining reporting years.

HOW TO SUBMIT INFORMATION

Below, each section of the spreadsheet is outlined along with guidance on providing data. Please submit all files electronically via compact disc, email, or ftp and as a hard copy. Please ensure that the following actions are taken:

- **Remaining Unmet Restoration Obligation from Previous Permit (Impervious Acres)**
    - Please enter the number of acres remaining that must be treated to meet your previous permit restoration requirement. This value would be zero if you completed restoration of the full impervious acres required under your previous permit.

- **Remaining Unmet Restoration Obligations from Previous Permit**
    - In this section you should report any unmet impervious surface restoration obligation remaining from the previous permit. The BMPs listed in this section are those proposed to be implemented in the next five-year permit term to address this unmet restoration obligation. Use BMP types and classes from the MDE Geodatabase. If a project has multiple types of a single BMP, identify the amount in the Number of BMPs column.
    - BMPs used to address unmet restoration obligations shall be reported in terms of impervious acres treated or equivalent impervious acres. Projects should be

credited using the 2014 Accounting Guidance and any additional guidance updates found on the Department's webpage, e.g., stream restoration, outfall stabilization, CMAC.
    - Provide the estimated cost for the entire project. If needed, identify additional planning or design costs as a separate line item in the spreadsheet.
    - Implementation status should be: Planning, Design, or Under Construction.
    - The projected implementation year should be from the end of the 4th generation permit through 2025.
    - Identify any total maximum daily load (TMDL) parameters, local water quality objectives (e.g., sediment, phosphorus, trash), and local concerns (e.g., climate resiliency) that will be addressed. Please use the comments column to describe in detail the co-benefits of the BMP.
    - Please ensure that all formulas for subtotals and totals are updated to reflect the applicable time periods.

- **Obligations from Previous Permit That Must Be Continued**
    - In this section you should report any obligations from the previous permit that must be continued through the next five-year permit term and/or replaced with a permanent BMP. This section should include water quality trades that must continue annually and that must be replaced with permanent BMPs prior to the end of the permit term. Trades from the previous permit must be replaced with BMPs (annual or capital). Use BMP types and classes from the MDE Geodatabase. If a project has multiple types of a single BMP, identify the amount in the Number of BMPs column.
    - For annual BMPs implemented during the previous permit, a TN and TSS load reduction shall be computed using the 2014 Accounting Guidance. Street lane miles and/or mass loading reductions may be noted in the comments column. Replacement BMPs must, at a minimum, provide this obligated TN and TSS load reduction. However, when these annual practices are converted to new permanent BMPs, benefits from these shall be reported using the 2019 Accounting Principles.
    - Provide the estimated cost for the entire project. If needed, identify additional planning or design costs as a separate line item in the spreadsheet.
    - Implementation status should be: Planning, Design, or Under Construction. It is acceptable if a project will not be completed by 2027.
    - The projected implementation year should be from the end of the 4th generation permit through 2027.
    - Identify any total maximum daily load (TMDL) parameters, local water quality objectives (e.g., sediment, phosphorus, trash), and local concerns (e.g., climate resiliency) that will be addressed as additional benefits. Please use the comments column to describe in detail the co-benefits of the BMP.
    - Please ensure that all formulas for subtotals and totals are updated to reflect the applicable time periods.

- **Proposed Restoration for the Next Permit**

- In this section you should report proposed new BMPs to implement as part of the next permit restoration requirement. Use BMP types and classes from the MDE Geodatabase. If a project has multiple types of a single BMP, identify the amount in the Number of BMPs column.
- Impervious Acres and Reductions for TSS andTN for proposed projects to be implemented during the next permit shall be reported using the accounting principles provided the 2019 Accounting Principles. Provide the estimated impervious acres treated for each project (excluding alternative BMPs). Include estimated total suspended solids (TSS) and total nitrogen (TN) load reductions for each structural and annual project. Alternative BMPs like street sweeping, tree planting, and stream restoration will no longer receive an equivalent impervious acre credit. Instead, use Bay Program guidance to determine and report estimated TSS and TN load reductions. For street sweeping and inlet cleaning, report lane miles or mass loading reductions in the comments column.
- Provide the estimated cost for the entire project. If needed, identify additional planning or design costs as a separate line item in the spreadsheet.
- Implementation status should be: Planning, Design, or Under Construction. It is acceptable if a project will not be completed by 2027.
- The projected implementation year should be from the end of the 4th generation permit through 2027.
- Identify any total maximum daily load (TMDL) parameters, local water quality objectives (e.g., sediment, phosphorus, trash), and local concerns (e.g., climate resiliency) that will be addressed. Please use the comments column to describe in detail the co-benefits of the BMP.
- Please ensure that all formulas for subtotals and totals are updated to reflect the applicable time periods.

Restoration Projects To Be Planned, Designed, and/or Constructed From The End Of 4th Generation Permit Through CY 2027
[INSERT MS4 NAME]

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

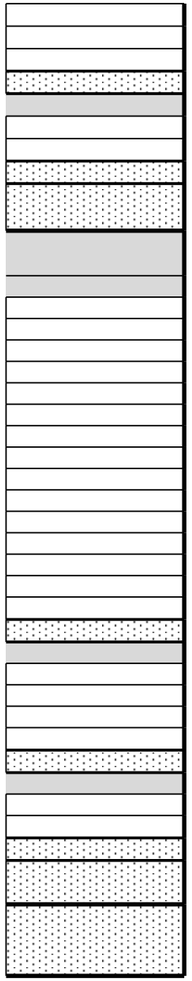
REST BMP ID	REST BMP TYPE[1]	BMP CLASS[1]	NUM BMP	IMP ACRES	TSS REDUCTION (lbs/year)	TN[6] REDUCTION (lbs/year)	IMPLEMENTATION COST	IMPLEMENTATION STATUS[2]	PROJECTED IMPLEMENTATION YEAR	TMDL PARAMETER OR WQ OBJECTIVE ADDRESSED
Remaining Unmet Restoration Obligations from Previous Permit										
Annual Operational Programs (Unmet Obligations from Previous Permit)[3,4]										
Street Sweeping*		A								
		A								
		A								
		A								
		A								
		A								
Catch Basin Cleaning*		A								
		A								
		A								
		A								
		A								
Septic Sytem Pumping		A								
		A								
		A								
		A								
		A								
		A								
Subtotal Operations[3]			0	0			$0			
Capital Projects (Unmet Obligations from Previous Permit Term)										
Subtotal Capital			0	0			$0			
Other (Unmet Obligations from Previous Permit Term)										
Subtotal Other			0	0			$0			
Total of Remaining Obligations from The Previous Permit			**0**	**0**			**$0**			
Obligations from Previous Permit That Must Be Continued										
Annual Operational Programs Required to be Maintained from Previous Permit[3,4]										
Street Sweeping		A								
		A								
		A								
		A								
		A								
Catch Basin Cleaning		A								
		A								
		A								
		A								
		A								
Septic Sytem Pumping		A								
		A								
		A								
		A								
		A								
Subtotal Operations[3]			0		0	0	$0			
Capital Projects (Proposed to Replace Annual Obligations)										

Subtotal Capital			0	0	0	0	$0			
Other (Proposed to Replace Annual Obligations)										
Subtotal Other			0	0	0	0	$0			
Total of Obligations from Previous Permit That Must Be Continued			**0**	**0.0**	**0.0**	**0.0**	**$0**			
Proposed Restoration for the Next Permit										
Operational Programs[4]										
Street Sweeping		A								
		A								
		A								
		A								
		A								
Catch Basin Cleaning		A								
		A								
		A								
		A								
		A								
Septic Sytem Pumping		A								
		A								
		A								
		A								
		A								
Subtotal Operations[5]			0		0	0	$0			
Capital Projects										
Subtotal Capital			0	0	0	0	$0			
Other										
Subtotal Other			0	0	0	0	$0			
Total for Next Permit			**0**	**0.0**	**0.0**	**0.0**	**$0**			
Total for Remaining Obligations from The Previous Permit and Prosed Activities for the Next Permit			0	0.0	0.0	0.0	$0			

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

Notes:
1 Use BMP types and classes from the MDE Geodatabase.

GENERAL COMMENTS[7]



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

BMP Classification	BMP Type Code	BMP Type
Alternative Surfaces (A)		
E	AGRE	Green Roof – Extensive
E	AGRI	Green Roof – Intensive
E	APRP	Permeable Pavements
E	ARTF	Reinforced Turf
Nonstructural Techniques (N)		
E	NDRR	Disconnection of Rooftop Runoff
E	NDNR	Disconnection of Non-Rooftop Runoff
E	NSCA	Sheetflow to Conservation Areas
Micro-Scale Practices (M)		
E	MRWH	Rainwater Harvesting
E	MSGW	Submerged Gravel Wetlands
E	MILS	Landscape Infiltration
E	MIBR	Infiltration Berms
E	MIDW	Dry Wells
E	MMBR	Micro-Bioretention
E	MRNG	Rain Gardens
E	MSWG	Grass Swale
E	MSWW	Wet Swale
E	MSWB	Bio-Swale
E	MENF	Enhanced Filters
Ponds (P)		
S	PWED	Extended Detention Structure, Wet
S	PWET	Retention Pond (Wet Pond)
S	PMPS	Multiple Pond System
S	PPKT	Pocket Pond
S	PMED	Micropool Extended Detention Pond
Wetlands (W)		
S	WSHW	Shallow Marsh
S	WEDW	ED – Wetland
S	WPWS	Wet Pond – Wetland
S	WPKT	Pocket Wetland
Infiltration (I)		
S	IBAS	Infiltration Basin
S	ITRN	Infiltration Trench
Filtering Systems (F)		

S	FBIO	Bioretention
S	FSND	Sand Filter
S	FUND	Underground Filter
S	FPER	Perimeter (Sand) Filter
S	FORG	Organic Filter (Peat Filter)
S	FBIO	Bioretention
Open Channels (O)		
S	ODSW	Dry Swale
S	OWSW	Wet Swale
Other Practices (X)		
S	XDPD	Detention Structure (Dry Pond)
S	XDED	Extended Detention Structure, Dry
S	XFLD	Flood Management Area
S	XOGS	Oil Grit Separator
S	XOTH	Other
Alternative BMPs		
A	MSS	Mechanical Street Sweeping
A	VSS	Regenerative/Vacuum Street Sweeping
A	IMPP	Impervious Surface Elimination (to pervious)
A	IMPF	Impervious Surface Elimination (to forest)
A	FPU	Planting Trees or Forestation on Pervious Urban
A	CBC	Catch Basin Cleaning
A	SDV	Storm Drain Vacuuming
A	STRE	Stream Restoration
A	OUT	Outfall Stabilization
A	SPSC	Regenerative Step Pool Storm Conveyance
A	SHST	Shoreline Management
A	SEPP	Septic Pumping
A	SEPD	Septic Denitrification
A	SEPC	Septic Connections to WWTP

From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Fri, 16 Aug 2019 16:15:24 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>; "Raymond Bahr" <raymond.bahr@maryland.gov>; "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>
Subject: Missing items in MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Kim...

We need the "MEP Narrative" (combined physical/financial), the completed (to the best of your ability recognizing that what is provided will end up in the Fact Sheet), and the list of projects. This last item was provided to us, but not in the format requested. If you did not receive the original package with the spreadsheet, let me know. Thanks! Stew C.

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment
1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

From: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>
Sent: Fri, 16 Aug 2019 18:18:56 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Raymond Bahr" <raymond.bahr@maryland.gov>; "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>
Subject: Re: Missing items in MEP Analysis
Attachments: Baltimore City.pdf, Accounting Principles.pdf, Restoration Project Portfolio.xlsx, UPDATED Restoration Portfolio Guidance 4-4-2019.pdf, Recommendations on Evaluating Financial Capacity as Part of an MEP Analysis_final 5_17_2019.docx, BCity MEP Cover Letter_5_17_2019.pdf

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Hi Kim,

That's OK. Please find attached the letters, guidance documents, and template spreadsheet that may be used for completing the portfolio and comprehensive MEP report.

Let us know if you have any questions?
Brian

On Fri, Aug 16, 2019 at 12:44 PM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> I thought I did have the right form. Let's be safe, please send me the spreadsheet that you want me to use.

> **From:** Stewart Comstock -MDE- [mailto:stewart.comstock@maryland.gov]
> **Sent:** Friday, August 16, 2019 12:15 PM
> **To:** Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
> **Cc:** Brian Cooper -MDE- <brian.cooper@maryland.gov>; Raymond Bahr <raymond.bahr@maryland.gov>; Jennifer Smith -MDE- <jenniferm.smith@maryland.gov>
> **Subject:** Missing items in MEP Analysis
>
> [THIS EMAIL IS FROM AN EXTERNAL SENDER]
>
> Kim...
>
> We need the "MEP Narrative" (combined physical/financial), the completed (to the best of your ability recognizing that what is provided will end up in the Fact Sheet), and the list of projects. This last item was provided to us, but not in the format

requested. If you did not receive the original package with the spreadsheet, let me know. Thanks! Stew C.

--

Stewart R. Comstock, P.E.
Program Review Division Chief

Sediment, Stormwater, & Dam Safety Program, WSA

Maryland Department of the Environment

1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

Click here to complete a three question customer experience survey.

--
Brian E. Cooper
Natural Resources Planner
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard | Baltimore, MD 21230-1708
410.537.3653

Click here to complete a three question customer experience survey.

Part IV. Recommendations on Evaluating Financial Capacity as Part of an MEP Analysis

Evaluating the financial capacity of a local jurisdiction to perform all stormwater services, is an important factor in determining the maximum extent practicable (MEP) level of implementation for Phase I Large municipal separate storm sewer system (MS4) permittees. A jurisdiction's financial capacity can be informed by characterizing the economic conditions of the community, estimating the per household municipal costs and expenditures, and characterizing the financial wherewithal of its government to pay for stormwater-related services. MDE recognizes that each Phase I Large MS4 jurisdiction is unique in its socioeconomic makeup and how stormwater programs are funded. Generally, sources of revenue used to pay for stormwater-related services include a combination of a dedicated fee or utility; general property and income tax revenues; grants and loans; and bond sales. The ability of a jurisdiction to adequately manage these funding sources is critical to the level of stormwater services provided. The data gathered in the Financial Capacity Analysis (FCA) spreadsheet and the narrative responses to the questions below will help each jurisdiction describe its MEP for performing stormwater-related services; economic status and its ability to afford these services; and its capacity to generate funds for these services.

It is recommended that each jurisdiction first complete the FCA spreadsheet. Then, the Department suggests that each jurisdiction answer the following questions that provide important local context regarding its FCA data and MEP analysis.

1. **What was the prior per household municipal cost of stormwater services and restoration activities for a jurisdiction's residents?**

   This first set of calculations in the FCA spreadsheet can be used to describe the municipal cost per household for stormwater-related services provided to the residential community in the past five years. Including the past and planned restoration costs and the costs of infrastructure maintenance and repair, inspection and education programs allows the jurisdiction to account for various costs - both capital and operational. These calculations can help characterize the relationship between these costs and residential household income.

   a. **What was the estimated annual municipal cost of providing stormwater-related management services to residential customers?**

      The five-year average annual cost of providing the full range of stormwater-related services can be compared to the median household income (MHI) of the community. The MHI provides a middle value of all the income ranges in a community. As the middle value, the MHI represents the income for at least half of the households.[1]

[1] U.S. Census Bureau. 2017. "American Community Survey and Puerto Rico Community Survey 2017 Subject Definitions" at pp. 86. Accessed at https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2017_ACSSubjectDefinitions.pdf?#

While percent of MHI may be a good indicator for communities that are homogeneous in income, each MS4 jurisdiction has unique income distributions. Capturing information on lower income brackets can help "tease out" the impacts of stormwater service costs on lower income households. The U.S. Census Bureau developed a Supplemental Poverty Measure (SPM) and determined that "At the national level, for a two-adult, two-child household in 2010, the SPM income threshold was set at $24,343."[2] Based on this, the FCA spreadsheet uses an income of $25,000/year, which represents the upper bound of the low income brackets, as a surrogate to provide information on this income group. While this does not reflect all lower income households, it is a good starting point for this analysis. Information collected in question 2c. below can be used to further characterize stormwater-related services on low income residents.

b. What is the estimated annual cost of the stormwater remediation fee to residential customers?

A similar analysis can be performed using just the stormwater remediation fee to isolate the annual cost of this revenue-generating mechanism for providing stormwater services to residential customers. The five-year average annual cost of the stormwater fee can be compared to MHI. This information can be used to help characterize the relative cost of stormwater remediation fee per household. For jurisdictions where the stormwater remediation fee covers only a portion of the total costs of stormwater related services, additional costs may be incurred by each household.

MDE recommends determining whether the stormwater remediation fee paid by each household disproportionately impacts lower income households. MDE recommends using the income of $25,000/year to represent the upper bound of the lower low income bracket.

c. What was the annual cost of the impervious surface restoration plan (ISRP) to residential customers?

Using the total cost of the ISRP during the previous permit term, the average annual cost can be compared to the MHI. Again, MDE recommends determining whether the stormwater remediation fee paid by each household disproportionately impacts lower income households. In addition, the percent of MHI for stormwater remediation fee can be compared to past ISRP spending.

[2] U.S. Conference of Mayors, American Water Works Association and Water Environment Federation. 2013. "Affordability Assessment Tool for Federal Water Mandates" at pp 19. Accessed at http://www.mayors.org/urbanwater/media/2013/0529-report-WaterAffordability.pdf."

d. What is the projected annual cost of the proposed restoration portfolio to residential customers?

Using the projected total cost of the proposed restoration portfolio, the average annual cost can be compared to the MHI. Again, MDE recommends determining whether the proposed restoration portfolio cost that may be paid by each household disproportionately impacts lower income households. The percent of MHI for stormwater remediation fee can be compared to the projected cost of the restoration portfolio. Additionally, the percent of MHI for the previous permit term's ISRP can be compared to the percent of MHI for the proposed restoration portfolio.

2. How do socioeconomic factors characterize the economic health of a jurisdiction? Are there indications that there are vulnerable populations in a jurisdiction that need to be considered?

Information on income distribution in a jurisdiction can be used to determine if lower income populations are disproportionately impacted by the costs of stormwater services. Household income statistics are broken down in the Census Data to help with this evaluation. While this low income indicator is important, many jurisdictions have programs to reduce the cost of these stormwater services.

a. How does the percent unemployed compare to the national average?

The percent unemployed shows the total number of unemployed people in a community.[3] This percentage can be compared to the national average reported in the American Community Survey (ACS) to help characterize the socioeconomic conditions of a jurisdiction. An unemployment percentage of greater than 1% above the national average is a local economic indicator that helps to show how stormwater costs may impact the unemployed. This 1% parameter comes from the U.S. Environmental Protection Agency's 1997 "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development"[4] (hereafter referred to as EPA's CSO Guidance).

b. How does the MHI compare to the national average?

Although the MHI does not specifically represent impacts of costs on lower income residents, comparing the MHI to the national average shows the overall earning capacity in a jurisdiction and provides additional information on the economic conditions of the residential community. According to the EPA's CSO Guidance, if the MHI of the community is more than 25% below the national average, the community would be considered economically vulnerable.

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[3] U.S. Census Bureau. 2017. "American Community Survey and Puerto Rico Community Survey 2017 Subject Definitions" at pp. 66. Accessed at https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2017_ACSSubjectDefinitions.pdf?#

[4] U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

c. What is the percentage of individuals below the poverty level and how does it compare to the national average?

The U.S. Census Bureau uses family size and income thresholds to determine estimates for the percentage of families and people whose income is below the poverty level.[5] This information can be used to describe the percentage of individuals in a jurisdiction that are below the poverty level compared to the national average. Percentages greater than 1% above the national average may indicate that a jurisdiction has a greater number of residents in poverty.

d. Are there any methods in place to reduce the annual cost of public stormwater-related services? Is a method in place to reduce the annual cost of stormwater-related services for low income residential customers?

Based on the answers in questions 1a, 1b, 1c, and 1d of this document, the costs on low income residents for providing stormwater-related services may be a large percentage of household income. Using the answers to questions 2a and 2c of this document, as well as the calculated cost for stormwater-related services on low income residents, describe all methods in place to reduce the cost on vulnerable populations. Additionally, have fee reduction requests from low income households impacted water or stormwater service revenues?

3. What is the financial capacity of a jurisdiction to borrow additional funds for stormwater-related management programs?

The ability of a jurisdiction to borrow additional funds can provide further information on how stormwater-related cost represents the community's MEP. The General Obligation (GO) and revenue bond ratings as well as the net debt as a percentage of full market property value (FMPV) all indicate how a jurisdiction fares in reference to debt. Known as debt burden, this information can characterize a jurisdiction's ability to issue additional debt to finance stormwater-related services.

a. Does the GO bond rating indicate a strong borrowing capacity?

GO bond ratings represent the ability of a jurisdiction to repay its debt. GO bond debt is paid by revenue from taxes (usually local property taxes). Revenue from the sale of GO bonds are the primary long-term debt funding mechanism of a community.[6] Moody's ratings of Aaa, Aa, and A, or Standard & Poor's ratings of AAA, AA, and A indicate a financially stable jurisdiction.

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[5] U.S. Census Bureau. 2016. "How the Census Bureau Measures Poverty". Accessed at https://www.census.gov/topics/income-poverty/poverty/about.html

[6] U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." at pp. 21. Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

b. Does the revenue bond rating indicate a strong borrowing capacity?

Revenue bond ratings reflect the financial conditions and management of a jurisdiction. These bonds are repaid from revenue generated from user or service fees.[7] Moody's ratings of Aaa, Aa, and A, or Standard & Poor's ratings of AAA, AA, and A indicate a financially stable jurisdiction.

c. Have either one of the bond ratings impacted past borrowing capacity and is there a potential for impacts to future borrowing?

A strong borrowing capacity will indicate a jurisdiction's ability to sufficiently borrow funds to pay for stormwater-related services. A weaker borrowing capacity will show a jurisdiction may be limited in the ability to increase debt to fund additional projects. Based on the bond ratings, jurisdictions should explain how borrowing during the previous permit term was impacted by bond ratings. The jurisdiction should also explain how borrowing during the next permit term could be impacted by current bond ratings.

d. Net debt as a percentage of FMPV?

Net debt is debt repaid by property taxes. The FMPV is the price a willing buyer would pay for real property and in this context it represents the full market value of real property in the jurisdiction. The calculated net debt as a percentage of FMPV provides a measurement of the debt burden on residents. It accounts for all debt issued by the jurisdiction and can be compared to a benchmark found in EPA's CSO Guidance to serve as an indicator of financial stability.

4. How great is the tax burden on existing properties within the community?

Financial management indicators help determine how great the tax burden is on existing properties within the community. These indicators can show whether a jurisdiction has a relatively high or low tax rate, which would indicate potential for concern if additional fees are added.

e. What is the property tax revenue collection rate and does it indicate a large amount of contributions from the tax base?

The property tax revenue collection rate serves as a measurement of tax collection system performance and residents' acceptance of tax levels.[8] The rate can be compared to an EPA CSO Guidance benchmark to indicate performance. A collection rate above 98% would be indicative of strong performance. A poor collection rate would be indicative of a tax structure that is burdensome on the residential population of the jurisdiction.

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[7] U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." at pp. 21. Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

[8] U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." at pp. 34. Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

f. Do the property tax revenues as a percentage of FMPV indicate that additional fees would cause an increased strain on the community?

The property tax revenues as a percentage of FMPV can be used to characterize the financial ability of a jurisdiction to support debt.[9] This comparison also provides information on how effective the local government is in providing services. A value below 2% indicates a financially strong community.

[9] U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." at pp. 32. Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

REFERENCES

U.S. Census Bureau. 2016. "How the Census Bureau Measures Poverty". Accessed at https://www.census.gov/topics/income-poverty/poverty/about.html

U.S. Census Bureau. 2017. "American Community Survey and Puerto Rico Community Survey 2017 Subject Definitions". Accessed at https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2017_ACSSubjectDefinitions.pdf?#

U.S. Conference of Mayors, American Water Works Association and Water Environment Federation. 2013. "Affordability Assessment Tool for Federal Water Mandates". Accessed at http://www.mayors.org/urbanwater/media/2013/0529-report-WaterAffordability.pdf."

U.S. Environmental Protection Agency. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development". Accessed at https://www3.epa.gov/npdes/pubs/csofc.pdf.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Tue, 20 Aug 2019 13:36:56 +0000
To: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen Wiggen" <wiggenk@charlescounty.org>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>
Cc: "Janis Markusic" <pwmark02@aacounty.org>; "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "Joiner, Jeremy" <JJoiner@FrederickCountyMD.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "Lowe, Christine" <cslowe@howardcountymd.gov>; "'gengles@ccg.carr.org'" <gengles@ccg.carr.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "'Knapp, Les'" <lknapp@mdcounties.org>
Subject: Draft permit template
Attachments: Maryland Draft Next Gen MS4 Phase I Permit 8_19_2019.pdf

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

MD MS4 managers,

MDE staff has provided the current text of the new permit template (sans Section IV.E on Restoration). I had asked for a strikeout/redline version that would capture changes from the current permit language, but, unfortunately, the attached document is just a .pdf file with no such markers.

I will be asking for a volunteer or two who will have the time between now and our planning call next Monday to compare this text against the current permit text and against the redline/strikeout version of our group's joint comments that we sent to MDE more than a year ago and to flag potential issues for group comment.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MARYLAND DEPARTMENT OF THE ENVIRONMENT

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

PART I. IDENTIFICATION

A. Permit Number: XX-XX-XXXX XXXXXXXXX

B. Permit Area

This permit covers all stormwater discharges from the municipal separate storm sewer system (MS4) owned or operated jurisdiction-wide by XXXXX County/City/Agency, Maryland.

C. Effective Date: To be determined (TBD)

D. Expiration Date: TBD

PART II. DEFINITIONS

Terms used in this permit are defined in relevant chapters of Title 40 of the Code of Federal Regulations (CFR) Parts 122 - 124 or the Code of Maryland Regulations (COMAR) 26.08.01, 26.17.01, and 26.17.02. Terms not defined in CFR or COMAR shall have the meanings attributed by common use.

PART III. WATER QUALITY

XXXXX County/City/Agency must manage, implement, and enforce stormwater management programs in accordance with the Clean Water Act (CWA) and corresponding stormwater National Pollutant Discharge Elimination System (NPDES) regulations, 40 CFR Part 122, to meet the following requirements:

1. Effectively prohibit pollutants in stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with Maryland's receiving water quality standards;

2. Attain applicable stormwater wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with Title 33 of the U.S. Code (USC) §1342(p)(3)(B)(iii); 40 CFR §122.44(k)(2) and (3); and

3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with all the conditions contained in PARTs IV through VII of this permit shall constitute compliance with §402(p)(3)(B)(iii) of the CWA and adequate progress toward compliance with Maryland's receiving water quality standards and EPA approved stormwater WLAs for this permit term.

PART IV. STANDARD PERMIT CONDITIONS

A. Permit Administration

XXXXX County/City/Agency shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County/City/Agency shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County/City/Agency shall submit in its annual reports to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

B. Legal Authority

XXXXX County/City/Agency shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR §122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County/City/Agency shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County/City/Agency's annual report.

C. Source Identification

Sources of pollutants in stormwater runoff jurisdiction-wide shall be identified by XXXXX County/City/Agency and linked to specific water quality impacts on a watershed basis. A georeferenced database shall be submitted annually in accordance with *Maryland Department of the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017),* hereafter (MS4 Geodatabase) that includes information on the following:

1. Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;

2. Industrial and commercial sources: industrial and commercial land uses and sites that the County/City/Agency has determined have the potential to contribute significant pollutants;

3. Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;

4. Impervious surfaces: public and private land cover delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;

5. Monitoring locations: locations established by the County/City/Agency for chemical, biological, and physical monitoring of watershed restoration efforts and the *2000 Maryland Stormwater Design Manual*, or as part a pooled monitoring approach as described in Part IV.F; and

6. Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.

D. Management Programs

The following management programs shall be implemented jurisdiction-wide by XXXXX County/City/Agency. These management programs are designed to control stormwater discharges and reduce associated pollutant loadings to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. Annual Reports for the County's/City's/Agency's management programs shall be in accordance with Part V.A of this permit and the MS4 Geodatabase.

1. Stormwater Management

An acceptable stormwater management program shall be maintained by the County/City/Agency in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the *2000 Maryland Stormwater Design Manual*. This includes:

   i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;
   ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and
   iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.

b. Maintaining programmatic and implementation information including, but not limited to:

i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;
ii. Number of redevelopment projects received;
iii. Number of stormwater exemptions issued; and
iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by the County/City/Agency.

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County/City/Agency's annual reports.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall be maintained by the County/City/Agency and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the County/City/Agency's erosion and sediment control enforcement authority;

b. Ensuring that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE; and

c. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

3. Illicit Discharge Detection and Elimination

The County/City/Agency shall implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:

a. Field screening at least 150 outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit. An alternative program may be submitted by the County/City/Agency for MDE approval that methodically identifies, investigates, and eliminates illegal discharges to the County/City/Agency's MS4;

b. Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;

c. Maintaining written standard operating procedures for outfall screenings, illicit discharge investigations, annual visual surveys of commercial and industrial areas, responding to illicit discharge complaints, and enforcement implementation;

d. Maintaining a program to address, and if necessary, respond to illegal discharges, dumping, and spills; and

e. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. When a suspected illicit discharge discovered within the City/County/Agency's jurisdiction is either originating from or discharging to an adjacent MS4, the City/County/Agency must coordinate with that MS4 to resolve the investigation. Significant discharges shall be reported to MDE for enforcement and/or permitting.

4. Litter and Floatables

a. The County/City/Agency shall evaluate current litter control problems associated with discharges from portions of its MS4 that are not already addressed under a TMDL for trash (litter and floatables). Actions to address documented litter control problems shall be submitted to MDE and updated annually.

b. As part of the County/City/Agency watershed assessments under PART IV.E.1 of this permit, the County/City/Agency shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.

5. Property Management and Maintenance

a. Coverage under Maryland's NPDES General Permit for Discharges of Stormwater Associated with Industrial Activity (SW Industrial GP) is typically required at facilities where the following activities are performed: maintenance or storage of vehicles or equipment; use, handling, transport, or storage of fertilizers, pesticides, landscaping materials, hazardous materials, or other materials that could pollute stormwater runoff. The County/City/Agency shall:

i. Ensure that a Notice of Intent (NOI) has been submitted to MDE for each County/City/Agency owned industrial facility requiring coverage under the SW Industrial GP; and
ii. Submit with the annual report a list of County/City/Agency properties requiring industrial stormwater permitting.

b. The County/City/Agency shall develop, implement, and maintain a good housekeeping plan (GHP) for County/City/Agency owned properties not required to be covered under Maryland's SW Industrial GP. The GHP shall be submitted to MDE by the County in its third year annual report and implemented thereafter. A standard GHP may be developed for all County owned property or separate GHPs may be developed for properties with similar use, e.g., recreation and parks properties, school properties. The GHP shall include, but not be limited to:

i. A description of property management activities;
ii. A map of the locations of properties covered by the GHP;
iii. A list of potential pollutants and their sources that result from facility activities;
iv. Written procedures designed to reduce the potential for stormwater pollution from property activities, including illicit discharges, dumping, and spills;
v. Written procedures for annually assessing County/City/Agency properties in order to prevent the discharge of pollutants, spills, and leaks into its municipal separate storm sewer system; and
vi. Annual training for all appropriate County/City/Agency staff and contractors regarding best practices for preventing, reducing, and eliminating the discharge of

pollutants during property activities.

c. The County/City/Agency shall continue to implement a program to reduce pollutants associated with the maintenance of jurisdiction-wide properties including local roads and parks. The maintenance program shall include the following activities where applicable:

i. Street sweeping;
ii. Inlet inspection and cleaning;
iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management;
iv. Litter removal; and
v. Pet waste removal.

d. The County/City/Agency shall reduce the use of winter weather deicing and anti-icing materials by developing a County/City/Agency Salt Management Plan (SMP) to be submitted to MDE in its third year annual report and implemented thereafter. The SMP shall be based on the guidance provided on best road salt management practices described in *the Maryland Department of Transportation, State Highway Administration's Maryland Statewide Salt Management Plan, October 2017*. The County/City/Agency's SMP shall include, but not be limited to:

i. An anticipated schedule of equipment replacement that provides for technological improvements that regulate material application rates;
ii. Training and outreach:
- Creating a local "Salt Academy" that annually provides County/City/Agency winter weather operator personnel and contractors with the latest training in deicer and anti-icer management, or the participation of County/City/Agency personnel and contractors in a "Salt Academy" administered by another MS4 permittee or State agency; and
- Developing best salt management practices outreach for educating homeowners within the County/City/Agency; and

iii. Tracking and reporting:
- Starting with the fourth annual report, during storm events where deicing or anti-icing materials are applied to County/City/Agency roads, track and record the amount of materials used and snowfall per event; and
- Report the deicing or anti-icing application by event or date, and the monthly and annual tonnage used per lane mile per inch of snow.

e. The County/City/Agency shall report annually on the changes in its

Property Management and Maintenance programs and the overall pollutant reductions resulting from this program.

6. Public Education

The County/City/Agency shall continue to implement a public education and outreach program to reduce stormwater pollutants. Education and outreach efforts may be integrated with other aspects of the County/City/Agency's activities. These efforts are to be documented and summarized in each annual report, with details on resources (e.g., personnel and financial) expended and method of delivery for education and outreach. The County/City/Agency shall implement a public outreach and education campaign with specific performance goals and deadlines including, but not limited to:

a. Maintaining a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

b. Providing information to inform the general public about the benefits of:

i. Increasing water conservation;
ii. Residential and community stormwater management implementation and facility maintenance;
iii. Proper erosion and sediment control practices;
iv. Increasing proper disposal of household hazardous waste;
v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal);
vi. Residential car care and washing;
vii. Litter reduction;
viii. Reducing, reusing, and recycling solid waste; and
ix. Proper pet waste management.

E. Restoration for Total Maximum Daily Loads and Chesapeake Bay

This section is under development..

F. Assessment of Controls

XXXXX County/City/Agency shall conduct BMP effectiveness and watershed assessment monitoring for tracking progress toward improving local water quality and restoring Chesapeake Bay.

1. BMP Effectiveness Monitoring

By April 10, 2020, the County/City/Agency shall notify MDE which option it chooses for BMP effectiveness monitoring. The two options are:

a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by the Chesapeake Bay Trust (CBT) for determining monitoring needs and selecting appropriate monitoring studies. To implement the required monitoring, the County/City/Agency shall pay $100,000 into a pooled monitoring CBT fund by July 1 of each year. Enrollment in the program shall be demonstrated through a memorandum of understanding (MOU) between the County/City/Agency and CBT. The County/City/Agency shall remain in the program for the duration of this permit term; or

b. The County/City/Agency shall continue monitoring the (*said*) outfall and (*said*) in-stream station in the (*said*) watershed, or select and submit for MDE's approval a new BMP effectiveness study for monitoring by April 10, 2020. Monitoring activities shall occur where the cumulative effects of watershed restoration activities, performed in compliance with this permit, can be assessed. The minimum criteria for chemical, biological, and physical monitoring are as follows:

i. Chemical Monitoring:

- Twelve (12) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If exceptional weather patterns (e.g., dry weather periods) or other circumstances (e.g., equipment failures) occur during the reporting year, the City/County/Agency shall provide documentation of such circumstance(s). A minimum of eight (8) storm events shall be monitored;
- Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods;
- At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136, and event mean concentrations (EMCs) shall be calculated;
- Baseflow sampling shall occur quarterly at the mid-point of each season, e.g., February 15 for the first quarter, June 15 for the second quarter.
- Stormwater flow and baseflow measurements shall be recorded at the outfall and in-stream stations for the following parameters:

Stormwater and Baseflow Representative Samples

(Parameters)
Total Suspended Solids (TSS)
Bacteria (*E.coli* or *Enterococcus* spp.)
Chloride
Discharge (flow)
Biological Oxygen Demand (BOD) or TOC
Orthophosphate
Total Nitrogen (TN)
Nitrate + Nitrite
Total ammonia (sewer signal)
Total Phosphorus (TP)

- Continuous measurements shall be recorded for the parameters listed below at the in-stream monitoring station or other practical location based on the approved study design;

Continuous Measurements (Parameters)
Temperature
pH
Discharge (flow)
Turbidity
Conductivity

- Data collected from stormwater, baseflow, and continuous monitoring shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models;
- An approved sampling plan under a prior MS4 permit for the County/City/Agency may continue until a new sampling plan is proposed under this permit.

ii. Biological Monitoring:

- Benthic macroinvertebrate samples shall be gathered each spring between the outfall and in-stream stations or other practical locations based on an MDE approved study design; and
- The County/City/Agency shall use the Maryland Biological Stream Survey (MBSS) sampling protocols for biological and stream habitat assessment.

iii. Physical Monitoring:

- A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a

reasonable area based on the approved study design. This assessment shall include annual comparison of permanently monumented stream channel cross-sections and the stream profile; and

- A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

iv. Annual Data Submittal: The County/City/Agency shall describe in detail its monitoring activities for the previous year and include the following:

- EMCs submitted on MDE's long-term monitoring MS4 Geodatabase as specified in PART V below;
- Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations;
- Any available analysis of surrogate relationships with the above monitoring parameters; and
- Any requests and accompanying justifications for proposed modifications to the monitoring program.

2. [County/City/Agency] Watershed Assessment and Trend Monitoring

By April 10, 2020, the County/City/Agency shall notify MDE which option it chooses for watershed assessment monitoring. The two options are as follows:

a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by CBT for determining appropriate watershed assessment monitoring. To implement the required monitoring, the County/City/Agency shall pay (between $150,000 and $200,000 based on the number of local TMDL assessments required) annually into a pooled monitoring CBT fund by July 1 of each year. Enrollment in the program shall be demonstrated through an MOU between the County/City/Agency and CBT. The County/City/Agency shall remain in the program for the duration of this permit term; or

b. The County/City/Agency shall submit a comprehensive plan for watershed monitoring by April 10, 2021 related to stream biology and habitat, bacteria, and chlorides for MDE's approval. The plan shall include:

i. Biological and habitat assessment monitoring at randomly selected stream sites using MBSS protocols;

ii. Bacteria, i.e., *E.coli*, *Enterococcus* spp., or fecal coliform monitoring; and
iii. Chloride assessments at two locations.

G. Program Funding

1. Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted by XXXXX County/City/Agency as required in PART V below.

2. Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. Annual Reporting

1. Annual progress reports, required under 40 CFR §122.42(c), will facilitate the long-term assessment of XXXXX County/City/Agency's NPDES stormwater program. The County/City/Agency shall submit annual reports on or before the anniversary date of this permit and post these reports on the County/City/Agency's website. All information, data, and analyses shall be based on the State's fiscal year and include:

   a. An executive summary on the status of implementing the County/City/Agency's MS4 programs that are established as permit conditions including:

      i. Permit Administration;
      ii. Legal Authority;
      iii. Source Identification;
      iv. Stormwater Management;
      v. Erosion and Sediment Control;
      vi. Illicit Discharge Detection and Elimination;
      vii. Litter and Floatables;
      viii. Property Management and Maintenance;
      ix. Public Education;
      x. Restoration for Total Maximum Daily Loads and Chesapeake Bay;
      xi. Assessment of Controls; and
      xii. Program Funding.

   b. A narrative summary describing the results and analyses of data, including monitoring data that is accumulated throughout the reporting year;

c. Expenditures for the reporting period and the proposed budget for the upcoming year;

d. A summary describing the number and nature of enforcement actions, inspections, and public education programs;

e. The identification of water quality improvements and documentation of attainment and/or progress toward attainment of schedules, benchmarks, deadlines, and applicable stormwater WLAs developed under EPA approved TMDLs; and

f. The identification of any proposed changes to the County/City/Agency's program when stormwater WLAs are not being met.

2. All annual reporting specified in PARTs IV.C, D, E, F, and G, or required anywhere within this permit shall be made using the *Maryland Department of the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017).* A corresponding User's Guide provides guidance for data requirements and entry into the MS4 Geodatabase.

3. Because this permit uses an iterative approach to implementation, the County/City/Agency must evaluate the effectiveness of its programs in each annual report. BMP and program modifications shall be made within 12 months if the County/City/Agency's annual report does not demonstrate compliance with this permit and show progress toward meeting stormwater WLAs developed under EPA approved TMDLs.

B. Program Review

In order to assess the effectiveness of XXXXX County/City/Agency's NPDES stormwater program for reducing the discharge of pollutants to the MEP and working toward meeting water quality standards, MDE will review annual reports, conduct field inspections, and periodically make requests for additional data to determine permit compliance. Procedures for the review of local erosion and sediment control and stormwater management programs exist in Maryland State law and regulations. Additional evaluations and field inspections shall be conducted for IDDE, public property management, assessment of controls, and impervious surface area and Chesapeake Bay restoration to determine compliance with permit conditions.

C. Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than 5 years unless administratively continued by MDE. Continuation or reissuance of this permit beyond this permit term will

require XXXXX County/City/Agency to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. Failure to reapply for coverage constitutes a violation of this permit.

As part of this application process, the County/City/Agency shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how each County/City/Agency watershed has been thoroughly evaluated, and the status of implementing water quality improvement projects and all schedules, benchmarks, and deadlines toward meeting stormwater WLAs. This application shall be used to gauge the effectiveness of the County/City/Agency's NPDES stormwater program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

1. The County/City/Agency's NPDES stormwater program goals;

2. Program summaries for the permit term regarding:

   a. Illicit discharge detection and elimination results;

   b. Impervious Surface and Chesapeake Bay Restoration status including County/City/Agency totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting stormwater WLAs developed under EPA approved TMDLs;

   c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved;

   d. Other relevant data and information for describing County/City/Agency programs;

3. Program operation and capital improvement costs for the permit term; and

4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the County/City/Agency's efforts to comply with the conditions of this permit.

PART VI. SPECIAL PROGRAMMATIC CONDITIONS

A. Maryland's baseline programs, including the 1991 Forest Conservation Act, 1997 Priority Funding Areas Act, 2007 Stormwater Management Act, 2009 Smart, Green & Growing Planning Legislation, 2010 Sustainable Communities Act, 2011 Best Available Technology Regulation, and the 2012 Sustainable Growth & Agricultural Preservation Act effectively mitigate the majority of the impacts from new development. Any additional loads will be offset through Maryland's alignment for growth policies and

procedures as articulated through Chesapeake Bay milestone achievement. The overriding goal shall be no net growth in loads and XXXXX County/City/Agency shall reflect these policies, programs, and implementation as part of its net WLA accounting as stipulated in Part IV.E.4.b.ii of this permit.

PART VII. ENFORCEMENT AND PENALTIES

A. Discharge Prohibitions and Receiving Water Limitations

XXXXX County/City/Agency shall prohibit non-stormwater discharges through its MS4. NPDES permitted non-stormwater discharges are exempt from this prohibition. Discharges from the following will not be considered a source of pollutants when properly managed: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration to separate storm sewers; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation waters; springs; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; de-chlorinated swimming pool discharges (not including filter backwash); street wash water; and firefighting activities.

Consistent with §402(p)(3)(B)(iii) of the CWA, the County/City/Agency shall take all reasonable steps to minimize or prevent the contamination or other alteration of the physical, chemical, or biological properties of any waters of the State, including a change in temperature, taste, color, turbidity, or odor of the waters or the discharge or deposit of any organic matter, harmful organism, or liquid, gaseous, solid, radioactive, or other substance into any waters of the State, that will render the waters harmful to:

1. Public health, safety, or welfare;

2. Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial use;

3. Livestock, wild animals, cats, or birds; and

4. Fish or other aquatic life.

B. Duty to Mitigate

XXXXX County/City/Agency shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

C. Duty to Comply

XXXXX County/City/Agency shall be responsible for complying with all conditions

of this permit. Other entities may be used to meet various permit obligations provided that both the County/City/Agency and the other entity agree contractually. Regardless of any arrangement entered into however, the County/City/Agency remains responsible for permit compliance. In no case may this responsibility or permit compliance liability be transferred to another entity.

Failure to comply with a permit provision constitutes a violation of the CWA and is grounds for enforcement action; permit termination, revocation, or modification; or denial of a permit renewal application. The County/City/Agency shall comply at all times with the provisions of the Environment Article, Title 4, Subtitles 1, 2, and 4; Title 7, Subtitle 2; and Title 9, Subtitle 3 of the Annotated Code of Maryland.

The County/City/Agency shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the County/City/Agency to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the County/City/Agency only when the operation is necessary to achieve compliance with the conditions of the permit.

D. Sanctions

1. Penalties Under the CWA - Civil and Criminal

Section 309(g)(2) of the CWA, 33 USC §1319(g)(2) provides that any person who violates any permit condition is subject to a civil penalty not to exceed $10,000 per day for each violation, not to exceed $125,000. Pursuant to the Civil Monetary Penalty Inflation Adjustment Rule, 40 CFR Part 19, any person who violates any NPDES permit condition or limitation is liable for an administrative penalty not to exceed $16,000 per day for each such violation, up to a total penalty of $177,500. Pursuant to Section 309(c) of the CWA, 33 USC §1319(c), any person who negligently violates any permit condition is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. Any person who knowingly violates any permit condition is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both.

2. Penalties Under the State's Environment Article - Civil and Criminal

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the County/City/Agency from civil or criminal responsibilities and/or penalties for a violation of Title 4, Title 7, and Title 9 of the Environment Article, Annotated Code of Maryland, or any federal, local, or other State law or regulation. Section 9-342 of the Environment Article

provides that a person who violates any condition of this permit is liable to a civil penalty of up to $10,000 per violation, to be collected in a civil action brought by MDE, and with each day a violation continues being a separate violation. Section 9-342 further authorizes MDE to impose upon any person who violates a permit condition, administrative civil penalties of up to $5,000 per violation, up to $50,000.

Section 9-343 of the Environment Article provides that any person who violates a permit condition is subject to a criminal penalty not exceeding $25,000 or imprisonment not exceeding 1 year, or both for a first offense. For a second offense, Section 9-343 provides for a fine not exceeding $50,000 and up to 2 years imprisonment.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who knowingly makes any false statement, representation, or certification in any records or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

E. Permit Revocation and Modification

1. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by XXXXX County/City/Agency for a permit modification or a notification of planned changes or anticipated noncompliance does not stay any permit condition. A permit may be modified by MDE upon written request by the County/City/Agency and after notice and opportunity for a public hearing in accordance with and for the reasons set forth in COMAR 26.08.04.10.

After notice and opportunity for a hearing and in accordance with COMAR 26.08.04.10, MDE may modify, suspend, or revoke and reissue this permit in whole or in part during its term for causes including, but not limited to the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. A change in any condition that requires either a temporary reduction or elimination of the authorized discharge;

d. A determination that the permitted discharge poses a threat to human health or welfare or to the environment and can only be regulated to acceptable levels by permit modification or termination;

e. To incorporate additional controls that are necessary to ensure that the permit effluent limit requirements are consistent with any applicable TMDL WLA allocated to the discharge of pollutants from the MS4; or

f. As specified in 40 CFR §§122.62, 122.63, 122.64, and 124.5.

2. Duty to Provide Information

The County/City/Agency shall furnish to MDE, within a reasonable time, any information that MDE may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit. The County/City/Agency shall also furnish to MDE, upon request, copies of records required to be kept by this permit.

F. Inspection and Entry

XXXXX County/City/Agency shall allow an authorized representative of the State or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulatory activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and obtain copies at reasonable times of any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times, without prior notice, any construction site, facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

G. Monitoring and Recordkeeping

Unless otherwise specified by this permit, all monitoring and records of monitoring shall be in accordance with 40 CFR §122.41(j).

H. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State or local law or regulations.

I. Severability

The provisions of this permit are severable. If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect. If the application of any provision of this permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

J. Signature of Authorized Administrator and Jurisdiction

Each application, report, or other information required under this permit to be submitted to MDE shall be signed as required by COMAR 16.08.04.01-1. Signatories shall be a principal executive officer, ranking elected official, or other duly authorized employee.

_____ _____

Lee Currey, Director **Date**
Water and Science Administration

Appendix A

TMDLs and Local Stormwater WLAs

(will be unique to each jurisdiction)

From: "Karl Berger" <kberger@mwcog.org>
Sent: Tue, 27 Aug 2019 20:22:18 +0000
To: "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>
Cc: "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>; "Knapp, Les" <lknapp@mdcounties.org>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen Wiggen" <wiggenk@charlescounty.org>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>
Subject: MS4 Phase I group comment on project portfolio pending requirement

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Jennifer:

On behalf of the full Phase I MS4 group, I am sending the following message regarding the status of project portfolios in the new permit.

> Given the August 30 deadline for the largest Phase 1 MS4 jurisdictions to submit their first-year project portfolios – as stated by MDE in the MACo-MDE Phase I MS4 meeting held August 14, 2019 - we are requesting immediate clarification on the intended status of that portfolio in the next round of permits.
>
> If the portfolio is intended to provide an advisory list of projects each jurisdiction intends to complete in a given year, to be updated with each annual report, then it is likely that MDE, with jurisdiction approval, could simply cull that information from the MEP restoration portfolios that have already been submitted.
>
> In the meeting, counties expressed concern that MDE not include consent decree elements in permits, such as enforceable annual benchmarks. Project plans can change for a myriad of reasons, ranging from land acquisition issues to public support and field constraints. MDE expressed a desire to avoid incorporating state legislative requirements in the form of Financial Assurance Plans into the MS4 permit. Counties support this. We also would like to avoid duplicative reporting requirements. We respectfully suggest that MDE's requirements for annual submissions be informational and streamlined, and include the flexibility to adjust individual projects and schedules. The counties would like to work with MDE in good faith to ensure that counties and MDE can provide what is being requested by EPA while avoiding unreasonably stringent permit requirements that will subject permittees to enforcement or citizen suits.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

From: "Grove, Kimberly (DPW)"
Sent: Wed, 28 Aug 2019 21:03:48 +0000
To: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Subject: RE: Missing items in MEP Analysis

Sorry for the delays. We struggled last week with more internet /server connection issues. I have just a few questions.

I sent the MEP capacity questionnaire on August 9, which included the project portfolio as question 8. That is being revised to match the excel format that you sent me on August 16. I do, though want to confirm that the structural / ESD projects completed prior to 2019 under partnerships could be used towards the next permit in this portfolio, since Baltimore met the 20% restoration requirement of the current permit. Otherwise, the ISR looks pitiful if just confined to Chapter 3 / 5 projects. The financial capacity spreadsheet will be sent with a narrative explanation of the resources used for the data by Monday, although I still have not received the data for 6 c to 6 e from our finance department.

My only questions are:

- What do you mean by "comprehensive report"?
- Is there a format for the Year 1 portfolio projects due at the end of the week? What is the timeframe for that Year 1, FY 2021?

Thanks,

Kimberly L. Grove, P.E.
Chief, Office of Compliance & Laboratories
Baltimore City Department of Public Works
(410) 396 - 0732 (office)
(443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Wednesday, August 28, 2019 4:50 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: Missing items in MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Hi Kim,

We wanted to follow up and see how you were doing with completing the portfolio, financial capacity spreadsheet, and the comprehensive report. Did you have any questions? Did you want to submit a completed portion while you work on another section?

Thanks,
Brian

On Fri, Aug 16, 2019 at 2:18 PM Brian Cooper -MDE- <brian.cooper@maryland.gov> wrote:

> Hi Kim,
>
> That's OK. Please find attached the letters, guidance documents, and template spreadsheet that may be used for completing the portfolio and comprehensive MEP report.
>
> Let us know if you have any questions?
> Brian
>
> On Fri, Aug 16, 2019 at 12:44 PM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:
>
> > I thought I did have the right form. Let's be safe, please send me the spreadsheet that you want me to use.
> >
> > **From:** Stewart Comstock -MDE- [mailto:stewart.comstock@maryland.gov]
> > **Sent:** Friday, August 16, 2019 12:15 PM
> > **To:** Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
> > **Cc:** Brian Cooper -MDE- <brian.cooper@maryland.gov>; Raymond Bahr <raymond.bahr@maryland.gov>; Jennifer Smith -MDE- <jenniferm.smith@maryland.gov>
> > **Subject:** Missing items in MEP Analysis
> >
> > [THIS EMAIL IS FROM AN EXTERNAL SENDER]
> >
> > Kim...
> >
> > We need the "MEP Narrative" (combined physical/financial), the completed (to the best of your ability recognizing that what is provided will end up in the Fact Sheet), and the list of projects. This last item was provided to us, but not in the format requested. If you did not receive the original package with the spreadsheet, let me know. Thanks! Stew C.
> >
> > --
> > ***Stewart R. Comstock, P.E.***
> > Program Review Division Chief
> > Sediment, Stormwater, & Dam Safety Program, WSA
> > Maryland Department of the Environment
> > 1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

Click here to complete a three question customer experience survey.

--
Brian E. Cooper
Natural Resources Planner
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard | Baltimore, MD 21230-1708
410.537.3653

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Brian E. Cooper
Natural Resources Planner
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard | Baltimore, MD 21230-1708
410.537.3653

Click here to complete a three question customer experience survey.

From: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>
Sent: Thu, 29 Aug 2019 15:45:51 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Subject: Re: Missing items in MEP Analysis
Attachments: BC 2017 AR Final.pdf

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Hi Kim,

I'm sorry to hear about your internet/server troubles. Responses to your questions are below.

- Yes, the additional acres from structural / ESD projects completed prior to 2019 under partnerships may be used towards the next permit in this portfolio.
- Please go ahead and submit the financial capacity spreadsheet without including answers to 6c - 6e. Provide a brief statement in the narrative explaining why those answers were not included.
- The "comprehensive report", referenced in MDE's May 17, 2019 letter, combines the questionnaires and spreadsheets into a single narrative. The letter states:

  > "The Department requests that each jurisdiction combine information from the Restoration Project Portfolio, Physical Capacity, and Financial Capacity components in to one comprehensive MEP Report. The Report shall include a narrative on all three components that explains why the Restoration Project Portfolio represents the most that a jurisdiction can achieve during its five-year permit term. For example, the answers to the Physical Capacity questionnaire, e.g., budget approvals, availability of contractors, project scheduling, permitting limitations, and the information provided in the FCA spreadsheet, e.g., median household incomes, socio-economic limitations, bond ratings, debt services, should provide the local data and context for determining a Restoration Project Portfolio MEP."

  MDE's August 16, 2019 email includes an attachment (i.e., "Part IV. Recommendations on Evaluating Financial Capacity as Part of an MEP Analysis") that provides more guidance on how to tie things together.

- The first year portfolio can be provided using the spreadsheet format found in the Restoration Portfolio. MDE is working on the time frame for year 1 and will provide additional guidance soon.

Also, in MDE's May 9, 2018 letter, the City was asked to submit additional information so that the TMDL implementation plans may be approved (see attached). Is the City ready to submit all of the additional information?

Thanks,
Brian

On Wed, Aug 28, 2019 at 5:03 PM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

Sorry for the delays. We struggled last week with more internet /server connection issues. I have just a few questions.

I sent the MEP capacity questionnaire on August 9, which included the project portfolio as question 8. That is being revised to match the excel format that you sent me on August 16. I do, though want to confirm that the structural / ESD projects completed prior to 2019 under partnerships could be used towards the next permit in this portfolio, since Baltimore met the 20% restoration requirement of the current permit. Otherwise, the ISR looks pitiful if just confined to Chapter 3 / 5 projects. The financial capacity spreadsheet will be sent with a narrative explanation of the resources used for the data by Monday, although I still have not received the data for 6 c to 6 e from our finance department.

My only questions are:

- What do you mean by "comprehensive report"?
- Is there a format for the Year 1 portfolio projects due at the end of the week? What is the timeframe for that Year 1, FY 2021?

Thanks,

Kimberly L. Grove, P.E.

Chief, Office of Compliance & Laboratories

Baltimore City Department of Public Works

(410) 396 - 0732 (office)

(443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Wednesday, August 28, 2019 4:50 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: Missing items in MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Hi Kim,

We wanted to follow up and see how you were doing with completing the portfolio, financial capacity spreadsheet, and the comprehensive report. Did you have any questions? Did you want to submit a completed portion while you work on another section?

Thanks,

Brian

On Fri, Aug 16, 2019 at 2:18 PM Brian Cooper -MDE- <brian.cooper@maryland.gov> wrote:

> Hi Kim,
>
> That's OK. Please find attached the letters, guidance documents, and template spreadsheet that may be used for completing the portfolio and comprehensive MEP report.
>
> Let us know if you have any questions?
>
> Brian

On Fri, Aug 16, 2019 at 12:44 PM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> I thought I did have the right form. Let's be safe, please send me the spreadsheet that you want me to use.

From: Stewart Comstock -MDE- [mailto:stewart.comstock@maryland.gov]
Sent: Friday, August 16, 2019 12:15 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
Cc: Brian Cooper -MDE- <brian.cooper@maryland.gov>; Raymond Bahr <raymond.bahr@maryland.gov>; Jennifer Smith -MDE- <jenniferm.smith@maryland.gov>
Subject: Missing items in MEP Analysis

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Kim...

We need the "MEP Narrative" (combined physical/financial), the completed (to the best of your ability recognizing that what is provided will end up in the Fact Sheet), and the list of projects. This last item was provided to us, but not in the format requested. If you did not receive the original package with the spreadsheet, let me know. Thanks! Stew C.

--

Stewart R. Comstock, P.E.
Program Review Division Chief

Sediment, Stormwater, & Dam Safety Program, WSA

Maryland Department of the Environment

1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

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Brian E. Cooper
Natural Resources Planner
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard | Baltimore, MD 21230-1708
410.537.3653

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Click here to complete a three question customer experience survey.

--

Brian E. Cooper
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1800 Washington Boulevard | Baltimore, MD 21230-1708
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Click here to complete a three question customer experience survey.

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

May 9, 2018

Mr. Rudolph S. Chow, P.E.
Director
Baltimore City Department of Public Works
600 Abel Wolman Municipal Building
Baltimore, MD 21202

Dear Mr. Chow:

The Maryland Department of the Environment (the Department) has reviewed Baltimore City's 2017 Annual Report submitted on December 27, 2017 for its National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit 11-DP-3315 (MD0068292). This review is provided as Attachment 1. In addition, this letter serves as the approval of the City's bacteria total maximum daily load (TMDL) implementation plans for the Herring Run, Gwynns Falls, Jones Falls, and the Patapsco River Lower North Branch. Comments on the remaining TMDL implementation plans are included as Attachment 2.

While most of the City's stormwater programs are progressing well, there is one major exception. Several of the City's TMDL implementation plans are missing information needed for the Department's approval. We request that the City submit the information in Attachment 2 to the Department by September 15, 2018 so that these TMDL implementation plans may be approved before expiration of the City's current MS4 permit on December 26, 2018.

The City reports that 3,953 impervious acres of impervious surface area restoration has been completed during the current permit term. This is about 92% of its restoration requirement of 4,291 acres. If the City determines that the impervious area restoration requirement will not be met by the end of the permit term, then the Department should be contacted presently to discuss alternatives, including permit modification or a consent order, to address this requirement.

The Department recognizes the effort required in implementing a successful stormwater management program. This effort is essential in our mutual goal of restoring urban streams and the Chesapeake Bay, and the City is commended for its commitment to and accomplishments of this program. If you should have any questions regarding this review, please contact me at 410-537-3567 or Jennifer M. Smith, Program Manager, Sediment, Stormwater and Dam Safety Program at 410-537-3561, or jenniferm.smith@maryland.gov.

Sincerely,

D. Lee Currey, Director
Water and Science Administration

Enclosures
cc: Kim Grove, P.E., Baltimore City Office of Compliance and Laboratories

Attachment 1
Maryland Department of the Environment's (MDE) Review of Baltimore City's 2017 Municipal Separate Storm Sewer System (MS4) Annual Report

MS4 Permit Conditions	MDE Assessment and Recommendations
PART V.A Annual Reporting	• Baltimore City's Annual Report, which covers fiscal year (FY) 2017 (i.e., July 1, 2016 to June 30, 2017), is the fourth report for the current permit. • The report was received on December 27, 2017.
PART IV.A Permit Administration	• Baltimore City submitted an updated organizational chart outlining the various City departments and their individual permit responsibilities (e.g., source identification, public education). The Department of Public Works (DPW) is responsible for coordinating permit related activities and implementing the majority of permit conditions. The Departments of Planning, Recreation and Parks, and Housing and Community Development also contribute to meeting various permit conditions like public education.
PART IV.B Legal Authority	• Baltimore City continued to maintain adequate legal authority for compliance with all permit conditions.
PART IV.C Source Identification	• The City has nearly completed the process of migrating information into MDE's Geodatabase format. The City's report included a summary of the migration's progress (see Table 2-2). With the submittal of the FY2017 report, the City has provided complete information except for the *BMP* table, and the *Outfall*, *BMPPOI,* and *BMPDrainageArea* feature classes. Also, as there are no septic systems or shoreline management practices within the City, the associated feature classes (e.g., *ALTBMPPoint*) have not been populated. • As discussed in previous reviews, MDE accepted the City's proposal for completing the urban best management practice (BMP) database by December 2018. In the FY2016 report, the City estimated that 711 BMPs were approved between 2005 and 2015. • The City has included in the FY2017 report information on 1,162 BMPs including: o 283 BMPs listed within the *BMP* table. All are identified as structural practices (i.e., the value for field *BMP_CLASS* is "S"). However, 63 of these are environmental site design (ESD) practices (i.e., 51 are micro-scale practices, 10 are alternative surfaces, and 2 are nonstructural practices) and the value for *BMP_CLASS* should be "E". MDE reported similar values in the FY2016 review and requested that these values be corrected for the current (FY2017) Annual Report. o 879 BMPs listed within the *RestBMP* feature class. All of these are listed as individual practices, and represent an increase of 210 more records than reported in FY2016. Of these, 231 are identified as complete (i.e., IMPL_STATUS = Complete); the remaining 648 are shown as planned (i.e., IMPL_STATUS = Planning) for future implementation. o Of the 1,162 records within the *BMP* table and *RestBMP* feature class, 884 represent individual BMPs that have been constructed (i.e.,

Attachment 1
MDE's Review of Baltimore City's
2017 MS4 Annual Report

MS4 Permit Conditions	MDE Assessment and Recommendations
PART IV.C Source Identification (cont.)	BUILT_DATE ≠ 1/1/1900 or 12/21/2099). o The City recognized in FY2016 that the current database is incomplete and has provided a schedule for correcting this issue. o The City has met the requirements of PART IV.C.1, 2, 4, 5, and 6. The City is taking the necessary steps to address PART IV.C.3.
PART IV.D.1 Stormwater Management	• For FY2017, the City reported the following: o 175 concept plans, 135 site development plans, and 135 final plans were received; o 150 stormwater management exemptions were issued for projects that disturbed < 5,000 square feet; o No water quality management waivers were requested. However, 22 quantity management waivers were requested and granted; and o As-built drawings were approved for 14 stormwater management BMPs. • The City's Office of Compliance and Laboratories (OCL) conducts inspections for both erosion and sediment control (ESC), and stormwater management (SWM). In FY2017, 1,064 of the joint inspections conducted were construction inspections for stormwater management. No stormwater management related violations were issued as a result of these inspections. • During the entire reporting period, 157 inspections were conducted for preventative maintenance on ESD and structural stormwater facilities. Of these, three required follow-up inspections and two resulted in identifying facilities to be removed. • The City has increased the number of construction inspections conducted since FY2016. The City is commended for its effort in this area.
PART IV.D.2 Erosion and Sediment Control	• The City reported having six inspectors and one supervisor in FY2017 for implementing the erosion and sediment control program. • In FY2017, the City received 157 service requests that were related to erosion and sediment control and that resulted in inspections. • In FY2017, there were 262 active grading permits within the City's jurisdiction. Of these, 110 were permits issued in FY2017. The total disturbed area for the active grading permits was 867 acres. The City also had 150 other active permits (e.g., standard plans), all of which were issued in FY2017. The total disturbed area for these permits was 4 acres. • The City conducted 2,766 inspections for compliance with approved ESC plans. Additionally, the City issued 3 stop work orders and 5 violation notices, and collected $16,200 associated with 5 fines levied. • The City submitted information to MDE regarding 27 projects with earth disturbances exceeding one acre (see Appendix C of the Report). • MDE's last evaluation of the City's ESC program was in October 2017 (i.e., FY2018). In that review, MDE found problems with seeding or reseeding, the maintenance or installation of stabilized construction entrances, and that filtering devices were either not installed correctly or required maintenance.

Attachment 1
MDE's Review of Baltimore City's
2017 MS4 Annual Report

MS4 Permit Conditions	MDE Assessment and Recommendations
PART IV.D.2 Erosion and Sediment Control (cont.)	The City is implementing improvements as a result of the field audit, including additional training of new inspectors to ensure consistent enforcement on construction sites. As a result, MDE judged the, the City's ESC program enforcement to be effective and authority granted for an additional two years. • The City has met the requirements of PART IV.D.2.
PART IV.D.3 Illicit Discharge Detection and Elimination (IDDE)	• The City conducts an MDE-approved alternative program that includes ammonia screening (AS), stream impact sampling (SIS), and pollution source tracking (PST) to detect and track illicit discharges. This includes a weekly analysis of 45 outfalls and a monthly screening of an additional 43 locations. In FY2017, the City also surveyed smaller storm drain systems along the East Baltimore Harbor and additional outfalls in response to water quality complaints by Blue Water Baltimore (BWB). In summary, the City initiated 178 PST investigations in FY2017, continued another 28 that were initiated prior to FY2017, and identified 125 illicit discharges. As a result, 98 of the illicit discharges were abated, 22 were located and are awaiting repairs, and 5 illicit discharges that could not be located were still being investigated. The details of all of the PST investigations were provided in Appendix I. Because of the proactive implementation of its IDDE program, the City continued to successfully detect and eliminate illicit discharges. • The City continued to survey commercial and industrial watersheds to discover and eliminate pollutant sources. For example, the City's fats, oils, and grease (FOG) program that targets food service establishments included 3,999 inspections in FY2017. This is a 10% increase from the 3,623 inspections in FY2016, and resulted in 1,948 notices of violation and 30 consent agreements issued to the 1,404 non-compliant establishments. • The City continued to administer a waste control program for exterior lead paint removal. In FY2017, the City issued permits to 287 sites. City inspectors made 265 site visits and issued 55 stop work notices. As a result, there were no documented discharges of exterior lead paint to the storm drain system. • The City's program to address illegal discharges, dumping, and spills included public outreach through the distribution of information and materials at festivals, at community meetings, and in utility bills. The City also maintains a citizen reporting system through a "3-1-1" call service, internet, and mobile phone. • The City has met the reporting requirements of PART IV.D.3.e. • MDE commends the City for collaborating with local environmental groups to further identify and eliminate illicit discharges, including cooperation with BWB and support for the Chesapeake Bay Trust Watershed Assistance grant awarded to the non-profit organization "Ridge to Reefs" for IDDE efforts in the field-testing of new equipment.

Attachment 1
MDE's Review of Baltimore City's
2017 MS4 Annual Report

MS4 Permit Conditions	MDE Assessment and Recommendations
PART IV.D.4 Trash and Litter	• The City submitted the status report on efforts underway in support of the implementation plan for the Middle Branch/Northwest Branch trash total maximum daily load (TMDL.) These efforts included continuing programs established in FY2015 like City-wide mechanical street sweeping (see below), styrofoam collection, public education (see below), and storm drain art programs. • The City initiated a City-wide Municipal Trash Can program in March 2016 (FY2016). This program, which ended in FY2017, distributed approximately 171,000 trash cans to households within the City. While a more detailed analysis of this program is promised for the FY2018 report, initial reconnaissance indicates that the program has resulted in an improvement in the cleanliness of City alleys. • In FY2016, the City conducted Phase I of the inlet modification/inlet cleaning program by modifying 414 inlets in selected neighborhoods with screens and inserts to prevent trash from entering the storm drain system. In FY2017, the City removed 26 tons of debris from 1,128 inlets within the targeted neighborhoods. • In April 2017, the City initiated a program that encourages small haulers of trash and debris to use the Northwest Transfer Station to dispose of their loads. Although this program was initiated late in FY2017, the City reports that 5,535 small haulers have used the facility resulting in the collection of approximately 3,171 tons of waste. • As part of coordinated efforts to reduce violence, the City concentrated municipal services within four targeted zones. As part of these efforts, the City expedited service requests for cleaning streets and removing debris from targeted areas.
PART IV.D.5 Property Management & Maintenance	• The number of miles swept (110,593 miles) and amount of debris collected (11,902 tons) decreased from previous reporting years. However, there was also a decrease in material loading to the streets (tonnage per mile). This decrease may be attributed to other trash reduction strategies described above. • The City continued its work to install inlet screens to increase the efficiency of its routine inlet cleaning activities. • The City continued to track pesticide and fertilizer use, implement integrated pest management, provide annual training, and register certified applicators. Overall, herbicide use decreased dramatically (42 lbs. versus 429 lbs. of glyphosate acid) from the previous reporting year. • The City applied 10,672 tons of sodium chloride deicers, which is a decrease from the 20,994 tons used in FY2016. Deicers were used in 5 winter storms that totaled 3 inches of snow. The City should continue to track deicer application per storm event and per total inches of snow, and provide a brief analysis of these data explaining how the City is ensuring that deicer is applied in an efficient manner.

Attachment 1
MDE's Review of Baltimore City's
2017 MS4 Annual Report

MS4 Permit Conditions	MDE Assessment and Recommendations
PART IV.D.5 Property Management & Maintenance (cont.)	• The City submitted to MDE in FY2015 updated stormwater pollution prevention plans (SWPPPs) and NOIs for all City-owned facilities. Staff training regarding the site SWPPP was performed at the majority of facilities. MDE encourages the City to provide annual staff training at all facilities as recommended in the industrial stormwater permit. • The requirements of PART IV.D.5 have been met.
PART IV.D.6 Public Education	• The City maintains a "3-1-1" call service, internet, and mobile phone hotline that allow citizens to report water quality complaints, illicit discharges, illegal dumping, and spills. • The Annual Report included a summary of all outreach activities that were conducted, attended, and/or supported by the City's DPW during FY2017. • The City provided the results of the stormwater restoration fee "credit" program, which allows participants an opportunity to reduce their fees. The City conducted 28 events with 1,016 participants. The events resulted in the collection of 9.6 tons of trash and planting of 87 trees. • The City also provided information on the Baltimore City Growing Green Design Competition, the Baltimore Green Registry, the City's Stormwater Advisory Committee (SWAC), the Baltimore City Water Industry Career Mentoring Program, National Green Infrastructure Certification Program (NGICP), B'More Beautiful Program, the City's GROW centers, and the Mayor's Fall and Spring Clean-Ups. • The requirements of PART IV.D.6 have been met, and MDE commends the City for its effort in public outreach and education.
PART IV.E Restoration Plans and TMDLs	• The City drains into five 8-digit watersheds: Back River, Patapsco River, Gwynns Falls, Jones Falls, and the Baltimore Harbor. Watershed studies for the Gwynns Falls (2004), Jones Falls (2008), and Back River (2008) watersheds are complete. The City has completed the watershed assessments for the Patapsco River and Baltimore Harbor watersheds. Full assessment reports will be included with the FY2018 Annual Report (i.e., due December 26, 2018). • MDE approved the City's impervious area assessment (i.e., 4,291 acres) on July 28, 2015. In the Annual Report, the City provided information on local projects and programs that resulted in the restoration of 3,953 acres of impervious area in FY2017. This is equivalent to 92% of the current restoration requirement, or 18.4% of the baseline. Because many of the physical projects are in the design phase, the majority of this effort is provided through programs like street sweeping. Of this total, 385 acres were attributed to impervious area removal, City-wide implementation of small ESD projects (e.g., rain garden, bioretention, tree planting), and structural projects (e.g., stream restoration). An additional 3,347 acres were restored through ongoing City-wide programs, and in particular, through street sweeping.

Attachment 1
MDE's Review of Baltimore City's
2017 MS4 Annual Report

MS4 Permit Conditions	MDE Assessment and Recommendations
PART IV.E Restoration Plans and TMDLs (cont.)	• The City corrected 10 illicit connections, totaling 3.9 acres of impervious acre restoration. MDE has determined that this approach is reasonable and meets the intent of the previously approved septic connection credit. • The City's effort includes the restoration of 3,347 acres of imperviousness through its street sweeping, inlet cleaning, and IDDE programs. Because the implementation of these programs is not permanent and tends to fluctuate significantly from year to year, MDE continues to caution against their use for the majority of the City's restoration effort. • In the MS4 Restoration and TMDL Watershed Implementation Plan (WIP, June 2015), the City listed five programmatic milestones for FY2017. Of these, the City has completed the following: o Commenced working on stormwater planning in three neighborhoods; o Increased staff for the Office of Communications and Community Affairs for outreach activities; o Completed an analysis of City-owned facilities for impervious area removal and stormwater retrofits; and o Created a Memorandum of Understanding (MOU) with the Baltimore Office of Promotion and the Arts (BOPA) to incorporate art into stormwater projects. • Activity on the following programmatic milestones from FY2016 has been initiated and is ongoing: o The City continues to work with local universities for assistance (e.g., internships, research, stewardship) with water quality improvements; o The tree survey conducted in coordination with the U.S. Forest Service was completed; however, the final report has been delayed to allow verification of the collected data; o The City completed draft modifications to the review processes facilitating restoration practices and submitted them to MDE. These recommendations are currently under review; o The City completed the integrated database for tracking SWM/ESC plan review and inspections; o Revising the City's zoning codes with updated SWM requirements. The zoning codes were adopted in December 2016 and became effective in June 2017 (FY2017); o Developing standardized designs and calculations for ESD. Final details should be available in FY2018; o Developing BMP maintenance plans for City-owned facilities. Plans have been developed for DPW projects in FY2016. However, other agencies are still developing these plans. DPW has been providing training based on the National Green Infrastructure Certification program (NGICP) modules; o The City completed the "one-stop shop" for resources on pollutant reduction in FY2017;

Attachment 1
MDE's Review of Baltimore City's
2017 MS4 Annual Report

MS4 Permit Conditions	MDE Assessment and Recommendations
PART IV.E Restoration Plans and TMDLs (cont.)	○ The proposed workshops were replaced with the NGICP training conducted by the City in Fall 2016 and Spring 2017; and ○ Creating consistent information, messages, and signage for stormwater pollutant reduction. This effort is ongoing with the installation of individual BMPs. • Activity on the following programmatic milestones has not yet begun: ○ Develop an Memorandum of Understanding (MOU) with National Pollutant Discharge Elimination System (NPDES) Phase II MS4s and NPDES General Discharge Permittees concerning off-site mitigation within the City. This effort has been delayed as MDE issued the Phase II MS4 general permits on April 27, 2018 (i.e., FY2018); and ○ Complete the feasibility studies for private participation incentive programs and the use of recycled materials. This effort has been delayed until FY2018. • The City's Chesapeake Bay TMDL WIP included four project milestones for FY2017. While progress was made, the City was unable to completely meet each milestone. Each milestone and its status are: ○ Complete the watershed assessment reports for the Lower North Branch of the Patapsco River and the Baltimore Harbor. These reports were initiated in FY2017 and the completed versions will be included in the FY2018 Annual Report; ○ Restore 1.8 miles of stream channel. The City completed 800 linear feet of stream restoration in FY2017. Construction on a further 2.8 miles of stream restoration was initiated but not completed; ○ Restore 9 acres using regenerative step pool conveyance systems. The final project design reduced this amount to only 6 acres. Project design is complete and construction is slated to begin in FY2018; ○ Restore 5.8 acres through impervious area removal and greening projects. The City has completed work on 0.9 acres. The remaining acreage was delayed by the project selection process; and ○ Plant 5,000 trees. The City planted 2,368 trees in FY2017. • The City provided the status of projects and updated output from the Maryland Assessment Scenario Tool (MAST) in Appendix L of the Annual Report. This information is used to evaluate compliance with the Chesapeake Bay TMDL. The City has used both MAST and an alternative analysis that is based on MDE's "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated" (MDE, 2014) to report progress on meeting the Chesapeake Bay TMDL. According to MAST, the City needs to reduce total nitrogen (TN) by 16%, total phosphorus (TP) by 47.1%, and total suspended solids (TSS) by 68.3% by the end of the current permit term. The second method yields reductions of 16%, 77%, and 36% for TN, TP, and TSS, respectively, by the end of the permit term (i.e., December 26, 2018). For FY2017, and using MAST, the City reported reductions of 0.5%,

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MDE's Review of Baltimore City's
2017 MS4 Annual Report

<table>
<tr><th>MS4 Permit Conditions</th><th>MDE Assessment and Recommendations</th></tr>
<tr><td>PART IV.E Restoration Plans and TMDLs (cont.)</td><td>
47.1%, and 20.1% for TN, TP, and TSS, respectively. Using the MDE guidance, the City reported reductions of 8%, 37%, and 17% for TN, TP, and TSS, respectively.

The City has a very thorough monitoring strategy for bacteria that includes the SIS and ammonia screening stations (see above). The results of the SIS monitoring were presented in the body (Section 3.1) and Appendices D & E to the FY2017 Annual Report. The geometric means for each station and year since 2009 were presented in Appendix E.
The City also reported that a modification to the existing consent decree (see Civil Action No. JFM-02-1524) was proposed in June 2017 (FY2017) and approved in October 2017 (FY2018). In response to this modification, the City will be submitting a revised bacteria TMDL implementation plan by June 2018 that reflects the schedule approved in the modified consent decree.
The City has not yet submitted implementation plans for the Baltimore Harbor and Back River PCB TMDLs. The City plans to submit a revised PCB TMDL implementation plan in FY2018 and reported that it is in continued discussions with MDE's Water and Science Administration (WSA) to better define the allocations and methodologies for progress assessments. The City has also initiated efforts to collaborate with the United States Geological Survey (USGS) and Baltimore County on PCB monitoring. MDE recognizes these efforts; however, implementation plans are required within one year of EPA's approval of the TMDL.
The City continued to refine the modeling of local TMDLs. The City provided updated information on its effort to comply with local nutrient and sediment TMDLs in Appendix M of the Annual Report. For the nutrient TMDLs, the City reported the following:

<table>
<tr><th rowspan="2">Watershed</th><th colspan="3">TN Reductions</th><th colspan="3">TP Reductions</th></tr>
<tr><th>Target*</th><th>FY2016</th><th>FY2017</th><th>Target*</th><th>FY2016</th><th>FY2017</th></tr>
<tr><td>Back River</td><td>22%</td><td>10%</td><td>5%</td><td>88%</td><td>35%</td><td>17%</td></tr>
<tr><td>Balt. Harbor</td><td>18%</td><td>9%</td><td>11%</td><td>63%</td><td>34%</td><td>40%</td></tr>
<tr><td colspan="7">* % reduction by end of permit term (12/26/2018)</td></tr>
</table>
For the sediment TMDLs the following reductions were reported:
<table>
<tr><th rowspan="2">Watershed</th><th colspan="3">TSS Reductions</th></tr>
<tr><th>Target*</th><th>FY2016</th><th>FY2017</th></tr>
<tr><td>Gwynns Falls</td><td>17%</td><td>7%</td><td>8%</td></tr>
<tr><td>Jones Falls</td><td>16%</td><td>8%</td><td>8%</td></tr>
<tr><td>Patapsco - LNB</td><td>10%</td><td>6%</td><td>12%</td></tr>
<tr><td colspan="4">* % reduction by end of permit term (12/26/2018)</td></tr>
</table>
</td></tr>
</table>

Attachment 1
MDE's Review of Baltimore City's
2017 MS4 Annual Report

MS4 Permit Conditions	MDE Assessment and Recommendations
PART IV.E Restoration Plans and TMDLs (cont.)	• When reporting progress, the City compares absolute load reductions from TMDL models to estimated BMP load reductions from its own modeling system. MDE does not consider this as a valid comparison. The City needs to transfer the required relative levels-of-effort (i.e., percent reductions) from the TMDLs to the modeling system used and re-estimate the required load reductions. • The City has not provided any information beyond the current permit term for the sediment TMDLs. The City needs to provide anticipated achievement dates for these TMDLs. • Previously, MDE asked the City to provide information concerning load reduction calculations for the street sweeping efforts. The City is claiming an 88% reduction in phosphorus (i.e., 18,715 lbs) toward the Phase II WIP targets; results that MDE has not been able to replicate. Because the City is claiming such a high level of reduction, these calculations need to be verifiable. • With respect to the trash TMDL, MDE previously asked for detailed explanations on reductions in trash from street sweeping. Currently, the City is claiming the collection of 424,484 lbs of trash on an annual basis. This is 95% of the total trash reduction required by the implementation plan, and is significantly greater than amounts reported by other jurisdictions. For these reasons, MDE needs a further explanation of these values. • The City has made some progress toward meeting these TMDLs in FY2017. Many of the restoration projects that will be used to address the Chesapeake Bay and local TMDLs will be designed and implemented in upcoming years. With the exception of the Back River nutrient TMDLs and the Patapsco-Lower North Branch (LNB) sediment TMDL, the City's progress toward meeting these TMDLs was marginal in FY2017. • In summary, MDE is concerned that many of the design milestones for the Chesapeake Bay and local TMDLs are not being met and that the City's implementation effort is lagging. Moving forward, the City needs to reevaluate the implementation of restoration projects so that future project milestones can be met.
PART IV.F Assessment of Controls	• Baltimore City captured samples from 10 storms at the Hamilton Avenue outfall monitoring station and samples from 11 storms at the Radecke Avenue in-stream monitoring station. Sampling fell short of the 12 storm monitoring requirement at both stations. The City cited problems with the Radecke Avenue automated sampling equipment on June 19, 2017, as the reason for sampling fewer storms. Also, the City indicated that the extended dry period during October and November 2016 limited the number of storm samples captured. The City used one of the base flow samples (October 25, 2016) to supplement this information. MDE acknowledges these difficulties,

Attachment 1
MDE's Review of Baltimore City's
2017 MS4 Annual Report

MS4 Permit Conditions	MDE Assessment and Recommendations
	and requests that the City continue working toward sampling 12 storms per year at each station. • The City submitted its chemical and biological monitoring data using the MS4 Geodatabase format. The submitted *ChemicalMonitoring* table was missing data, as detailed below: o Total Petrochemical Hydrocarbons (TPH) was missing for all samples prior to August 2016. After that, the City modified its protocol and started sampling for TPH; and o The City also noted that a lab error prevented a September 2016 sample from being analyzed. • The *BiologicalMonitoring* table was mostly complete, with a couple of missing entries. The City has reported that BIBI ratings continued to rank in the "Very Poor" range. • The *MonitoringSite* and *MonitoringDrainageArea* feature classes have been completed. • The City conducted physical monitoring at Moores Run and provided results in Appendix G of its Annual Report. Elevation changes in the channel appeared to be consistent with previous years, as reported. • Stormwater Management Assessment: MDE awaits the results on the evaluation of the City's restoration projects throughout Stony Run, which the City plans to release with the next (FY2018) Annual Report. • MDE conducted a field inspection of the City's Assessment of Controls program on March 21, 2017. This inspection included a demonstration of the City's monitoring protocol and methods, and a request for chemical monitoring, land use, and BMP data not previously submitted. The City provided the requested data electronically on April 4 and 6, 2017. As a result, on April 13, 2017, MDE informed the City that this program met permit requirements.
PART IV.G Program Funding	• Detailed information on the expenditures and budget related to the implementation were included in the *FiscalAnalyses* associated table of the City's Geodatabase. The expenditures for implementing NPDES program and other stormwater related activities (e.g., maintenance of infrastructure) in FY2017 were $19,121,970 and $4,452,740, respectively, for a total of $23,574,708. Funding has increased over the past few years, demonstrating the City's commitment to the NPDES stormwater permit program and to improving water quality. • The City also provided information on funding sources. The total stormwater cost for FY2017 was $23,574,708. Of this, $17,736,113 was funded by the City's stormwater utility, $1,643,438 was funded by the water/wastewater utility, $1,604,823 was from the City's General Fund, and $2,590,335 was funded by other sources. • The City provided a Watershed Protection and Restoration Program (WPRP)

Attachment 1
MDE's Review of Baltimore City's
2017 MS4 Annual Report

MS4 Permit Conditions	MDE Assessment and Recommendations
PART IV.G Program Funding (cont.)	Annual Report for FY2017 as required. Using the same template, the WPRP Annual Report should be submitted as a narrative file in the geodatabase by December 27, 2018. • As per the letter dated October 17, 2016, MDE requested additional clarification on the City's Financial Assurance Plan (FAP). This clarification and the City's next FAP should be submitted as narrative files in the geodatabase by December 27, 2018. A guidance document and updated template were provided on March 8, 2018.

Attachment 2
Maryland Department of the Environment's Approval of Baltimore City's Stormwater Wasteload Allocation Implementation Plans for Meeting Municipal Separate Storm Sewer System (MS4) Permit Requirements

The Maryland Department of the Environment (the Department) has reviewed Baltimore City's stormwater waste load allocation (SW-WLA) implementation plans. These plans were originally submitted as part of the City's 2014 MS4 annual report and revised in subsequent annual reports. The results of this review are as follows:

The bacteria total maximum daily load (TMDL) implementation plans for the Herring Run, Gwynns Falls, Jones Falls, and the Patapsco River Lower North Branch (Patapsco LNB) focus on remediation, finding and eliminating human sources of bacteria, and monitoring to manage and evaluate progress adaptively. These plans also provide detailed schedules for achievement of the TMDL SW-WLAs. These plans follow the Department's guidance and are hereby approved.

The implementation plans for the Back River and Baltimore Harbor Bay nutrient TMDLs, the Gwynns Falls, Jones Falls, and Patapsco LNB sediment TMDLs and the Chesapeake Bay nutrient and sediment TMDLs meet the following approval criteria:

- Estimates of watershed baseline pollutant loads were based on scientifically defensible modeling tools;
- The modeled baseline years were consistent with baseline conditions in applicable TMDLs;
- Modeling of expected pollutant load reductions was based on scientifically defensible BMP reduction efficiencies;
- Detailed cost estimates for individual projects, programs, and controls for implementing the plan within the current permit term were provided;
- Mechanisms employed for tracking progress toward the required load reductions were discussed; and
- The plans incorporated elements of adaptive management that use water quality monitoring data to assess the effectiveness of implemented practices and to adjust implementation strategies if data do not achieve expected trends.

However, the following information is missing from these implementation plans:

- The TMDL implementation plans must be revised to utilize a percent reduction methodology that applies the TMDL SW-WLA percent reduction to the City's urban stormwater baseline load, as estimated in its own modeling system (see *Guidance for Developing Stormwater Wasteload Allocation Implementation Plans* at http://www.mde.state.md.us/programs/Water/TMDL/DataCenter/Pages/TMDLStormwaterImplementation.aspx);
- A schedule and achievement date for the full SW-WLA required reductions must be provided; and

- Street sweeping load reduction calculations, notably the City's estimated reductions towards the Chesapeake Bay TMDLs, must be revised to account only for the increase in annual tonnage collected since TMDL baseline conditions.

Additionally, the City must provide the following:

- A full plan including a proposed monitoring strategy and implementation schedule for the Baltimore Harbor and Back River polychlorinated biphenyl (PCB) TMDL; and
- A memorandum documenting the differences in methodologies for determining trash load reductions between the City's Baltimore Harbor Trash TMDL implementation plan and the Department's TMDL. This memorandum should indicate that the Trash TMDL load reduction requirements have not been met and that the City will continue to work with the Department to rectify the differences in load reduction methodologies.

The information requested above must be submitted the Department by September 15, 2018 so that these TMDL implementation plans may be approved before expiration of the City's current MS4 permit.

From: "Grove, Kimberly (DPW)"
Sent: Tue, 10 Sep 2019 21:10:17 +0000
To: "Brian Cooper -MDE- (brian.cooper@maryland.gov)" <brian.cooper@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Cc: "Desantis, Paul (DPW)" <Paul.Desantis@baltimorecity.gov>
Subject: MS4 submittals - portfolio and financial capacity
Attachments: Financial Capacity Baltimore City 8-9-19.xlsx, Baltimore City Restoration Projects Portfolio 2020-2027 9-10-19.xlsx, Baltimore City Restoration Projects Portfolio 2020-2021 9-10-19.xlsx

Attached are the following:

- Portfolio for 2020 to 2027 as attachment for question 8 of the questionnaire, previously submitted on 8/10/19.
- First year (2020 and 2021) projects to be completed.
- Financial capacity spreadsheet, except for questions 6.

The supporting narrative for all submittals will be sent to you by the end of the week. It is still in review. Please contact me if you have any questions.

Thanks,

Kimberly L. Grove, P.E.
Chief, Office of Compliance & Laboratories
Baltimore City Department of Public Works
(410) 396 - 0732 (office)
(443) 835-9272 (cell)

Financial Capacity Spreadsheet		
1	County/City Name	Baltimore City, MD
2	Cost As A Percent Of Household Income	
2a	Median Household Income (MHI)	
2b	Total Number Of Households In Jurisdiction	
2c	Average Annual Cost For Public Stormwater Related Management Programs	
2d	Annual Cost For Public Stormwater Related Management Programs Per Household	
2e	% Of MHI Spent On Public Stormwater Related Management Programs	
2f	Total Annual Stormwater Remediation Fee Per Household	
2g	% Of MHI Spent Annually On Stormwater Remediation Fee	
3	Cost Of Impervious Surface Restoration As A Percent Of Household Income	
3a	Total In Previous Permit Term Spent On The Impervious Surface Restoration Plan (ISRP)	
3b	Average Annual Cost Of The ISRP During The Previous Permit Term	
3c	Annual Cost Of The ISRP Per Household During The Previous Permit Term	
3d	% Of MHI Spent On The ISRP During The Previous Permit Term	
3e	Total Projected Cost For Restoration Portfolio	
3f	Projected Annual Cost For Restoration Portfolio	
3g	Projected Annual Cost For Restoration Portfolio Per Household	
3h	% Of MHI Spent On Projected Cost Of Restoration Portfolio	
4	Cost For Low-Income Residential Customers As A Percent Of Household Inc	
4a	Percentage Of Households With Annual Income <$25,000	
4b	% Of Income For Low Income Households Spent On Public Stormwater Related Management Programs	
4c	% Of Income For Low Income Households Spent On Stormwater Remediation Fees	
4d	% Of Income For Low Income Household Spent On The ISRP	
4e	% Of MHI For Low Income House Spent On Projected Cost Of Restoration Portfolio	
5	Key Socioeconomic Indicators	
5a	Percentage Unemployed	
5b	Median Household Income	
5c	Percent Of Individuals (All People) Below Poverty Level	
6	Financial Capacity Indicators	
6a	Debt Indicators	Bond Rating – GO[1] Bonds
6b		Bond Rating – Revenue Bonds
6c		Net Debt As A % Of FMPV[2]
6d	Financial Management Indicators	Property Tax Revenues As % Of FMPV
6e		Property Tax Revenue Collection Rate

Notes:
1. GO = General Obligation
2. FMPV = Full Market Property Value

$	46,641
	239,791.00
$	18,109,000.00
$	75.52
	0.16%
$	60.00
	0.13%
$	50,984,013.00
$	10,196,802.60
$	42.52
	0.09%
$	129,859,219.00
$	25,971,843.80
$	108.31
	0.23%
come	
	29.50%
	0.30%
	0.24%
	0.17%
	0.43%
	6.10%
$	46,641
	22.40%

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

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

Restoration Projects To Be Planned, Designed, and/or Constructed from CY 2020 Through CY 2027
Baltimore City, Maryland

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

REST BMP ID	REST BMP TYPE[1]	BMP CLASS[1]	NUM BMP	IMP ACRES	TSS REDUCTION (lbs/year)	TN[6] REDUCTION (lbs/year)	IMPLEMENTATION COST	IMPLEMENTATION STATUS[2]	PROJECTED IMPLEMENTATION YEAR	TMDL PARAMETER OR WQ OBJECTIVE ADDRESSED
Remaining Unmet Restoration Obligations from Previous Permit										
Annual Operational Programs (Unmet Obligations from Previous Permit)[3,4]										
Street Sweeping		A								
		A								
		A								
		A								
		A								
		A								
Catch Basin Cleaning		A								
		A								
		A								
		A								
		A								
Septic Sytem Pumping		A								
		A								
		A								
		A								
		A								
		A								
Subtotal Operations[3]			0	0			$0			
Capital Projects (Unmet Obligations from Previous Permit Term)										
Subtotal Capital			0	0			$0			
Other (Unmet Obligations from Previous Permit Term)										
Subtotal Other			0	0			$0			
Total of Remaining Obligations from The Previous Permit			**0**	**0**			**$0**			
Obligations from Previous Permit That Must Be Continued										
Annual Operational Programs Required to be Maintained from Previous Permit[3,4]										
Street Sweeping		A								
		A								
		A								
		A								
		A								
Catch Basin Cleaning		A								
		A								
		A								
		A								
		A								
Septic Sytem Pumping		A								
		A								
		A								
		A								
		A								
Subtotal Operations[3]			0		0	0	$0			
Capital Projects (Proposed to Replace Annual Obligations)										

Subtotal Capital			0	0	0	0	$0			
Other (Proposed to Replace Annual Obligations)										
Subtotal Other			0	0	0	0	$0			
Total of Obligations from Previous Permit That Must Be Continued			**0**	**0.0**	**0.0**	**0.0**	**$0**			
Proposed Restoration for the Next Permit										
Operational Programs[4]										
Street Sweeping		A								
		A								
		A								
		A								
Catch Basin Cleaning		A								
		A								
		A								
		A								
		A								
Septic Sytem Pumping		A								
		A								
		A								
		A								
		A								
Subtotal Operations[5]			0		0	0	$0			
Capital Projects										
BC16ST000291,326,328	IMPP	A	3		1720	11.2	$1,281,500	Under Construction	2020	
Various	IMPP	A	6		10924	72.4	$5,653,900	Design	2021	
Various	MMBR	E	8	14.9	9004	88.6	$4,324,520	Design	2021	
BC16ST000261, 259	STRE	A	2		3419600	952	$13,059,300	Under Construction	2021	
BC16ST000267	STRE	A	1		967200	293	$6,141,000	Design	2021	
Subtotal Capital			20	14.9	4408448	1417.2	$30,460,220			
Other										
Subtotal Other			0	0	0	0	$0			
Total for Next Permit			**20**	**14.9**	**4,408,448.0**	**1,417.2**	**$30,460,220**			
Total for Remaining Obligations from The Previous Permit and Prosed Activities for the Next Permit			20	14.9	4,408,448.0	1,417.2	$30,460,220			

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

Notes:
1 Use BMP types and classes from the MDE Geodatabase.

GENERAL COMMENTS[7]

BCPS sites for education.
BCPS sites for education.
Some traffic calming sites in ROW. Educational signage and programming.
Utility protection. Flood reduction. Edudation programming.
Utility protection. Flood reduction.
Used due to overperformance from current permit. (2010-2021)
Used due to overperformance from current permit. (2010-2021)

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

BMP Classification	BMP Type Code	BMP Type
Alternative Surfaces (A)		
E	AGRE	Green Roof – Extensive
E	AGRI	Green Roof – Intensive
E	APRP	Permeable Pavements
E	ARTF	Reinforced Turf
Nonstructural Techniques (N)		
E	NDRR	Disconnection of Rooftop Runoff
E	NDNR	Disconnection of Non-Rooftop Runoff
E	NSCA	Sheetflow to Conservation Areas
Micro-Scale Practices (M)		
E	MRWH	Rainwater Harvesting
E	MSGW	Submerged Gravel Wetlands
E	MILS	Landscape Infiltration
E	MIBR	Infiltration Berms
E	MIDW	Dry Wells
E	MMBR	Micro-Bioretention
E	MRNG	Rain Gardens
E	MSWG	Grass Swale
E	MSWW	Wet Swale
E	MSWB	Bio-Swale
E	MENF	Enhanced Filters
Ponds (P)		
S	PWED	Extended Detention Structure, Wet
S	PWET	Retention Pond (Wet Pond)
S	PMPS	Multiple Pond System
S	PPKT	Pocket Pond
S	PMED	Micropool Extended Detention Pond
Wetlands (W)		
S	WSHW	Shallow Marsh
S	WEDW	ED – Wetland
S	WPWS	Wet Pond – Wetland
S	WPKT	Pocket Wetland
Infiltration (I)		
S	IBAS	Infiltration Basin
S	ITRN	Infiltration Trench
Filtering Systems (F)		

S	FBIO	Bioretention
S	FSND	Sand Filter
S	FUND	Underground Filter
S	FPER	Perimeter (Sand) Filter
S	FORG	Organic Filter (Peat Filter)
S	FBIO	Bioretention
Open Channels (O)		
S	ODSW	Dry Swale
S	OWSW	Wet Swale
Other Practices (X)		
S	XDPD	Detention Structure (Dry Pond)
S	XDED	Extended Detention Structure, Dry
S	XFLD	Flood Management Area
S	XOGS	Oil Grit Separator
S	XOTH	Other
Alternative BMPs		
A	MSS	Mechanical Street Sweeping
A	VSS	Regenerative/Vacuum Street Sweeping
A	IMPP	Impervious Surface Elimination (to pervious)
A	IMPF	Impervious Surface Elimination (to forest)
A	FPU	Planting Trees or Forestation on Pervious Urban
A	CBC	Catch Basin Cleaning
A	SDV	Storm Drain Vacuuming
A	STRE	Stream Restoration
A	OUT	Outfall Stabilization
A	SPSC	Regenerative Step Pool Storm Conveyance
A	SHST	Shoreline Management
A	SEPP	Septic Pumping
A	SEPD	Septic Denitrification
A	SEPC	Septic Connections to WWTP

Restoration Projects To Be Planned, Designed, and/or Constructed from CY 2020 Through CY 2027
Baltimore City, Maryland

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

REST BMP ID	REST BMP TYPE[1]	BMP CLASS[1]	NUM BMP	IMP ACRES	TSS REDUCTION (lbs/year)	TN[6] REDUCTION (lbs/year)	IMPLEMENTATION COST	IMPLEMENTATION STATUS[2]	PROJECTED IMPLEMENTATION YEAR	TMDL PARAMETER OR WQ OBJECTIVE ADDRESSED
Remaining Unmet Restoration Obligations from Previous Permit										
Annual Operational Programs (Unmet Obligations from Previous Permit)[3,4]										
Street Sweeping		A								
		A								
		A								
		A								
		A								
		A								
Catch Basin Cleaning		A								
		A								
		A								
		A								
		A								
Septic Sytem Pumping		A								
		A								
		A								
		A								
		A								
		A								
Subtotal Operations[3]			0	0			$0			
Capital Projects (Unmet Obligations from Previous Permit Term)										
Subtotal Capital			0	0			$0			
Other (Unmet Obligations from Previous Permit Term)										
Subtotal Other			0	0			$0			
Total of Remaining Obligations from The Previous Permit			**0**	**0**			**$0**			
Obligations from Previous Permit That Must Be Continued										
Annual Operational Programs Required to be Maintained from Previous Permit[3,4]										
Street Sweeping		A								
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		A								
		A								
Septic Sytem Pumping		A								
		A								
		A								
		A								
		A								
Subtotal Operations[3]			0		0	0	$0			
Capital Projects (Proposed to Replace Annual Obligations)										

Subtotal Capital			0	0	0	0	$0			
Other (Proposed to Replace Annual Obligations)										
Subtotal Other			0	0	0	0	$0			
Total of Obligations from Previous Permit That Must Be Continued			**0**	**0.0**	**0.0**	**0.0**	**$0**			
Proposed Restoration for the Next Permit										
Operational Programs[4]										
Street Sweeping		A								
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		A								
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		A								
Subtotal Operations[5]			0		0	0	$0			
Capital Projects										
	IMPP	A	3		1720	11.2	$1,281,500	Under Construction	2020	
	IMPP	A	6		10924	72.4	$5,653,900	Design	2021	
	FBIO	E	1	3.3	1734	17.4	$955,100	Design	2022	
	MMBR	E	8	14.9	9004	88.6	$4,324,520	Design	2021	
	MMBR	E	8	13.6	8394	82.6	$6,334,400	Design	2022	
	SPSC	A	1		5068	138.5	$1,403,750	Design	2023	
	STRE	A	2		3419600	952	$13,059,300	Under Construction	2021	
	STRE	A	1		967200	293	$6,141,000	Design	2021	
	STRE	A	6		4926024	1523.3	$24,890,500	Design	2022	
	STRE	A	1		644800	195	$5,295,000	Design	2023	
Subtotal Capital			37	31.8	9994468	3374	$69,338,970			
Other										
Subtotal Other			0	0	0	0	$0			
Total for Next Permit			**37**	**31.8**	**9,994,468.0**	**3,374.0**	**$69,338,970**			
Total for Remaining Obligations from The Previous Permit and Prosed Activities for the Next Permit			37	31.8	9,994,468.0	3,374.0	$69,338,970			

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

Notes:
1 Use BMP types and classes from the MDE Geodatabase.

GENERAL COMMENTS[7]

BCPS sites for education.
BCPS sites for education.
Next to rec center, signage / education.
Some traffic calming sites in ROW. Educational signage and programming.
Some traffic calming sites in ROW. Educational signage and programming.
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Utility protection. Flood reduction. Edudation programming.
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Utility protection. Flood reduction. Edudation programming.
Used due to overperformance from current permit. (2010-2021)
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BMP Class	
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E	ESD
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BMP Classification	BMP Type Code	BMP Type
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E	AGRI	Green Roof – Intensive
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E	NSCA	Sheetflow to Conservation Areas
Micro-Scale Practices (M)		
E	MRWH	Rainwater Harvesting
E	MSGW	Submerged Gravel Wetlands
E	MILS	Landscape Infiltration
E	MIBR	Infiltration Berms
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E	MMBR	Micro-Bioretention
E	MRNG	Rain Gardens
E	MSWG	Grass Swale
E	MSWW	Wet Swale
E	MSWB	Bio-Swale
E	MENF	Enhanced Filters
Ponds (P)		
S	PWED	Extended Detention Structure, Wet
S	PWET	Retention Pond (Wet Pond)
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S	PPKT	Pocket Pond
S	PMED	Micropool Extended Detention Pond
Wetlands (W)		
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S	WEDW	ED – Wetland
S	WPWS	Wet Pond – Wetland
S	WPKT	Pocket Wetland
Infiltration (I)		
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S	ITRN	Infiltration Trench
Filtering Systems (F)		

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S	FSND	Sand Filter
S	FUND	Underground Filter
S	FPER	Perimeter (Sand) Filter
S	FORG	Organic Filter (Peat Filter)
S	FBIO	Bioretention
Open Channels (O)		
S	ODSW	Dry Swale
S	OWSW	Wet Swale
Other Practices (X)		
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S	XDED	Extended Detention Structure, Dry
S	XFLD	Flood Management Area
S	XOGS	Oil Grit Separator
S	XOTH	Other
Alternative BMPs		
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A	SPSC	Regenerative Step Pool Storm Conveyance
A	SHST	Shoreline Management
A	SEPP	Septic Pumping
A	SEPD	Septic Denitrification
A	SEPC	Septic Connections to WWTP

From: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>
Sent: Thu, 12 Sep 2019 19:52:19 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Desantis, Paul (DPW)" <Paul.Desantis@baltimorecity.gov>
Subject: Re: MS4 submittals - portfolio and financial capacity

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Thank you, Kim. We will let you know if we have any questions.

Best,
Brian

On Tue, Sep 10, 2019 at 5:10 PM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> Attached are the following:
>
> - Portfolio for 2020 to 2027 as attachment for question 8 of the questionnaire, previously submitted on 8/10/19.
> - First year (2020 and 2021) projects to be completed.
> - Financial capacity spreadsheet, except for questions 6.
>
> The supporting narrative for all submittals will be sent to you by the end of the week. It is still in review. Please contact me if you have any questions.
>
> Thanks,
>
> Kimberly L. Grove, P.E.
>
> Chief, Office of Compliance & Laboratories
>
> Baltimore City Department of Public Works

(410) 396 - 0732 (office)

(443) 835-9272 (cell)

--
Brian E. Cooper
Natural Resources Planner
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard | Baltimore, MD 21230-1708
410.537.3653

From: "Karl Berger" <kberger@mwcog.org>
Sent: Thu, 19 Sep 2019 18:15:06 +0000
To: "Jennifer Smith -MDE- (jenniferm.smith@maryland.gov)" <jenniferm.smith@maryland.gov>; "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>
Cc: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen Wiggen" <wiggenk@charlescounty.org>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "'Les Knapp'" <lknapp@mdcounties.org>
Subject: MS4 Phase I progress toward new permits

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Jennifer,

On behalf of the MS4 Phase I group affiliated with MACo, I am enquiring about the status of various matters arising out of our Aug. 14 meeting.

They include:

1. Modifications to the draft permit metrics based on the discussions we had in our August 14 meeting
2. New schedule and additional information
   (both noted in your 8/27 email)

3. Date(s) for a meeting on stream restoration accounting
   (noted in your 8/29 email)

Also, MS4 managers are eager to see the revisions in the new Accounting Guidance document.

p.s. I will be out on vacation the week of Sept. 23 -27. You can address any communication to the Phase I group via my COG colleague Heidi Bonnaffon, hbonnaffon@mwcog.org, 202-962-3216.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Mon, 7 Oct 2019 16:40:57 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Lee Currey" <lee.currey@maryland.gov>; "Raymond Bahr" <raymond.bahr@maryland.gov>; "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>; "Brian Cooper -MDE-" <brian.cooper@maryland.gov>
Subject: Updated Restoration Project Portfolio
Attachments: Update Instructions for Completing Restoration Project Porfolios 10-4-2019_jms.docx, Restoration Project Portfolio -10-04-19 (2).xlsx, Restoration Portfolio Accounting Principles 10-4-2019 final.docx, BC Letter.pdf

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Dear Ms. Grove:

Thank you for your continued cooperation with the development of the next generation NPDES MS4 Phase 1 Large permit. In response to comments from our August 14, 2019 meeting, the Maryland Department of the Environment (Department) has incorporated the equivalent impervious area (EIA) metric for both upland and alternative BMPs into the next generation permit. This effort has resulted in an update to the Restoration Project Portfolio spreadsheet. This update reflects the Chesapeake Bay Phase 6 Watershed Model, includes EIA calculations for alternative practices, and provides incentives for green infrastructure and watershed management.

Attached to the email are the updated Restoration Project Portfolio spreadsheet and guidance for your use. The Department remains on a tight timeline to get a draft permit to Tentative Determination by the end of 2019. To meet this time line, we are requesting that you submit a revised an updated Restoration project portfolio no later than November 7, 2019. Thank you again for your effort and cooperation. Please feel free to contact me or Ray Bahr if you have any questions or require further clarification.

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment
1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

Click here to complete a three question customer experience survey.

Restoration Projects To Be Planned, Designed, and/or Constructed From The End Of 4th Generation Permit Through CY 2027

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

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[4] REDUCTION (lbs/year)	IMP ACRES (IA)	GREEN STORMWATER INFRASTRUC-TURE (GSI) CREDIT (IA X 0.35)	WATERSHED MANAGE-MENT (WM) CREDIT	TOTAL IMP ACRES (W/ GSI AND WM CREDITS)	IMPLEMEN-TATION COST	IMPLEMEN-TATION STATUS[2]	PROJECTED IMPLEMEN-TATION YEAR	TMDL PARAMETER OR WQ OBJECTIVE ADDRESSED	GENERAL COMMENTS[2]
Remaining Unmet Restoration Obligations from Previous Permit																			
Annual Operational Programs (Unmet Obligations from Previous Permit)[3],[4]																			
Street Sweeping*		A	ANNUAL											0					
		A	ANNUAL											0					
		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					
		A	ANNUAL											0					
Septic Sytem Pumping		A												0					
		A												0					
		A												0					
		A												0					
		A												0					
		A												0					
Subtotal Operations[3]				0				0	0	0	0			0	$0				
Capital Projects (Unmet Obligations from Previous Permit Term)																			
														0					
														0					
														0					
														0					
Subtotal Capital				0				0	0	0	0	0	0	0	$0				
Other (Unmet Obligations from Previous Permit Term)																			
														0					
														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]																			
Street Sweeping		A	ANNUAL											0					
		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					
		A	ANNUAL											0					
Septic Sytem Pumping		A												0					
		A												0					
		A												0					
		A												0					
		A												0					
Subtotal Operations[3]				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																	
		A	ANNUAL																	
Catch Basin Cleaning		A	ANNUAL																	
		A	ANNUAL																	
		A	ANNUAL																	
		A	ANNUAL																	
		A	ANNUAL																	
Septic Sytem Pumping		A																		
		A																		
		A																		
		A																		
		A																		
Subtotal Operations (up to 2025)[5]				0				0	0	0	0			0	$0					
Capital Projects																				
														0						
														0						
														0						
														0						
Subtotal Capital (up to 2025)				0				0	0	0	0	0	0	0	$0					
Other																				
														0						
														0						
Subtotal Other (up to 2025)				0				0	0	0	0	0	0	0	$0					
Total for Next Permit (up to 2025)				**0**				**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**$0**					
Total for Next Permit and Projected Years				**0**				**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**$0**					
Total for Remaining Obligations from The Previous Permit, Continued Obligations, and Proposed Activities for The Next Permit (up to 2025)				**0**				**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**$0**					
Total for Remaining Obligations from The Previous Permit, Continued Obligations, and Proposed Activities for The Next Permit (up to 2027)				**0**				**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**$0**					

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

BMP Classification	BMP Type Code	BMP Type
Alternative Surfaces (A)		
E	AGRE	Green Roof – Extensive
E	AGRI	Green Roof – Intensive
E	APRP	Permeable Pavements
E	ARTF	Reinforced Turf
Nonstructural Techniques (N)		
E	NDRR	Disconnection of Rooftop Runoff
E	NDNR	Disconnection of Non-Rooftop Runoff
E	NSCA	Sheetflow to Conservation Areas
Micro-Scale Practices (M)		
E	MRWH	Rainwater Harvesting
E	MSGW	Submerged Gravel Wetlands
E	MILS	Landscape Infiltration
E	MIBR	Infiltration Berms
E	MIDW	Dry Wells
E	MMBR	Micro-Bioretention
E	MRNG	Rain Gardens
E	MSWG	Grass Swale
E	MSWW	Wet Swale
E	MSWB	Bio-Swale
E	MENF	Enhanced Filters
Ponds (P)		
S	PWED	Extended Detention Structure, Wet
S	PWET	Retention Pond (Wet Pond)
S	PMPS	Multiple Pond System
S	PPKT	Pocket Pond
S	PMED	Micropool Extended Detention Pond
Wetlands (W)		
S	WSHW	Shallow Marsh
S	WEDW	ED – Wetland
S	WPWS	Wet Pond – Wetland
S	WPKT	Pocket Wetland
Infiltration (I)		
S	IBAS	Infiltration Basin
S	ITRN	Infiltration Trench
Filtering Systems (F)		

S	FBIO	Bioretention
S	FSND	Sand Filter
S	FUND	Underground Filter
S	FPER	Perimeter (Sand) Filter
S	FORG	Organic Filter (Peat Filter)
S	FBIO	Bioretention
Open Channels (O)		
S	ODSW	Dry Swale
S	OWSW	Wet Swale
Other Practices (X)		
S	XDPD	Detention Structure (Dry Pond)
S	XDED	Extended Detention Structure, Dry
S	XFLD	Flood Management Area
S	XOGS	Oil Grit Separator
S	XOTH	Other
Alternative BMPs		
A	MSS	Mechanical Street Sweeping
A	VSS	Regenerative/Vacuum Street Sweeping
A	IMPP	Impervious Surface Elimination (to pervious)
A	IMPF	Impervious Surface Elimination (to forest)
A	FPU	Planting Trees or Forestation on Pervious Urban
A	CBC	Catch Basin Cleaning
A	SDV	Storm Drain Vacuuming
A	STRE	Stream Restoration
A	OUT	Outfall Stabilization
A	SPSC	Regenerative Step Pool Storm Conveyance
A	SHST	Shoreline Management
A	SEPP	Septic Pumping
A	SEPD	Septic Denitrification
A	SEPC	Septic Connections to WWTP
A	FTW	Floating Treatment Wetland
A	FTC	Forest Conservation
A	CLS	Conservation Landscaping
A	RCL	Riparian Conservation Landscaping
A	IDDE	Illicit Discharge Detection & Elimination
A	OTH	Other

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

October 7, 2019

Kimberly L. Grove
Division Chief
DPW, Office of Compliance and Laboratories
3001 Druid Park Drive, Room 321
Baltimore, MD 21215

Dear Ms. Grove:

The Maryland Department of the Environment (Department) continues to work through the development of the next generation National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Phase 1 Large permit. At our NPDES MS4 Phase 1 jurisdiction group meeting held on August 14, 2019, there was strong support for retaining in the next permit the equivalent impervious acre metric for both upland best management practices (BMPs) and alternative BMPs. The Department has spent the past month incorporating equivalent impervious acres (EIA) into the next generation permit construct. To be consistent with Maryland's Phase III Watershed Implementation Plan to Restore Chesapeake Bay by 2025, the Department has developed an update to the Restoration Project Portfolio spreadsheet. This update is based on the Chesapeake Bay Phase 6 Watershed Model and incorporates the EIA calculations for alternative practices. In addition, the Department has added green stormwater infrastructure and watershed management credit calculators to the Restoration Project Portfolio to incentivize restoration practices that are designed and vegetated to mimic natural systems and/or provide additional storage volume. Finally, the Department is requesting Total Phosphorus load reductions to be included in the Restoration Project Portfolios.

The Restoration Project Portfolio includes the list of projects or best management practices a jurisdiction plans to implement over the next five-year permit term. Thus, this portfolio is very important to the process of developing the next generation Phase 1 MS4 permit restoration requirements. The Department is asking each Phase 1 Large MS4 to update its Restoration Project Portfolio spreadsheet to incorporate these changes. The Department has developed guidance on how to perform the EIA calculations and load reductions, how to update the Restoration Project Portfolio spreadsheet, and has updated the project portfolio spreadsheet format accordingly (see attached). The principles found in this guidance are based on the Draft 2019 Accounting Document and the Phase 6 model.

The Department remains on a tight timeline to get a draft permit to Tentative Determination by the end of 2019. The department therefore requests that each Phase 1 Large MS4 submit a revised and updated Restoration Project Portfolio no later than November 7, 2019.

Thank you in advance for your time and effort in preparing this information. Please feel free to contact me or Raymond Bahr at 410-537-3543 if you have any questions or require further clarification.

Sincerely,

Jennifer M. Smith, Manager
Sediment, Stormwater, and Dam Safety Program
Water and Science Administration

Enclosures

cc: D. Lee Currey, Director, Water and Science Administration
Raymond P. Bahr, Deputy Program Manager, SSDS

ase feel free to
re further

Updated Instructions for Completing Restoration Project Portfolios

As part of the new MS4 Phase I permit development process, the Maryland Department of the Environment (Department) requests each MS4 permittee to submit an updated Restoration Project Portfolio, detailing restoration projects to be planned, designed, and/or constructed during the next permit term. Updates to this portfolio will allow the MS4 permittee to report equivalent impervious acres and TN, TP, and TSS load reductions for all proposed restoration projects. This Updated Restoration Project Portfolio shall be completed using the updated Excel workbook, "Restoration Project Portfolio_10-04-19.xlsx". Changes to this workbook include the addition of six columns to report TP load reductions, rainfall depth (P_E) treated, green infrastructure credit achieved, watershed management credit achieved, updated total impervious acre credits achieved, length of stream restored and street lane miles swept. Most of the requirements for completing the previous version of the spreadsheet remain and are repeated here. However there are a few revisions and additions to note. Requirements for completing this workbook are summarized below.

DESCRIPTION OF REQUIREMENTS

Complete the provided spreadsheet for restoration projects to be planned, designed, and/or under construction from the end of the 4th generation permit through 2025. These projects can be annual BMPs (including water quality trading credits) and capital projects. Additional years 2026 and 2027 are optional to show those projects that require more than five years to complete due to their size or complexity.

The updated restoration portfolio acts as an extension of the recent FAP submittal; thus, proposed activities for the next five years can include those practices reported in the 2018 Financial Assurance Plan. However, the Department requests that the portfolio identify nutrient and sediment reductions as well as the local concerns that would be addressed. This information should be more specific for the first reporting year but may be more generalized for the remaining reporting years.

HOW TO SUBMIT INFORMATION

Below, each section of the spreadsheet is outlined along with guidance on providing data. General instructions for calculating impervious surface restoration and pollutant load reductions in accordance with the Restoration Project Portfolio Accounting Principles are provided in a separate document. These principles are based on the DRAFT 2019 *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* currently under development. Please submit all files electronically via compact disc, email, or ftp and as a hard copy. Also, please ensure that the following actions are taken:

- **Remaining Unmet Restoration Obligation from Previous Permit (Impervious Acres)**
  - Please enter the number of acres remaining that must be treated to meet your previous permit restoration requirement. This value would be zero if you completed restoration of the full impervious acres required under your previous permit.

- **Remaining Unmet Restoration Obligations from Previous Permit**
  - In this section you should report any unmet impervious surface restoration obligation remaining from the previous permit. The BMPs listed in this section are those proposed to be implemented in the next five-year permit term to address this unmet restoration obligation.
  - All stormwater management BMPs, programmatic initiatives, and perennial alternative control practices and water quality trades used to address unmet restoration obligations shall be reported in terms of impervious acres treated or equivalent impervious acres as well as TN, TP, and TSS reductions. Projects should be credited using the Restoration Project Portfolio Accounting Principles and any additional guidance updates found on the Department's webpage, e.g., stream restoration, outfall stabilization, CMAC (continuous monitoring and adaptive control).
  - The projected implementation year should be from the end of the 4th generation permit through 2025.
  - For additional guidance, refer to the section below titled "Reporting Specific Projects".

- **Obligations from Previous Permit That Must Be Continued**

  In this section you should report any obligations from the previous permit that must be continued through the next five-year permit term and/or replaced with a stormwater management BMP, programmatic initiative, or alternative control practices in accordance with the Restoration Project Portfolio Accounting Principles.

  Water Quality Trades
  - Water quality trades must continue annually and be replaced prior to the end of the permit term.
  - These practices and the associated data should be reported in the section titled "Other (Proposed to Replace Annual Obligations)".
  - Equivalent impervious acres treated by water quality trades must be continued yearly or replaced at a one to one impervious acre ratio. In addition, please report the TN, TP and TSS reductions expected from these water quality trades.

  Annual Alternative Practices
  - For annual alternative control practices implemented during the previous permit, impervious acre equivalencies were computed using the 2014 Accounting Guidance. The portfolio shall include annual alternative control practices that are continued each year or replaced in accordance with the Restoration Project Portfolio Accounting Principles. Impervious acres treated by each annual alternative control practices must be continued yearly or replaced at a one to one impervious acre ratio. In addition, please report the TN, TP and TSS reductions expected from these annual alternative BMPs.
  - These practices and the associated data should be reported under the section titled "Annual Operational Programs Required to be Maintained from Previous Permit".
  - If annual septic pumping was utilized in the previous permit and is required to be maintained, it should be reported in this section.

Replacement BMPs

- When these water quality trades or annual practices are converted to new stormwater management BMPs, programmatic initiatives, or permanent alternative control practices, the impervious acres managed and the TN, TP and TSS load reductions shall be reported using the Restoration Project Portfolio Accounting Principles.
- When replacing water quality trades, the projected implementation year should be from the end of the 4th generation permit through 2025. When replacing annual practices, the projected implementation year should be from the end of the current permit through 2027. It is acceptable if a project will not be completed by 2027.
- For additional guidance, refer to the section below titled "Reporting Specific Projects".

- **Proposed Restoration for the Next Permit**
  - In this section you should report proposed BMPs to implement as part of the next permit restoration requirement.
  - All stormwater management BMPs, programmatic initiatives, and perennial alternative control practices and water quality trades proposed as new restoration for the next permit shall be reported in terms of impervious acres treated or equivalent impervious acres as well as TN, TP, and TSS reductions. Projects should be credited using the Restoration Project Portfolio Accounting Principles and any additional guidance updates found on the Department's webpage, e.g., stream restoration, outfall stabilization, CMAC (continuous monitoring and adaptive control).
  - The projected implementation year should be from the end of the current permit through 2025. Additional projects may be planned up through 2027.
  - Provide line items for annual operations and maintenance costs. Also include annual capital improvement project information, if possible, on stormwater/flood control BMPs that are being repaired for safety but do not achieve any additional water quality credit, e.g., a dam repair or enhanced emergency spillway project. In the comment field note "watershed management".
  - For additional guidance, refer to the section below titled "Reporting Specific Projects".

REPORTING SPECIFIC PROJECTS

General

- Use BMP types and classes from the MDE Geodatabase. Additional BMP types (e.g., IDDE) from the Restoration Project Portfolio Accounting Principles may also be used.
- If a project has multiple types of a single BMP, identify the amount in the Number of BMPs column. If using septic pumping or denitrification, report the number of affected septic systems in this column.
- For upland BMPs, provide the total drainage area for the project. If there is no drainage area for specific programmatic initiatives or alternative control practices, leave this field blank.
- Impervious Acres and Reductions for TN, TP, and TSS for proposed projects shall be reported using the Restoration Project Portfolio Accounting Principles.
- Provide the estimated cost for the entire project. If needed, identify additional planning or design costs as a separate line item in the spreadsheet.
- Implementation status should be: Planning, Design, or Under Construction.

- Identify any total maximum daily load (TMDL) parameters, local water quality objectives (e.g., sediment, phosphorus, trash), and local concerns (e.g., watershed management) that will be addressed. Please use the comments column to describe in detail the co-benefits of a BMP.
- If green stormwater infrastructure (GSI) or watershed management (WM) credits are claimed for stormwater ponds or wetlands, include an example calculation.
- Please ensure that all formulas for subtotals and totals are updated to reflect the applicable time periods.

BMPs for Upland Applications

- Provide the P_E for the project. When the P_E is unknown for a planned project or initiative, use a default of 1 inch to be conservative.
- For stormwater BMPs eligible for the GSI credit, report in the GSI Credit column the value of the impervious acres treated multiplied by 0.35. In the WM Credit column, report the value of the additional acres. Provide the total impervious acres treated in the column labeled Total Impervious Acres (w/ GSI and WM Credits). If a practice is not eligible for GSI credit, the Total Impervious Acres column equals the Impervious Acres column. Note: the GSI and WM credits are applied only to the impervious acres; TN, TP, and TSS calculations are not affected.

Alternative BMPS

- For alternative practices, provide the equivalent impervious acres treated for each project in the Impervious Acres column. Refer to the 2019 Restoration Project Portfolio Accounting Principles for further guidance on how to determine equivalent impervious acres for alternative practices.
- For stream restoration, shoreline stabilization, or outfall stabilization (or "prevented sediment practices"), provide the estimated linear feet in the Length Restored column.
- Street lane miles and/or mass loading reductions may be noted in the comments column.
- For land-use conversion BMPs or programmatic initiatives, identify if the BMP is an annual or permanent practice.
- For street sweeping and inlet cleaning, report lane miles/frequency or mass loading reductions in the comments column.

Restoration Project Portfolio Accounting Principles
(Updated October 7, 2019)

The Restoration Project Portfolio previously required impervious area calculations for structural stormwater BMPs and load reductions for alternative BMPs. The portfolio should now include both impervious area calculations and load reductions for all practices. The following is a summary of the basic impervious surface restoration and pollutant load reduction principles to follow when completing the Restoration Project Portfolio. These principles are based on the Chesapeake Bay Program Phase 6 watershed model and the draft 2019 *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*, currently under development.

Calculating Impervious Surface Restoration

BMPs for Upland Applications

- Impervious Acre Credits
  - The impervious acre credit for structural practices is based on the impervious acres in a BMP's drainage area and the depth of rainfall treated (P_E). A water quality volume (WQ_V) treatment of 1 inch of rainfall is required to receive full credit (i.e., 1:1) for the impervious acres in the BMP's drainage area. However, additional credit for upland applications may be available.
  - For structural BMPs, additional impervious acre credits may be obtained when projects incorporate green stormwater infrastructure (GSI) and/or additional volume for watershed management (WM). BMPs eligible for GSI credit include Chapter 5 practices (e.g., rain gardens, micro-bioretention), Chapter 3 practices (i.e., infiltration, bioretention) that are considered runoff reduction or "RR", and Chapter 3 structural practices that are designed and vegetated to mimic natural systems (e.g., enhanced wetland practices). In general, when designs for these practices incorporate required design criteria (e.g., "shall" performance criteria) and recommended criteria (e.g., "should" performance criteria) found in the 2000 Maryland Stormwater Design Manual (Manual, MDE 2000 & 2009), the GSI credit may be claimed. GSI credit is based on the Bay Program's pollutant rate curves for stormwater BMPs. RR practices have greater pollutant removal rates than stormwater treatment or "ST" practices. An additional credit of 35% reflects the average difference between the ST and RR curves for TN, TP, and TSS removal. Therefore, for these practices, report in the GSI Credit column the value of the impervious acres treated multiplied by 0.35.
  - Additional storage volume above the WQv may be considered for WM credit as facilities with greater storage volume are more adaptable to changing weather patterns and intense, short duration storms. Additional storage for WM credit does not need to meet WQv criteria. When additional storage is provided, an additional 0.025 impervious area credit may be added for every inch of rainfall treated in excess of the water quality treatment provided up to a maximum of 2 inches (i.e., maximum credit = 0.5 acres).
  - If a practice is not eligible for GSI credit, the Total Impervious Acres column equals the Impervious Acres column. If a stormwater management BMP can only claim additional GSI credit, the Total Impervious Acres equals the value in the Impervious Acres column + the additional GSI credit. If a stormwater management BMP can claim GSI and WM credits, Tables 1 and 2 below may be used to determine GSI and WM credits.

Table 1. Impervious Acre Credits for Additional Watershed Management (WM) Volume	
WM Volume[1]	**WM Credit per Acre of Watershed Imperviousness**
0.0	0.0
0.2	0.05
0.4	0.1
0.6	0.15
0.8	0.2
1.0	0.25
1.2	0.3
1.4	0.35
1.6	0.4
1.8	0.45
2.0	0.5
[1]WM captured is the difference between the total volume captured and the volume treated for water quality. The maximum value for WM is 2.0 inches.	

Table 2. Impervious Acre Credits for Green Stormwater Infrastructure (GSI)				
Rainfall Depth Treated (inches)	**Impervious Acre Credit per Acre of Watershed Area**	**Green Infrastructure Credit Multiplier**	**Additional Credit per Acre of Watershed Area**	**Total Credit per Acre of Watershed Impervious Area**
0.2	0.2	0.35	0.07	0.27
0.4	0.4	0.35	0.14	0.54
0.6	0.6	0.35	0.21	0.81
0.8	0.8	0.35	0.28	1.08
1.0	1.0	0.35	0.35	1.35
1.2	1.05	0.35	0.37	1.42
1.4	1.1	0.35	0.38	1.48
1.6	1.15	0.35	0.40	1.55
1.8	1.2	0.35	0.42	1.62
2.0	1.25	0.35	0.44	1.69
2.2	1.3	0.35	0.46	1.76
2.4	1.35	0.35	0.47	1.82
2.6	1.4	0.35	0.48	1.89
2.8	1.45	0.35	0.49	1.96
3.0	1.5	0.35	0.50	2.0

Example: As an example, consider applying WM and GSI credits for a retrofit of a dry detention pond with a 40.0 acre drainage area, 10.0 of which are impervious: The dry pond has no existing water quality features. Therefore, 10.0 impervious acres in its 40.0 acre contributing drainage area are untreated. A retrofit project is proposed to add a permanent pool, expand the pond footprint, and reconfigure the control structure to treat the entire water quality volume, or a P_E=1.0 inch. This retrofit design would achieve 10.0 impervious acre credits. An additional 1 inch of temporary storage is provided above the water quality

volume for watershed management. This adds an additional 0.25 impervious acre credit per acre of watershed area for a total of 12.5 impervious acre credits (see Table 1).

Alternatively, the project could include various green design improvements including sediment forebays, stilling basins, deep and shallow pools, microtopography, an aquatic bench, various planting zones and discharge stabilization. Forests, wetlands and buffers could be incorporated into the design. With these additional features, the project would meet all minimum requirements and green stormwater infrastructure design criteria. Therefore, the original 10 impervious acres treated is multiplied by 35% for a GSI credit of 13.5 acres (see Table 2).

If the project included both the WM features and the GSI features, the total credit would be 16 acres (10 acres x (0.25 WM credit +1.35 GSI credit)).

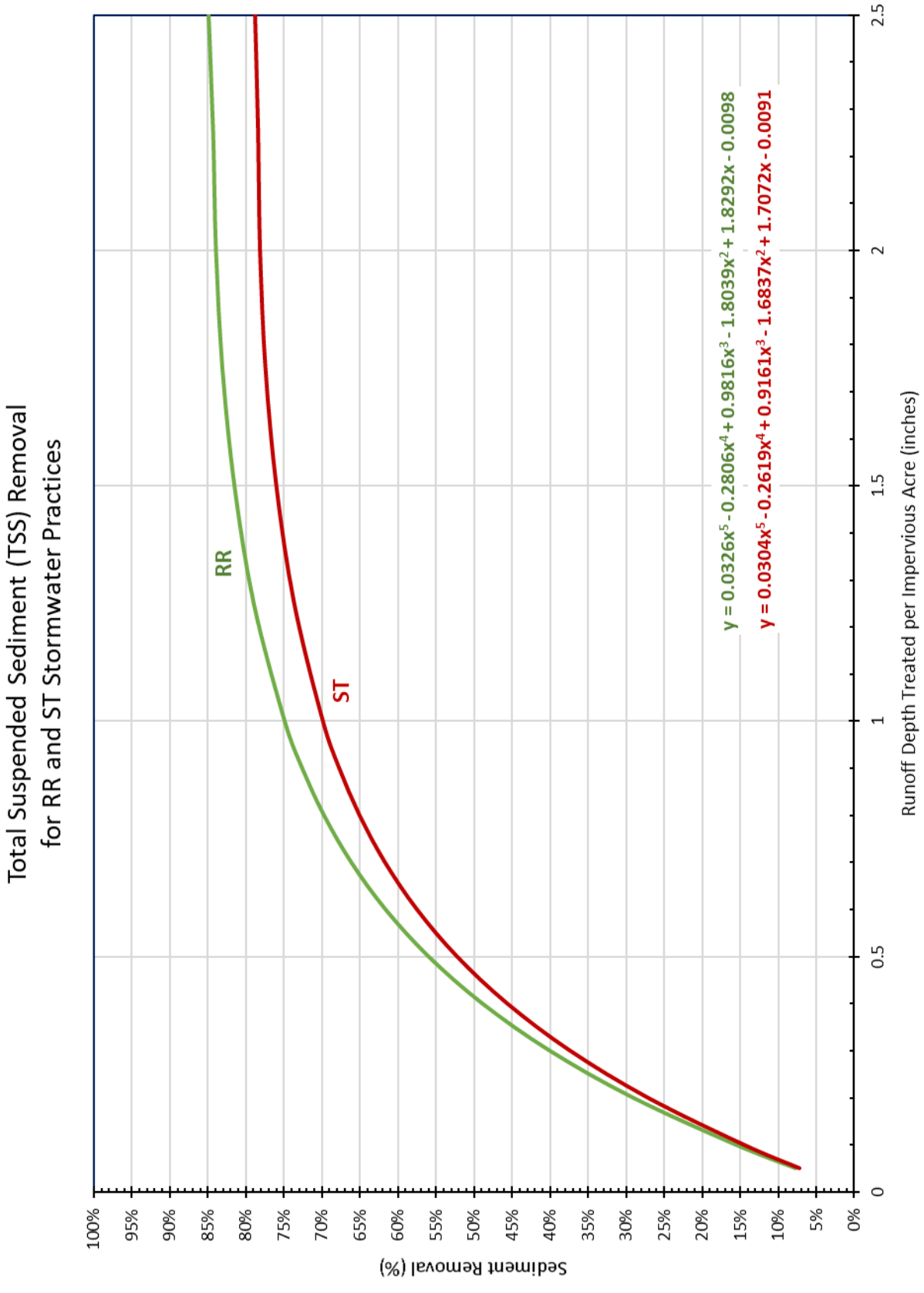
- Pollutant Load Reductions
  - Pollutant unit loads for an impervious acre per the Chesapeake Bay Phase 6 Watershed Model are:

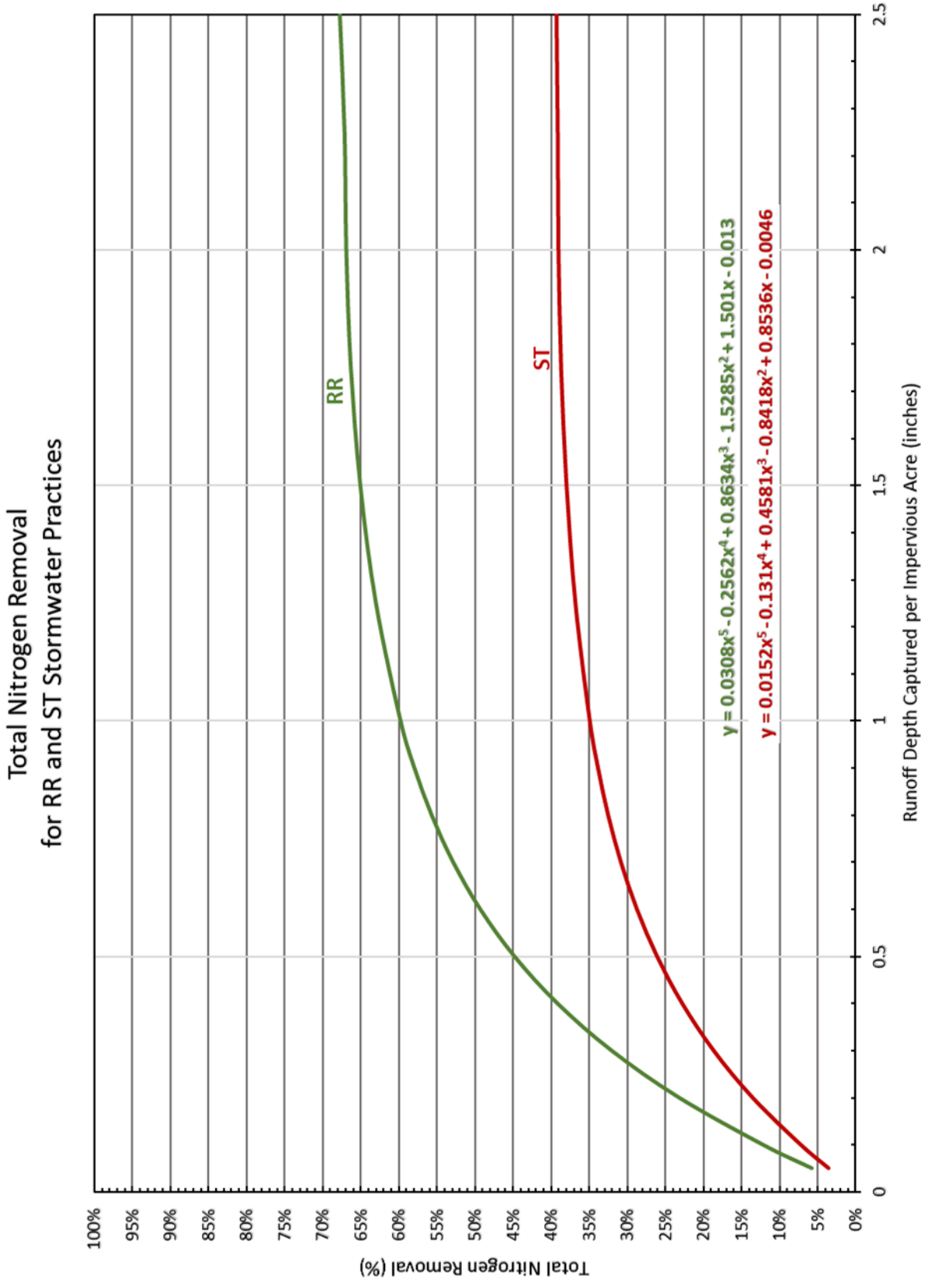
TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS (lbs/ac/yr)
14.66	0.72	1,668.19

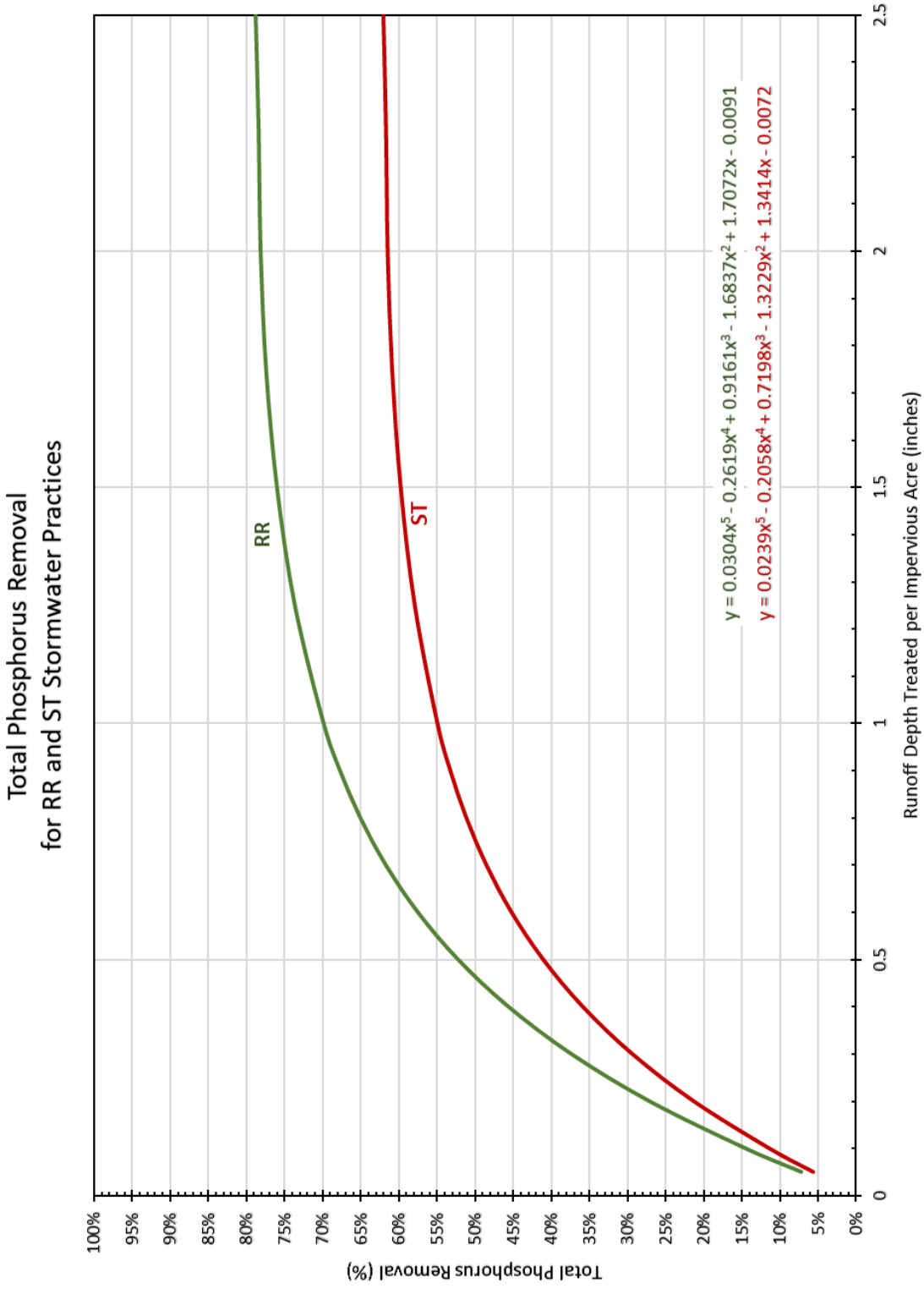
  - For all BMPs for Upland Applications, include estimated TN, TP, and TSS load reductions. Use the unit loads above and the adjustor curves and Table 3 below to determine TN, TP, and TSS load reductions.

Table 3. CBP Pollutant Removal Efficiencies for Upland BMPs

Runoff Depth Treated (Inches)	TN		TP		TSS	
	RR	ST	RR	ST	RR	ST
0.20	23.3%	13.6%	27.2%	21.4%	29.1%	27.2%
0.40	39.2%	22.8%	45.7%	35.9%	48.9%	45.7%
0.60	49.3%	28.8%	57.5%	45.2%	61.7%	57.5%
0.80	55.7%	32.5%	65.1%	51.1%	69.7%	65.1%
1.00	59.8%	34.9%	69.9%	54.9%	74.9%	69.9%
1.20	62.4%	36.5%	73.1%	57.4%	78.3%	73.1%
1.40	64.3%	37.6%	75.2%	59.1%	80.6%	75.2%
1.60	65.6%	38.3%	76.7%	60.3%	82.2%	76.7%
1.80	66.4%	38.8%	77.6%	61.0%	83.3%	77.6%
2.00	66.9%	39.1%	78.2%	61.4%	83.9%	78.2%
2.20	67.0%	39.2%	78.4%	61.6%	84.3%	78.4%
2.40	67.3%	39.2%	78.6%	61.8%	84.6%	78.6%
2.60	68.4%	39.5%	79.3%	62.4%	85.5%	79.3%


Total Suspended Sediment (TSS) Removal
for RR and ST Stormwater Practices
RR
ST
y = 0.0326x5 - 0.2806x4 + 0.9816x3 - 1.8039x2 + 1.8292x - 0.0098
y = 0.0304x5 - 0.2619x4 + 0.9161x3 - 1.6837x2 + 1.7072x - 0.0091
Sediment Removal (%)
100%
95%
90%
85%
80%
75%
70%
65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
0
0.5
1
1.5
2
2.5
Runoff Depth Treated per Impervious Acre (inches)


Total Nitrogen Removal
for RR and ST Stormwater Practices
RR
ST
y = 0.0308x5 - 0.2562x4 + 0.8634x3 - 1.5285x2 + 1.501x - 0.013
y = 0.0152x5 - 0.131x4 + 0.4581x3 - 0.8418x2 + 0.8536x - 0.0046
Total Nitrogen Removal (%)
100%
95%
90%
85%
80%
75%
70%
65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
0
0.5
1
1.5
2
2.5
Runoff Depth Captured per Impervious Acre (inches)



Alternative BMPs - Programmatic

- Provide the load reductions and equivalent impervious acres treated for each project. Use Table 4 and Table 5 below to determine equivalent impervious acres and load reductions for

each programmatic alternative BMP. The table is based on planning rates and is subject to change.

Table 4: Load Reductions and Equivalent Impervious Acres for Programmatic Alternative BMPs

Efficiency BMP	Load Reduced			Equivalent Impervious Acres	Units
	TN (lbs/acre/yr)	TP (lbs/acre/yr)	TSS (lbs/acre/yr)		
IDDE Programmatic	0.03	0.00	0.00	0.001	Per acre treated
Advanced Sweeping - 1 pass/12 weeks	0.00	0.07	356.62	0.025	Per acre/ mile swept
Advanced Sweeping - 1 pass/2 weeks	0.73	0.34	1961.41	0.146	
Advanced Sweeping - 1 pass/4 weeks	0.36	0.21	1069.86	0.082	
Advanced Sweeping - 1 pass/8 weeks	0.25	0.14	713.24	0.055	
Advanced Sweeping - 1 pass/week	1.09	0.55	2852.95	0.221	
Advanced Sweeping - 2 pass/week	1.46	0.69	3744.50	0.285	
Advanced Sweeping - fall 1 pass/1-2 weeks else monthly	0.73	0.34	1,783.10	0.139	
Advanced Sweeping - spring 1 pass/1-2 weeks else monthly	0.36	0.28	1,248.17	0.100	
Mechanical Broom - 1 pass/4 weeks	0.00	0.00	17.83	0.001	
Mechanical Broom - 1 pass/week	0.00	0.00	89.15	0.004	
Mechanical Broom - 2 pass/week	0.00	0.00	178.31	0.007	

Table 5: Alternative Septic BMPs

	Notes	Load Reduced			Impervious Acre Equivalent
		TN (lbs/acre/yr)	TP (lbs/acre/yr)	TSS (lbs/acre/yr)	
Septic Pumping	Pumping system is maintained and verified for annual credit	0.69	0	0	0.03
Septic Denitrification	Permanent credit for installing enhanced septic denitrification	6.0	0	0	0.26
Septic Connections to WWTP	Permanent credit for septic system connected to a WWTP	0[1]	0	0	0.39

[1]Actual load reductions shall be reported through local health department. Septic system credits only apply to impervious acre requirements.

Alternative BMPs – Prevented Sediment

- For stream restoration, shoreline stabilization, or outfall stabilization, provide the estimated linear feet in the Length Restored column.
- Load reductions and impervious acre credits for stream restoration, shoreline stabilization, and outfall stabilization use linear feet as the unit measure. Use Table 6 below to determine equivalent impervious acres and load reductions for each practice. This table is based on planning rates and is subject to change.

Table 6: Load Reduction and Equivalent Impervious Acres for Prevented Sediment Practices

Efficiency BMP	Load Reduced			Equivalent Impervious Acres	Units
	TN (lbs/acre/yr)	TP (lbs/acre/yr)	TSS (lbs/acre/yr)		
Floating Treatment Wetland – 10% Coverage	0.10	0.02	73.89	0.008	Per acre treated
Floating Treatment Wetland – 20% Coverage	0.22	0.05	150.99	0.017	
Floating Treatment Wetland – 30% Coverage	0.32	0.07	224.88	0.026	
Floating Treatment Wetland – 40% Coverage	0.43	0.09	295.55	0.034	
Floating Treatment Wetland – 50% Coverage	0.53	0.11	369.44	0.042	
Stream Restoration (LF) (Planning Rate)	.075	.068	248	0.02	Per linear ft
Shoreline Management (Planning Rate)	.086	.061	164	0.03	

Alternative BMPs – Land-use Conversion

- Provide the load reductions and estimated impervious acres treated for each project. Use Table 7 below to determine equivalent impervious acres and load reductions for each practice. The table is based on planning rates and is subject to change.

Table 7: Load Reduction and Equivalent Impervious Acres for Land-use Conversion BMPs

Land Use Conversion BMP	Load Reduced			Equivalent Impervious Acres	Units
	TN (lbs/acre/yr)	TP (lbs/acre/yr)	TSS (lbs/acre/yr)		
Forest Planting *(Turf → Forest)*	11.12	1.78	2,806	1.1	Per acre
Riparian Forest Planting	13.90	2.23	3,280	1.4	Per acre
Conservation Landscaping *(Turf → Mixed Open)*	5.24	0.53	0.00[1]	0.4	Per acre
Riparian Conservation Landscaping	6.55	0.66	0.00[1]	0.5	Per acre
Forest Conservation	10.57	1.10	2,465.63	0.46	Per acre
Impervious Surface Reduction *(Impervious → Turf)*	6.96	0.44	5,239	0.7	Per acre
Street Trees *(Roads → Tree Canopy over Impervious)*	3.09	0.76	1,248	0.4	Per acre
Urban Tree Canopy Planting *(Turf → Tree Canopy Over Turf)*	3.20	0.50	206	0.3	Per acre

[1]*if the credit was <0, the credit was set to 0. MDE will not be taking a negative credit.*

From: "Karl Berger" <kberger@mwcog.org>
Sent: Tue, 22 Oct 2019 19:44:55 +0000
To: "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>
Cc: "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>; "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Knapp, Les" <lknapp@mdcounties.org>
Subject: Feedback regarding latest restoration project portfolio guidance
Attachments: Text of Phase I MS4 letter to MDE.October 2019.pdf

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Lee,

Attached is the text of a letter outlining the Phase I MS4 group's concerns and questions about the recent package of materials from MDE for updating the restoration project portfolios for the five largest MS4s. The group is working with MACo staff to finalize a letter and attachment based on this text to be sent soon.

In the meantime, I am sending this text because of the tight timetable MDE staff has requested for updating the project portfolios by Nov. 7. The text details seven key concerns and a further list of 23 more detailed questions, for which the group's members need answers before they can update their portfolios.

Given the complexity of some of the issues, it may be advisable to hold a face-to-face meeting with the group to go over MDE's responses.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

Phase I MS4 group letter to MDE (via MACo)
Oct. 22, 2019

D. Lee Currey, Director
Water and Science Administration
Maryland Department of the Environment (MDE)
1800 Washington Blvd., Ste. 4502
Baltimore, MD 21230-1718

Dear Director Currey:

I am writing to provide initial feedback on the package of revised principles and instructions for updating the restoration project portfolios that the Maryland Department of the Environment provided to the five largest Phase I MS4s in correspondence dated October 7, 2019.

The concerns and questions that follow were developed by the technical managers of Maryland's Phase I MS4 permittees, who have formed a workgroup under the auspices of the Maryland Association of Counties.

The MS4 managers appreciate MDE's efforts to work with the group to develop restoration requirements for new permits that are financially and programmatically achievable. However, the latest documents supplied by MDE leave the group with a lack of clarity regarding MDE's timetable and overall permit direction. They also lead to a long list of questions. And they potentially change some principles that the group had thought were previously settled.

Until these concerns and questions are addressed, members of the group will not be able to complete the updates MDE has requested to the restoration project portfolios.

The group also urges MDE to hold the individual meetings with the Phase I permittees as originally proposed in April and included in the permit development schedule MDE provided in August. These meetings should be held after MDE determines what it plans to require in each permit but before MDE issues tentative determination drafts.

The group's overall concerns and questions follow. A separate set of more detailed questions is included as an attachment. Both the letter and attachment have been previously supplied to MDE via email.

1. The new set of accounting principles is significantly different from the principles that were provided in April 2019. In addition, the document states that the pollution reduction and impervious restoration calculations are draft and subject to change. MDE is asking local governments to plan for and commit to regulatory requirements in their restoration portfolios when the basis of meeting those requirements is still unclear and subject to change. Can MDE indicate when the principles and calculation methods will be considered final and not subject to further changes?

2. Joint efforts have produced a new basis for restoration requirements in the new permits that the group supports, namely, MEP-driven restoration portfolios. However, the group is concerned about seemingly contradictory statements from MDE about stormwater permitting

progress in future years. Considerable local effort has already gone into the development of the MEP restoration portfolios to set the basis for restoration requirements and further efforts will be needed to supply the revisions requested by MDE. Can MDE confirm that you are committed to using the MEP restoration portfolios to set restoration requirements under the new permits?

3. The group's understanding from the accounting principles and portfolio guidance provided in April was that credit for projects designed to meet any unmet obligation from the existing permit's 20-percent impervious surface restoration requirement would be based on the 2014 Accounting Guidance and old Chesapeake Bay Program model (Version 5.3.2) calculations. That principle is no longer clear to the group. Is MDE changing this principle?

4. The guidance provided in April also indicated that restoration work following completion of the 20% ISRP would be credited using Chesapeake Bay Program expert panel reports and the Phase 6 Chesapeake Bay Watershed Model (CBWM). The BMPs provided in the October 7, 2019, Accounting Principles do not match the BMPs, BMP efficiencies and EIA calculations that were based on the Phase 6 CBWM and presented by MDE at the September 27, 2018, meeting of the Accounting Guidance Committee. Those rates were subsequently updated and provided to the committee on October 16, 2018. What is the reason for these differences?

5. Under the most recent set of instructions, the impervious area cap for stream restoration projects described in MDE's April 2019 memorandum is no longer in effect. Please confirm if this is the case.

6. There is a lack of clarity concerning the new guidance for calculating credits for green stormwater infrastructure and watershed management. See the group's attached list of detailed questions.

7. The schedule for permit development provided to us in August is no longer feasible. Under that schedule, each of the five large Phase I MS4s expected to meet with MDE between August 30 and September 30, 2019. MDE was going to complete the draft MS4 permit, fact sheets and accounting guidance by September 15, 2019. And MDE planned to submit the draft permits to EPA by September 30, 2019, and provide EPA with 60 days to review. These documents were not provided to the Phase I large jurisdictions by the date promised and the meetings did not occur. What is the new schedule for the development of new permits for the large Phase I jurisdictions? When will the draft permits, fact sheets and accounting guidance be provided? What is the timetable for EPA review? When will MDE meet with each large jurisdiction? What is MDE's estimated date for issuing tentative determination drafts?

The group's members appreciate the opportunity they have had to discuss the provisions of a new permit with MDE staff. We believe more consultation and transparent communication among the parties will result in permits that will make the greatest progress to achieving Maryland's water quality goals. Thank you for considering these concerns and issues; we await your response.

List of Detailed Questions

Updated Instructions for Completing Restoration Project Portfolios (Updated October 7, 2019)

1. Is TP a “new” metric for the new permit? Or will IA, TN and TSS remain the three major restoration metrics?

2. How is MDE defining “Implementation Year” in the excel document? Is this calendar year or fiscal year? Is this when a project starts or is substantially complete?

3. What guidance documents are included in the following statement: “Projects should be credited using the Restoration Project Portfolio Accounting Principles and any additional guidance updates found on the Department’s webpage, e.g., stream restoration, outfall stabilization, CMAC (continuous monitoring and adaptive control).” Does this include the 2014 Accounting Guidance? The April 2019 Accounting Principles?

4. Please provide updated versions of tables A.1 and D.1 from the 2014 Guidance Manual.

Restoration Project Portfolio Accounting Principles (Updated October 7, 2019)

1. Please clarify which guidance should be used to calculate pollution reductions and impervious restoration for the "unmet obligations" and "obligations from previous permit that must be continued." Prior to these new instructions, MDE's instructions were to:
   a. Use the 2014 Guidance document and subsequent memoranda to compute the pollution reductions and impervious restoration of the following:
      i. Projects proposed to meet unmet obligations from prior permit term
      ii. Annual BMPs completed during prior permit term
   b. Use the new 2019 guidance to compute the pollution reductions and impervious restoration of the following:
      i. New annual BMPs proposed for new permit term
      ii. Projects proposed to replace annual BMPs completed during prior permit term

2. The new guidance does not discuss use of Chesapeake Bay Program expert panel protocols for stream restoration or shoreline management. Can applicants convert protocol pollutant load reductions to impervious restoration acres as per the 2014 Guidance appendix D method (with Phase 5 or Phase 6 deltas as appropriate, see question 1)? If so, is stream restoration still subject to an impervious area cap as described in the April 2019 memorandum?

3. For the new WM and GSI impervious restoration credits: please clarify how these credits relate to the volumes treated by existing SWM facilities. Specifically:
   a. Are these credits available for SWM facilities constructed prior to the start of the next permit? Prior to the expiration of the prior permit? Or only facilities constructed after some cutoff date?
   b. When the water quality function of a dry detention or extended detention pond is improved by a conversion, and the original facility provided watershed management (e.g. 10 year, 100

year, CPv storage, etc.), is the converted facility eligible for WM credits? Or are WM credits only available when new watershed management volume is added where none existed before?

4. Which BMP Types in the MDE Geodatabase would qualify for green stormwater infrastructure (GSI) and watershed management (WM) credit(s)?

5. Are Chapter 5 ESD practices considered structural BMPs?

6. Footnote 1 to Table 1 states that "WM captured is the difference between the total volume captured and the volume treated for water quality. The maximum value for WM is 2.0 inches." Is WQv above 1 inch considered WM? What is the difference between captured and treated?

7. Is a dry-extended detention pond providing CPv (with zero WQv) eligible for WM credit?

8. What type of temporary storage is eligible for the WM credit? Channel Protection Volume (Cpv) only? Or can it be a combination of CPv, Overbank Flood Protection Volume (Qp), and Extreme Flood Volume (Qf)?

9. Is WM rainfall depth? Or runoff depth?

10. Can you provide an example on how you determine the WM volume in inches?

11. Can a stand-alone BMP (i.e. Bioretention) qualify for the GSI credit?

12. What are the "minimum requirements and green stormwater infrastructure design criteria" that would qualify a BMP for the additional 35% GSI credit?

13. Can a dry-extended detention pond with GSI features receive GSI credit (e.g. Bioswale as conveyance to a dry pond)?

14. The combination of Chapter 3 of the 2000 stormwater manual, and the 2014 accounting guidance, implies that ED (CPv) storage provided on top of WQv can count as additional WQv, and achieve greater IA credit based on Table 3 in the 2014 guidance. Is that still the case for ED above a wet pool, or does the WM credit construct replace that?

15. If a pond retrofit provides 150% WQv in the wet pool, would Table 3 of the 2014 accounting guidance still apply? i.e., we would count that extra 50% as more WQv, and not WM volume?

16. In Table 2. Impervious Acre Credits for Green Stormwater Infrastructure (GSI); is column 2 mislabeled? Should it be "Impervious Acre Credit per Acre of Watershed *Impervious* Area?"

17. In Table 2. Impervious Acre Credits for Green Stormwater Infrastructure (GSI); is column 4 mislabeled? Should it be "Additional Credit per Acre of Watershed *Impervious* Area?"

18. Were the Additional Credit per Acre of Watershed Area and Total Credit per Acre of Watershed Impervious Area adjusted for Rainfall Depths Treated (inches) for 2.6 inches, 2.8 inches, and 3

inches to cap the additional credit at 0.5 acre? See yellow highlighted cells below.

Table 2. Impervious Acre Credits for Green Stormwater Infrastructure (GSI)

Rainfall Depth Treated (inches)	Impervious Acre Credit per Acre of Watershed *Impervious* Area	Green Infrastructure Credit Multiplier	Additional Credit per Acre of Watershed *Impervious* Area	Total Credit per Acre of Watershed Impervious Area
0.2	0.2	0.35	0.07	0.27
0.4	0.4	0.35	0.14	0.54
0.6	0.6	0.35	0.21	0.81
0.8	0.8	0.35	0.28	1.08
1	1	0.35	0.35	1.35
1.2	1.05	0.35	0.37	1.42
1.4	1.1	0.35	0.38	1.48
1.6	1.15	0.35	0.4	1.55
1.8	1.2	0.35	0.42	1.62
2	1.25	0.35	0.44	1.69
2.2	1.3	0.35	0.46	1.76
2.4	1.35	0.35	0.47	1.82
2.6	1.4	0.35	0.48	1.89
2.8	1.45	0.35	0.49	1.96
3	1.5	0.35	0.5	2

19. The Bay model has separate impervious acre loading rates for roads and non-roads. Is the rate provided a combination of both? Is it a statewide average?

20. Why are loading rates only provided for impervious acres? Don't we also need to account for loads from pervious acres in calculating pollutant reductions? Pollutant unit loads for pervious urban areas are needed to calculate pollution load reductions.

21. In Table 4, load reduced is in lbs/acre/yr, can we assume that one impervious acre is equivalent to one curb-lane mile swept, as stated in the Recommendations of the Expert Panel to Define Removal Rates for Street and Storm Drain Cleaning Practices? Or do we need to correct for lane width as described in the 2014 Accounting Guidance? Otherwise we will need to multiply mile swept to road width to get the acre.

22. Credit for "Impervious Urban to Forest" was previously listed in the 2014 Accounting Guidance document. This was not listed in Table 7. Is there no credit for "Impervious Urban to Forest" or is that accounted the same as Forest Planting (turf → Forest)?

23. What is the acre conversion for street trees? How many trees are in an acre?

24. The updated accounting principles do not include load reductions and EIA for catch basin cleaning, storm drain vacuuming, or outfall stabilization. Can we assume they stay the same as the 2014 guidance if not listed in the updated accounting principles?

From: "Karl Berger" <kberger@mwcog.org>
Sent: Wed, 30 Oct 2019 11:51:53 +0000
To: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen Wiggen" <wiggenk@charlescounty.org>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>
Cc: "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>
Subject: Latest MACo letter
Attachments: Letter 2019-10-29 Letter to MDE on MS4 Concerns (MACo).pdf

MS4 managers,

Here is a copy of the letter to MDE we crafted that Les was able to send officially via MACo. Lee Currey has acknowledged receipt of the letter.

(Thanks Les!)

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MARYLAND Association of COUNTIES

October 29, 2019

D. Lee Currey
Director, Water & Science Administration
Maryland Department of the Environment
Montgomery Park Business Center
1800 Washington Blvd.
Baltimore, MD 21230

Dear Director Currey,

The Maryland Association of Counties (MACo) and the County Municipal Separate Stormwater Sewer System (MS4) Workgroup are providing some initial feedback on the package of revised principles and instructions for updating the restoration project portfolios that the Maryland Department of the Environment provided to the five largest Phase I MS4s in correspondence dated October 7, 2019.

The concerns and questions that follow were developed through the Workgroup by the technical managers of Maryland's Phase I MS4 permittees. Both MACo and the Workgroup appreciate the Maryland Department of the Environment's (MDE's) efforts to work with the group to develop restoration requirements for new permits that are financially and programmatically achievable.

However, the latest documents supplied by MDE leave the Workgroup with a lack of clarity regarding MDE's timetable and overall permit direction. They also raise numerous questions and potentially change some principles that the Workgroup had thought were previously settled. Until these concerns and questions are addressed, counties will not be able to complete the updates MDE has requested to their restoration project portfolios.

MACo and the Workgroup also urge MDE to hold the individual meetings with the Phase I permittees as originally proposed in April and included in the permit development schedule MDE provided in August. These meetings should be held after MDE determines what it plans to require in each permit but before MDE issues tentative determination drafts.

The Workgroup's overall concerns and questions follow. A separate set of more detailed questions is included as an attachment. Both the letter and attachment have been previously supplied to MDE via email.

169 Conduit Street, Annapolis, MD 21401
410.269.0043 BALT/ANNAP ◆ 301.261.1140 WASH DC ◆ 410.268.1775 FAX
www.mdcounties.org

1. The new set of accounting principles is significantly different from the principles that were provided in April 2019. In addition, the document states that the pollution reduction and impervious restoration calculations are draft and subject to change. MDE is asking local governments to plan for and commit to regulatory requirements in their restoration portfolios when the basis of meeting those requirements is still unclear and subject to change. Can MDE indicate when the principles and calculation methods will be considered final and not subject to further changes?

2. Joint efforts have produced a new basis for restoration requirements in the new permits that the group supports, namely, Maximum Extent Practicable (MEP)-driven restoration portfolios. However, the group is concerned about seemingly contradictory statements from MDE about stormwater permitting progress in future years. Considerable local effort has already gone into the development of the MEP restoration portfolios to set the basis for restoration requirements and further efforts will be needed to supply the revisions requested by MDE. Can MDE confirm that you are committed to using the MEP restoration portfolios to set restoration requirements under the new permits?

3. The Workgroup's understanding from the accounting principles and portfolio guidance provided in April was that credit for projects designed to meet any unmet obligation from the existing permit's 20-percent impervious surface restoration requirement would be based on the 2014 Accounting Guidance and old Chesapeake Bay Program model (Version 5.3.2) calculations. That principle is no longer clear to the Workgroup. Is MDE changing this principle?

4. The guidance provided in April also indicated that restoration work following completion of the 20 percent Impervious Surface Restoration Plan (ISRP) would be credited using Chesapeake Bay Program expert panel reports and the Phase 6 Chesapeake Bay Watershed Model (CBWM). The Best Management Practices (BMPs) provided in the October 7, 2019, Accounting Principles do not match the BMPs, BMP efficiencies and Effective Impervious Area (EIA) calculations that were based on the Phase 6 CBWM and presented by MDE at the September 27, 2018, meeting of the Accounting Guidance Committee. Those rates were subsequently updated and provided to the committee on October 16, 2018. What is the reason for these differences?

5. Under the most recent set of instructions, the impervious area cap for stream restoration projects described in MDE's April 2019 memorandum is no longer in effect. Please confirm if this is the case.

6. There is a lack of clarity concerning the new guidance for calculating credits for green stormwater infrastructure and watershed management. See the Workgroup's attached list of detailed questions.

7. The schedule for permit development provided to the Workgroup in August is no longer feasible. Under that schedule, each of the five large Phase I MS4s expected to meet with MDE between August 30 and September 30, 2019. MDE was going to complete the draft MS4 permit, fact sheets and accounting guidance by September 15, 2019. And MDE planned to submit the draft permits to U.S. Environmental Protection Agency (EPA) by September 30, 2019, and provide EPA with 60 days to review. These documents were not provided to the Phase I large jurisdictions by the date promised and the meetings did not occur. What is the new schedule for the development of new permits for the large Phase I jurisdictions? When will the draft permits, fact sheets and accounting guidance be provided? What is the timetable for EPA review? When will MDE meet with each large jurisdiction? What is MDE's estimated date for issuing tentative determination drafts?

MACo and the Workgroup appreciate the opportunity to have ongoing discussions with MDE staff over the new MS4 permit provisions. We believe more consultation and transparent communication among the parties will result in permits that will make the greatest progress to achieving Maryland's water quality goals. Thank you for considering these concerns and issues.

Sincerely,

Leslie Knapp Jr.

Leslie Knapp Jr.
Legal and Policy Counsel
MACo

List of Detailed Questions

Updated Instructions for Completing Restoration Project Portfolios (Updated October 7, 2019)

1. Is TP a "new" metric for the new permit? Or will IA, TN and TSS remain the three major restoration metrics?

2. How is MDE defining "Implementation Year" in the excel document? Is this calendar year or fiscal year? Is this when a project starts or is substantially complete?

3. What guidance documents are included in the following statement: "Projects should be credited using the Restoration Project Portfolio Accounting Principles and any additional guidance updates found on the Department's webpage, e.g., stream restoration, outfall stabilization, CMAC (continuous monitoring and adaptive control)." Does this include the 2014 Accounting Guidance? The April 2019 Accounting Principles?

4. Please provide updated versions of tables A.1 and D.1 from the 2014 Guidance Manual.

Restoration Project Portfolio Accounting Principles (Updated October 7, 2019)

1. Please clarify which guidance should be used to calculate pollution reductions and impervious restoration for the "unmet obligations" and "obligations from previous permit that must be continued." Prior to these new instructions, MDE's instructions were to:
   a. Use the 2014 Guidance document and subsequent memoranda to compute the pollution reductions and impervious restoration of the following:
      i. Projects proposed to meet unmet obligations from prior permit term
      ii. Annual BMPs completed during prior permit term
   b. Use the new 2019 guidance to compute the pollution reductions and impervious restoration of the following:
      i. New annual BMPs proposed for new permit term
      ii. Projects proposed to replace annual BMPs completed during prior permit term

2. The new guidance does not discuss use of Chesapeake Bay Program expert panel protocols for stream restoration or shoreline management. Can applicants convert protocol pollutant load reductions to impervious restoration acres as per the 2014 Guidance appendix D method (with Phase 5 or Phase 6 deltas as appropriate, see question 1)? If so, is stream restoration still subject to an impervious area cap as described in the April 2019 memorandum?

3. For the new WM and GSI impervious restoration credits: please clarify how these credits relate to the volumes treated by existing SWM facilities. Specifically:
   a. Are these credits available for SWM facilities constructed prior to the start of the next permit? Prior to the expiration of the prior permit? Or only facilities constructed after some cutoff date?
   b. When the water quality function of a dry detention or extended detention pond is improved by a conversion, and the original facility provided watershed management (e.g. 10 year, 100 year, CPv storage, etc.), is the converted facility eligible for WM credits? Or are WM credits only available when new watershed management volume is added where none existed before?

4. Which BMP Types in the MDE Geodatabase would qualify for green stormwater infrastructure (GSI) and watershed management (WM) credit(s)?

5. Are Chapter 5 ESD practices considered structural BMPs?

6. Footnote 1 to Table 1 states that "WM captured is the difference between the total volume captured and the volume treated for water quality. The maximum value for WM is 2.0 inches." Is WQv above 1 inch considered WM? What is the difference between captured and treated?

7. Is a dry-extended detention pond providing CPv (with zero WQv) eligible for WM credit?

8. What type of temporary storage is eligible for the WM credit? Channel Protection Volume (Cpv) only? Or can it be a combination of CPv, Overbank Flood Protection Volume (Qp), and Extreme Flood Volume (Qf)?

9. Is WM rainfall depth? Or runoff depth?

10. Can you provide an example on how you determine the WM volume in inches?

11. Can a stand-alone BMP (i.e. Bioretention) qualify for the GSI credit?

12. What are the "minimum requirements and green stormwater infrastructure design criteria" that would qualify a BMP for the additional 35% GSI credit?

13. Can a dry-extended detention pond with GSI features receive GSI credit (e.g. Bioswale as conveyance to a dry pond)?

14. The combination of Chapter 3 of the 2000 stormwater manual, and the 2014 accounting guidance, implies that ED (CPv) storage provided on top of WQv can count as additional WQv, and achieve greater IA credit based on Table 3 in the 2014 guidance. Is that still the case for ED above a wet pool, or does the WM credit construct replace that?

15. If a pond retrofit provides 150% WQv in the wet pool, would Table 3 of the 2014 accounting guidance still apply? i.e., we would count that extra 50% as more WQv, and not WM volume?

16. In Table 2. Impervious Acre Credits for Green Stormwater Infrastructure (GSI); is column 2 mislabeled? Should it be "Impervious Acre Credit per Acre of Watershed *Impervious* Area?"

17. In Table 2. Impervious Acre Credits for Green Stormwater Infrastructure (GSI); is column 4 mislabeled? Should it be "Additional Credit per Acre of Watershed *Impervious* Area?"

18. Were the Additional Credit per Acre of Watershed Area and Total Credit per Acre of Watershed Impervious Area adjusted for Rainfall Depths Treated (inches) for 2.6 inches, 2.8 inches, and 3 inches to cap the additional credit at 0.5 acre? See yellow highlighted cells below.

e 2. Impervious Acre Credits for Green Stormwater Infrastructure (GSI)				
infall Depth ated (inches)	**mpervious Acre redit per Acre of ershed *Impervious* Area**	**n Infrastructure edit Multiplier**	**ditional Credit per Acre of Watershed *pervious* Area**	**Total Credit per Acre of Watershed pervious Area**
0.2	0.2	0.35	0.07	0.27
0.4	0.4	0.35	0.14	0.54
0.6	0.6	0.35	0.21	0.81
0.8	0.8	0.35	0.28	1.08
1	1	0.35	0.35	1.35
1.2	1.05	0.35	0.37	1.42
1.4	1.1	0.35	0.38	1.48
1.6	1.15	0.35	0.4	1.55
1.8	1.2	0.35	0.42	1.62
2	1.25	0.35	0.44	1.69
2.2	1.3	0.35	0.46	1.76
2.4	1.35	0.35	0.47	1.82
2.6	1.4	0.35	0.48	1.89
2.8	1.45	0.35	0.49	1.96
3	1.5	0.35	0.5	2

19. The Bay model has separate impervious acre loading rates for roads and non-roads. Is the rate provided a combination of both? Is it a statewide average?

20. Why are loading rates only provided for impervious acres? Don't we also need to account for loads from pervious acres in calculating pollutant reductions? Pollutant

unit loads for pervious urban areas are needed to calculate pollution load reductions.

21. In Table 4, load reduced is in lbs/acre/yr, can we assume that one impervious acre is equivalent to one curb-lane mile swept, as stated in the Recommendations of the Expert Panel to Define Removal Rates for Street and Storm Drain Cleaning Practices? Or do we need to correct for lane width as described in the 2014 Accounting Guidance? Otherwise we will need to multiply mile swept to road width to get the acre.

22. Credit for "Impervious Urban to Forest" was previously listed in the 2014 Accounting Guidance document. This was not listed in Table 7. Is there no credit for "Impervious Urban to Forest" or is that accounted the same as Forest Planting (turf → Forest)?

23. What is the acre conversion for street trees? How many trees are in an acre?

24. The updated accounting principles do not include load reductions and EIA for catch basin cleaning, storm drain vacuuming, or outfall stabilization. Can we assume they stay the same as the 2014 guidance if not listed in the updated accounting principles?

From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Fri, 8 Nov 2019 21:35:19 +0000
To: "Les Knapp" <lknapp@mdcounties.org>; "kberger@mwcog.org" <kberger@mwcog.org>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Erik Michelsen" <pwmich20@aacounty.org>; "Jeff DeHan" <jmdehan@co.pg.md.us>; "David Lykens" <dlykens@baltimorecountymd.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>; "Raymond Bahr" <raymond.bahr@maryland.gov>; "Lee Currey" <lee.currey@maryland.gov>
Subject: Letter regarding MEP Restoration Portfolio updates
Attachments: Knapp MS4 Letter 11_8_2019.pdf

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

All...

Thank you for your continued patience and cooperation as we continue to develop the next generation NPDES Phase I MS4 permit. On October 22, 2019, the Maryland Department of the Environment (Department) received a letter via the Maryland Association of Counties (MACo) with questions on the Maximum Extent Practicable (MEP) Restoration Project Portfolio update request. The attached letter that outlines the Department's response to these questions has been provided for your information.

Again, thank you for your cooperation. The Department values the input that it has received from the MS4s during the development of the next generation permit. If there are any questions concerning this email, please contact me at 410-537-3550 or by email, Raymond Bahr at 410-537-3545 or Raymond.Bahr@maryland.gov, or Jennifer Smith at 410-537-3561 or Jenniferm.smith@maryland.gov.

--
Stewart R. Comstock, P.E.
Program Review Division Chief
Sediment, Stormwater, & Dam Safety Program, WSA
Maryland Department of the Environment
1800 Washington Blvd | Baltimore, MD | 21230 | 410-537-3550 | stewart.comstock@maryland.gov

Click here to complete a three question customer experience survey.

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

November 8, 2019

Les Knapp
Legal and Policy Counsel
Maryland Association of Counties
169 Conduit Street
Annapolis, MD 21401

Dear Mr. Knapp:

Thank you for your recent letter to Lee Currey, Director, Water and Science Administration (WSA), Maryland Department of the Environment (Department), regarding questions from the Municipal Separate Storm Sewer System Phase I Large jurisdictions (MS4s) on the Maximum Extent Practicable (MEP) Restoration Project Portfolio update request. The Director received your letter and asked me to respond on his behalf.

On October 7, 2019, the Department distributed an updated MEP Restoration Project Portfolio spreadsheet and guidance to the MS4s and requested that they be re-submitted by November 7, 2019. These MEP Restoration Project Portfolios will be used by the Department in the development of the next generation National Pollutant Discharge Elimination System (NPDES) MS4 Phase 1 Large permit. On October 22, 2019, the Department received your letter that included a list of questions from the MS4s concerning the development of the MEP standard for the next generation permit. The answers to these questions are important and will be incorporated into the MS4 permit's companion document, the *2019 Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*.

In order to remain on track for meeting Chesapeake Bay Milestones of issuing the MS4 permit tentative determinations by the end of December, 2019, the Department has decided to use the current MEP analyses and MEP Restoration Project Portfolios that it received from each jurisdiction. The Department will provide the draft permit to the Environmental Protection Agency (EPA) and to each MS4 in the coming weeks. The Department will then meet with EPA and each jurisdiction to discuss the draft permits and next steps.

The Department values the input that it has received from the MS4s and looks forward to continuing this dialogue as we work toward issuing tentative determinations. Should you have questions, please contact me at 410-537-3561 or by email at jenniferm.smith@maryland.gov or Raymond Bahr at Raymond.bahr@maryland.gov.

Sincerely,

Jennifer M. Smith
Sediment, Stormwater, and Dam Safety Division
Water and Science Administration

cc: Lee Currey, Director, Water and Science Administration
Raymond Bahr, Deputy Program Manager, Sediment, Stormwater, and Dam Safety Program
Karl Berger, Metropolitan Washington Council of Governments

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 2 Dec 2019 20:58:04 +0000
To: "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>
Cc: "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>; "Raymond Bahr -MDE- (raymond.bahr@maryland.gov)" <raymond.bahr@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Knapp, Les" <lknapp@mdcounties.org>
Subject: Comments on Aug. 19 permit draft
Attachments: Group comments on MDE's 8-19-19 permit template draft.revised.docx

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Lee,

Attached are the MS4 Phase I group's comments on the Aug. 19, 2019, draft permit text that MDE staff sent to us. The group is working with MACo staff to finalize a letter and formal comments to be sent shortly, but we wanted your staff to get a chance to review these as soon as possible.

Many of the comments relate to the new Good Housekeeping Plan requirements that were included in MDE's latest draft. However, the comments also include comments on other sections, including some we made previously. These include a set of comments on Section IV.E re restoration. This section is noted as "under development" in MDE's Aug. 19 draft, as we jointly work out the details of the MEP approach. The comments that are included in this section relate to the current permit's existing language re local TMDL implementation plans and thus may still be relevant.

The comments use the Track Changes feature in Word to record our suggestions in strikeout/redline form. The document also includes Word-formatted comments in the right margin space.

Also, as usual, although the comments represent a group consensus, the MS4 permittees may comment separately on their draft permits.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MARYLAND DEPARTMENT OF THE ENVIRONMENT
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

PART I. IDENTIFICATION

A. Permit Number: XX-XX-XXXX XXXXXXXXX

B. Permit Area

This permit covers all stormwater discharges from the municipal separate storm sewer system (MS4) owned or operated jurisdiction-wide by XXXXX County/City/Agency, Maryland.

C. Effective Date: To be determined (TBD)

D. Expiration Date: TBD

PART II. DEFINITIONS

Terms used in this permit are defined in relevant chapters of Title 40 of the Code of Federal Regulations (CFR) Parts 122 - 124 or the Code of Maryland Regulations (COMAR) 26.08.01, 26.17.01, and 26.17.02. Terms not defined in CFR or COMAR shall have the meanings attributed by common use.

PART III. WATER QUALITY

XXXXX County/City/Agency must manage, implement, and enforce stormwater management programs in accordance with the Clean Water Act (CWA) and corresponding stormwater National Pollutant Discharge Elimination System (NPDES) regulations, 40 CFR Part 122, to meet the following requirements:

1. Effectively prohibit pollutants in stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with Maryland's receiving water quality standards;

2. Attain applicable stormwater wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with Title 33 of the U.S. Code (USC)
§1342(p)(3)(B)(iii); 40 CFR §122.44(k)(2) and (3); and

3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with all the conditions contained in PARTs IV through VII of this permit shall constitute compliance with §402(p)(3)(B)(iii) of the CWA and adequate progress toward compliance with Maryland's receiving water quality standards and EPA approved stormwater WLAs for this permit term.

PART IV. STANDARD PERMIT CONDITIONS

A. Permit Administration

XXXXX County/City/Agency shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County/City/Agency shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County/City/Agency shall submit in its annual reports to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

B. Legal Authority

XXXXX County/City/Agency shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR §122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County/City/Agency shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County/City/Agency's annual report.

C. Source Identification

Sources of pollutants in stormwater runoff jurisdiction-wide shall be identified by XXXXX County/City/Agency and linked to specific water quality impacts on a watershed basis. A georeferenced database shall be submitted annually in accordance with *Maryland Department of the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017)*, hereafter (MS4 Geodatabase) that includes information on the following:

Commented [KB1]: Outdated and must be updated for the requirements of this permit

1. Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;

2. Industrial and commercial sources: industrial and commercial land uses and sites that the County/City/Agency has determined have the potential to contribute significant pollutants;

3. Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;

4. Impervious surfaces: public and private land cover delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;

5. Monitoring locations: locations established by the County/City/Agency for chemical, biological, and physical monitoring of watershed restoration efforts and the *2000 Maryland Stormwater Design Manual,* or as part a pooled monitoring approach as described in Part IV.F; and

6. Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.

D. Management Programs

The following management programs shall be implemented ~~jurisdiction-wide~~within its MS4 permit area by XXXXX County/City/Agency. These management programs are designed to control stormwater discharges and reduce associated pollutant loadings to the maximum extent practicable (MEP) and shall be maintained for the term of this permit.
Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. Annual Reports for the County's/City's/Agency's management programs shall be in accordance with Part V.A of this permit and the MS4 Geodatabase.

Commented [KB2]: The permit applies to the MS4, not the entire jurisdiction.

1. Stormwater Management

An acceptable stormwater management program shall be maintained by the County/City/Agency in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the *2000 Maryland Stormwater Design Manual*. This includes:

i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;
ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and
iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.

b. Maintaining programmatic and implementation information including, but not limited to:

i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;
ii. Number of redevelopment projects received;
iii. Number of stormwater exemptions issued; and
iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by the County/City/Agency.

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County/City/Agency's annual reports.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall be maintained by the County/City/Agency and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the County/City/Agency's erosion and sediment control enforcement authority;

b. Ensuring that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE; and

c. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

3. Illicit Discharge Detection and Elimination

The County/City/Agency shall implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:

a. Field screening at least 150 outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit. An alternative program may be submitted by the County/City/Agency for MDE approval that methodically identifies, investigates, and eliminates illegal discharges to the County/City/Agency's MS4;

b. Conducting annual visual surveys of privately-owned commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;

c. Conduct annual visual surveys of improved properties (i.e. contains buildings or paved areas) owned in-fee by County/City/Agency and not subject to the Maryland General Permit for Discharges of Stormwater Associated with Industrial Activity, for purposes of discovering, documenting, and eliminating upland pollutant sources. Any identified pollutant sources shall be appropriately managed or eliminated and good housekeeping practices (GHP) employed from that time forward per Part IV.D.5.b. Properties with identified pollutant sources shall be resurveyed on a routine basis to ensure GHP implementation. Areas surveyed and survey results shall be reported annually;

~~c.~~d. Maintaining written standard operating procedures for outfall screenings, illicit discharge investigations, annual visual surveys of commercial and industrial areas, annual visual surveys of County-owned improved properties, responding to illicit discharge complaints, and enforcement implementation;

~~d.~~e. Maintaining a program to address, and if necessary, respond to illegal discharges, dumping, and spills; and

~~e.~~f. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. When a suspected illicit discharge discovered within the City/County/Agency's jurisdiction is either originating from or discharging to an adjacent MS4, the City/County/Agency must coordinate with that MS4 to resolve the investigation. Significant discharges shall be reported to MDE for enforcement and/or permitting.

4. Litter and Floatables

a. The County/City/Agency shall evaluate current litter control problems associated with discharges from portions of its MS4 that are not already addressed under a TMDL for trash (litter and floatables). Actions to address documented litter control problems shall be submitted to MDE and updated annually.

~~b. As part of the County/City/Agency watershed assessments under PART IV.E.1 of this permit, the County/City/Agency shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.~~

5. Property Management and Maintenance

a. Coverage under Maryland's NPDES General Permit for Discharges of Stormwater Associated with Industrial Activity (SW Industrial GP) is typically required at facilities where the following activities are performed: maintenance or storage of vehicles or equipment; use, handling, transport, or storage of fertilizers, pesticides, landscaping materials, hazardous materials, or other materials that could pollute stormwater runoff. The County/City/Agency shall:

Commented [KB3]: Proposed ONLY IN LIEU OF the full Good Housekeeping Plan requirements found in Part IV.D.5.b of the 8/19/19 Draft MS4 Phase I Permit.

It is understood that these are properties the County owns outright (owned in fee), not leased properties.

Commented [KB4]: Duplicative of 4.a. Also, watershed assessments are complete per requirements of Gen 4 MS4 Permit. It is our understanding that additional watershed assessments will not be required in the Gen 5 Ms4 Permit.

i. Ensure that a Notice of Intent (NOI) has been submitted to MDE for each County/City/Agency owned industrial facility requiring coverage under the SW Industrial GP; and

ii. Submit with the annual report a list of County/City/Agency properties requiring industrial stormwater permitting. Data to be submitted are the facility name and type, location (grid coordinates in NAD 83 meters), SW Industrial GP number, and NOI registration number.

Commented [KB5]: MDE- please revise the GDB requirements for Municipal Facilities to match the revised permit requirements. Make QTR_INSP, LAST_INSP_DATE, QUARTER, SWPPP, SWPPP_TRAINING, and ANNUAL_REVIEW fields optional. These data and narrative files are shared between the individual permitted facility and MDEs industrial permit compliance staff. Reporting these same data via the MS4 geodatabase is duplicative.

b. No later than the expiration date of this permit, the County/City/Agency shall install and maintain markings on all stormdrain inlets located on County/City/Agency owned and built property not subject to the SW Industrial GP, having greater than 2 acres of impervious surface, and where materials or activities occur and are expected to have exposure to stormwater resulting from rain, snow, snowmelt or runoff.

Commented [KB6]: Propose inclusion IN LIEU OF the full GHP section.

~~b.~~c. The County/City/Agency shall develop, implement, and maintain a good housekeeping plan (GHP) for those County/City/Agency owned properties identified, via Part IV.D.3 c of this permit, as in need of a GHP. ~~not required to be covered under Maryland's SW Industrial GP. The GHP shall be submitted to MDE by the County in its third year annual report and implemented thereafter.~~ A standard GHP may be developed for ~~all~~ those County~~-~~owned ~~property~~ properties identified, via Part IV.D.3 c of this permit, or separate GHPs may be developed for properties with similar use, e.g., recreation and parks properties, school properties. The GHP shall include, but not be limited to:

Commented [KB7]: Let's focus our resources and efforts on identifying problems that really exist and fixing those, rather than deploying preventative measures for problems that may not really exist. Both options have a cost. Identifying problems and fixing them will ensure the cost provides a clear and demonstrable benefit. Prevention without diagnosis of a real problem is much more difficult to justify.

i. A description of property management activities subject to GHP;
ii. A map of the ~~locations of properties~~property areas covered by the GHP;
iii. A list of potential pollutants and their sources that may result from facility activities;
iv. Written procedures designed to reduce the potential for stormwater pollution from property activities, including illicit discharges, dumping, and spills;

Commented [KB8]: For evidence of GHP implementation, refer back to the routine re-screening of these properties via the IDDE program.

~~c.~~d. The County/City/Agency shall continue to implement a program to reduce pollutants associated with the maintenance of County/City/Agency-owned ~~jurisdiction-wide~~ properties including local roads and parks. The maintenance program shall include the following activities where applicable:

i. Street sweeping;
ii. Inlet inspection and cleaning;
iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management;
iv. Litter removal; and
v. Pet waste removal.

~~d.~~e. The County/City/Agency shall ~~reduce~~ manage the use of winter weather deicing and anti-icing materials by developing a County/City/Agency Salt Management Plan

(SMP) to be submitted to MDE in its third year annual report and implemented thereafter. The SMP shall be based on the guidance provided on best road salt management practices described in *the Maryland Department of Transportation, State Highway Administration's Maryland Statewide Salt Management Plan, October 2017*. The County/City/Agency's SMP shall include, but not be limited to:

i. A plan for testing, evaluation of new equipment and strategies for continual improvement~~n anticipated schedule of equipment replacement that provides for technological improvements that regulate material application rates~~;

ii. Training and outreach:
- Creating a local "Salt Academy" that annually provides County/City/Agency winter weather operator personnel and contractors with the latest training in deicer and anti-icer management, or the participation of County/City/Agency personnel and contractors in a "Salt Academy" administered by another MS4 permittee or State agency; and
- Developing best salt management practices outreach for educating homeowners within the County/City/Agency; and

iii. Tracking and reporting:
- Starting with the fourth annual report, during storm events where deicing or anti-icing materials are applied to County/City/Agency roads, track and record the amount of materials used and snowfall per event; and
- Report the deicing or anti-icing application by event or date, and the monthly and annual tonnage used per lane mile per inch of snow.

~~e.~~f. The County/City/Agency shall report annually on the changes in its Property Management and Maintenance programs and the overall pollutant reductions resulting from this program.

6. Public Education

The County/City/Agency shall continue to implement a public education and outreach program to reduce stormwater pollutants. Education and outreach efforts may be integrated with other aspects of the County/City/Agency's activities. These efforts are to be documented and summarized in each annual report, with details on resources (e.g., personnel and financial) expended and method of delivery for education and outreach. The County/City/Agency shall implement a public outreach and education campaign with specific performance goals and deadlines including, but not limited to:

a. Maintaining a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

b. Providing information to inform the general public about the benefits of:

i. Increasing water conservation;
ii. Residential and community stormwater management implementation and facility maintenance;
iii. Proper erosion and sediment control practices;
iv. Increasing proper disposal of household hazardous waste;

Commented [KB9]: This language is consistent with SHA plan (see Section 13).

v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal);
vi. Residential car care and washing;
vii. Litter reduction;
viii. Reducing, reusing, and recycling solid waste; and
ix. Proper pet waste management.

E. Restoration for Total Maximum Daily Loads and Chesapeake Bay

~~This section is under development..~~

1. TMDL Stormwater Implementation Plans

a. Within one year of permit issuance, the County/City/Agency shall propose a TMDL stormwater implementation plan for meeting each EPA approved local and Chesapeake Bay stormwater WLA. A single plan may be developed for TMDLs targeting the same pollutant of concern, or a comprehensive plan may be developed to address all of the pollutants of concern. ~~Each~~ The TMDL stormwater implementation plan shall include estimated ~~interim and~~ final benchmarks for implementing stormwater BMPs, programmatic initiatives, and alternative control practices ~~for meeting~~consistent with the stormwater WLA within the permit term. The TMDL stormwater implementation plan shall report on the estimated continual maintenance costs of each stormwaterBMP, programmatic initiative and alternative control practice and how the efforts contribute to the overall MEP toward restoration. TMDL stormwater implementation plans approved by MDE during the previous permit cycle may be used to comply with this requirement;

b. ~~Within one year of permit issuance, the County/City/Agency shall provide~~Each implementation plan shall include a ~~specific~~ list of stormwater BMPs, programmatic initiatives, and alternative control practices that will be completed during this permit term. ~~Specify~~ The list shall include the estimated cost of each practice/program ~~on the list~~ and how the implementation of each will work toward meeting the local and Chesapeake Bay stormwater WLAs, impervious area restoration requirements in Part IV.E.2., and the additional Chesapeake Bay restoration requirement in Part IV.E.3. For tracking progress, the County/City/Agency shall ~~propose~~ report annual~~ly targets as follows~~:

i. The n~~N~~umerical stormwater BMP and alternative control practices ~~implementation benchmarks~~implemented that year;
ii. Narrative programmatic initiative milestones accomplished that year;
iii. Numerical impervious acre restoration ~~benchmarks~~achieved that year and its progress toward the final benchmark;
iv. Numerical pollutant load reduction benchmarks for TN and TP and progress toward Chesapeake Bay stormwater WLAs; and
v. Numerical (or narrative where appropriate) pollutant load reductions ~~benchmarks~~ for local stormwater WLAs.

~~MDE's approval of specific lists of stormwater BMPs, programmatic initiatives, and alternative control practices that will be completed during this permit term toward meeting established benchmarks and milestones shall be enforced.~~

c. Following submittal of TMDL stormwater implementation plan(s), XXXX County/City/Agency shall report annually on implementation progress,including any project substitutions. ~~In the event that an annual target is not met, the report on implementation progress shall include steps that XXXX County/City/Agency is taking to ensure that the missed target is met and that subsequent targets are met on schedule.~~

d. For any local TMDL with a stormwater WLA that is approved by EPA subsequent to the issuance of this permit, the County/City/Agency shall submit a TMDL stormwater implementation plan within one year of that approval date to address changes from the previous local TMDLimplementation plan:

i. TMDL stormwater implementation plans shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County/City/Agency water quality analysis; and

ii. Each TMDL stormwater implementation plan shall include estimated ~~interim and~~ final benchmarks for implementing the stormwater BMPs, programmatic initiatives, and alternative stormwater controls proposed as part of the plan.

4. Adaptive Management

The County/City/Agency shall continue to implement, evaluate, and update all of its existing plans for each EPA approved stormwater WLA by:

a. Evaluating and tracking the implementation of stormwater BMPs, programmatic initiatives, and alternative control practices through monitoring or modeling to estimate the net change in pollutant load reductions or a water quality response;

b. Documenting progress toward meeting established benchmarks, milestones, and final dates for stormwater WLAs; and

c. Developing an ongoing and iterative process that continuously implements new and additional stormwater BMPs, programmatic initiatives, and alternative control practices when stormwater WLAs ~~are not being~~have not been met ~~according to established benchmarks, milestones, and~~before the approved final dates.

5. Public Participation

The County/City/Agency shall provide ~~continual~~ outreach to the public regarding the development of its TMDL stormwater implemen~~n~~mtation plans. ~~Additionally, the County/City/Agency shall allow for public participation in the TMDL process, solicit input, and incorporate any relevant ideas and program improvements that can aid in achieving stormwater WLAs, TMDL water quality endpoints and water quality standards.~~ The County/City/Agency shall provide a comment period to the public regarding its TMDL stormwater implementation plans that will allow for suggestions on the draft version and comments on the final version.The County/City/Agency shall provide:

a. Notice in a local newspaper ~~and~~ or the County/City/Agency's web site outlining how the public may obtain information on the development of TMDL stormwater implementation plans and opportunities for comment;

b. Procedures for providing electronic and/or paper copies of TMDL stormwater implementation ~~restoration~~ plans to interested parties upon request;

c. A minimum 30 day comment period before finalizing TMDL stormwater implementation plans;

~~d. The County/City/Agency shall continue to provide for public comment on individual local stormwater management BMPs, programmatic initiatives, and alternative practices targeted at achieving the TMDL plan;~~

~~d.~~e. A summary in each ~~annual report~~implementation plan of how the County/City/Agency addressed or will address any material comment received from the public.

F. Assessment of Controls

XXXXX County/City/Agency shall conduct BMP effectiveness and watershed assessment monitoring for tracking progress toward improving local water quality and restoring Chesapeake Bay.

1. BMP Effectiveness Monitoring

By April 10, 2020, the County/City/Agency shall notify MDE which option it chooses for BMP effectiveness monitoring. The two options are:

a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by the Chesapeake Bay Trust (CBT) for determining monitoring needs and selecting appropriate monitoring studies. To implement the required monitoring, the County/City/Agency shall pay $100,000 into a pooled monitoring CBT fund by ~~July 1~~Sept. 1 of each year participating. Enrollment in the program shall be demonstrated through a memorandum of understanding (MOU) between the County/City/Agency and CBT. The County/City/Agency shall remain in the program for the duration of this permit term; or

b. The County/City/Agency shall continue monitoring the (*said*) outfall and (*said*) in-stream station in the (*said*) watershed, or select and submit for MDE's approval a new BMP effectiveness study for monitoring by April 10, 2020. Monitoring activities shall occur where the cumulative effects of watershed restoration activities, performed in compliance with this permit, can be assessed. The minimum criteria for chemical, biological, and physical monitoring are as follows:

i. Chemical Monitoring:

- Twelve (12) storm events shall be monitored per year at each monitoring

Commented [KB10]: Local papers do not exist in some jurisdictions

Commented [KB11]: 1.Inviting public comment on any and all BMPs etc. at any time would negatively impact restoration implementation by slowing the process down, increasing the cost of each project, and reducing permittee flexibility and adaptations.
2. Lists of BMPs, programmatic initiatives, and alternative practices are part of the TMDL plans, and TMDL plans are already exposed to public comment, then it is redundant to specify these items are open for public comment.

Commented [KB12]: The MS4s have the following concerns or questions about the pooled monitoring option in this section:
* Confirm that EPA and MDE will recognize and authorize the pooled monitoring approach as satisfying permit monitoring conditions.
* Provide explanation on how participation costs are determined for participating jurisdictions.
* How are monitoring results to be validated and accepted (State vs. jurisdictions)?
* Provide clarity on volunteer participation vs. participation with State/Permit track. Our understanding is that volunteer participation in the pool will allow jurisdictions to have greater control or direction as to the "problem or question" being proposed through the grant RFP solicitations. Who has control and how will the questions/problems be developed and vetted under the pooled monitoring program?

Commented [KB13]: Need time for fiscal year change

location with at least two occurring per quarter. Quarters shall be based on the calendar year. If exceptional weather patterns (e.g., dry weather periods) or other circumstances (e.g., equipment failures) occur during the reporting year, the City/County/Agency shall provide documentation of such circumstance(s). A minimum of eight (8) storm events shall be monitored;

- Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods;
- At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136, and event mean concentrations (EMCs) shall be calculated;
- Baseflow sampling shall occur quarterly at the mid-point of each season, e.g., February 15 for the first quarter, June 15 for the second quarter.
- Stormwater flow and baseflow measurements shall be recorded at the outfall and in-stream stations for the following parameters:

Stormwater and Baseflow Representative Samples

(Parameters)
Total Suspended Solids (TSS)
Bacteria (*E.coli* or *Enterococcus* spp.)
Chloride
Discharge (flow)
Biological Oxygen Demand (BOD) or TOC
Orthophosphate
Total Nitrogen (TN)
Nitrate + Nitrite
Total ammonia (sewer signal)
Total Phosphorus (TP)

- Continuous measurements shall be recorded for the parameters listed below at the in-stream monitoring station or other practical location based on the approved study design;

Continuous Measurements (Parameters)
Temperature
pH
Discharge (flow)
Turbidity
Conductivity

- Data collected from stormwater, baseflow, and continuous monitoring shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models;
- An approved sampling plan under a prior MS4 permit for the

County/City/Agency may continue until a new sampling plan is proposed under this permit.

ii. Biological Monitoring:

- Benthic macroinvertebrate samples shall be gathered each spring between the outfall and in-stream stations or other practical locations based on an MDE approved study design; and
- The County/City/Agency shall use the Maryland Biological Stream Survey (MBSS) sampling protocols for biological and stream habitat assessment.

iii. Physical Monitoring:

- A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on the approved study design. This assessment shall include annual comparison of permanently monumented stream channel cross-sections and the stream profile; and

- A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

iv. Annual Data Submittal: The County/City/Agency shall describe in detail its monitoring activities for the previous year and include the following:

- EMCs submitted on MDE's long-term monitoring MS4 Geodatabase as specified in PART V below;
- Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations;
- Any available analysis of surrogate relationships with the above monitoring parameters; and
- Any requests and accompanying justifications for proposed modifications to the monitoring program.

2. [County/City/Agency] Watershed Assessment and Trend Monitoring

By April 10, 2020, the County/City/Agency shall notify MDE which option it chooses for watershed assessment monitoring. The two options are as follows:

a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by CBT for determining appropriate watershed assessment monitoring for stream biology and habitat, bacteria, and chlorides. The County/City/Agency can select the type of watershed assessment monitoring (stream biology and habitat, bacteria, and chlorides) for the pooled monitoring. . To implement the required monitoring, the County/City/Agency shall pay (between $101,000 and $166,000 for biological monitoring; $8,000 and $55,000 for bacteria monitoring, and $8,100 and $15,200 for chloride monitoring ~~$150,000 and $200,000~~

Commented [KB14]: Montgomery County does not want to duplicate its biological trend monitoring program, but sees potential in joining into a pooled monitoring program for bacteria and chloride. This section should be more flexible for opting into the pooled monitoring.

based on the number of local TMDL assessments required) annually into a pooled monitoring CBT fund by July 1September 1 of each year participating. Enrollment in the program shall be demonstrated through an MOU between the County/City/Agency and CBT. Once the County/City/Agency has joined the program, theThe County/City/Agency shall remain in the program for the duration of this permit term; or

b. The County/City/Agency shall submit a comprehensive plan for watershed monitoring by April 10, 2021 related to stream biology and habitat, bacteria, and chlorides for MDE's approval. The plan shall include:

i. Biological and habitat assessment monitoring at randomly selected stream sites using MBSS protocols;

ii. Bacteria, i.e., *E.coli*, *Enterococcus* spp., or fecal coliform monitoring; and

iii. Chloride assessments at two locations.

G. Program Funding

1. Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted by XXXXX County/City/Agency as required in PART V below.

2. Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. Annual Reporting

1. Annual progress reports, required under 40 CFR §122.42(c), will facilitate the long-term assessment of XXXXX County/City/Agency's NPDES stormwater program. The County/City/Agency shall submit annual reports on or before the anniversary date of this permit and post these reports on the County/City/Agency's website. All information, data, and analyses shall be based on the State's fiscal year and include:

a. An executive summary on the status of implementing the County/City/Agency's MS4 programs that are established as permit conditions including:

i. Permit Administration;
ii. Legal Authority;
iii. Source Identification;
iv. Stormwater Management;
v. Erosion and Sediment Control;
vi. Illicit Discharge Detection and Elimination;

vii. Litter and Floatables;
viii. Property Management and Maintenance;
ix. Public Education;
x. Restoration for Total Maximum Daily Loads and Chesapeake Bay;
xi. Assessment of Controls; and
xii. Program Funding.

b. A narrative summary describing the results and analyses of data, including monitoring data that is accumulated throughout the reporting year;

c. Expenditures for the reporting period and the proposed budget for the upcoming year;

d. A summary describing the number and nature of enforcement actions, inspections, and public education programs;

e. The identification of water quality improvements and documentation of attainment and/or progress toward attainment of schedules, benchmarks, deadlines, and applicable stormwater WLAs developed under EPA approved TMDLs; and

f. The identification of any proposed changes to the County/City/Agency's program when stormwater WLAs are not being met.

2. All annual reporting specified in PARTs IV.C, D, E, F, and G, or required anywhere within this permit shall be made using the *Maryland Department of the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017)*. A corresponding User's Guide provides guidance for data requirements and entry into the MS4 Geodatabase.

3.

4. Because this permit uses an iterative approach to implementation, the County/City/Agency must evaluate the ~~effectiveness~~ progression of its programs toward meeting the permit goals in each annual report. The County/City/Agency shall show through narrative and/or numerical documentation the progression towards meeting stormwater WLAs developed under EPA approved TMDLs. This evaluation will coincide with the BMP Effectiveness Monitoring reporting outlined in Part IV. ~~BMP and program modifications shall be made within 12 months if the County/City/Agency's annual report does not demonstrate compliance with this permit and show progress toward meeting stormwater WLAs developed under EPA approved TMDLs.~~

Commented [KB15]: Outdated and must be updated for the requirements of this permit

Regarding PART IV.D.5.a --
MDE- please revise the GDB requirements for the *MunicipalFacilities* Feature Class to match the Gen 5 MS4 permit requirements. Make QTR_INSP, LAST_INSP_DATE, QUARTER, SWPPP, SWPPP_TRAINING, and ANNUAL_REVIEW fields optional. These data and narrative files are shared between the individual 12-SW permitted facility and MDEs industrial permit compliance staff. Reporting via the MS4 Geodatabase is duplicative.

Additional modifications to the GDB structure may be necessary to accommodate the data required in Parts IV. C, D, E, F, and G.

B. Program Review

In order to assess the effectiveness of XXXXX County/City/Agency's NPDES stormwater program for reducing the discharge of pollutants to the MEP and working toward meeting water quality standards, MDE will review annual reports, conduct field inspections, and periodically make requests for additional data to determine permit compliance. Procedures for the review of local erosion and sediment control and stormwater management programs exist in Maryland State law and regulations. Additional evaluations and field inspections shall be conducted for IDDE, public property management, assessment of controls, and impervious surface area and Chesapeake Bay restoration to determine compliance with permit conditions.

C. Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than 5 years unless administratively continued by MDE. Continuation or reissuance of this permit beyond this permit term will require XXXXX County/City/Agency to reapply for NPDES stormwater discharge permit coverage in its fourth-year annual report. Failure to reapply for coverage constitutes a violation of this permit.

As part of this application process, the County/City/Agency shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how each County/City/Agency watershed has been thoroughly evaluated, and the status of implementing water quality improvement projects and all schedules, benchmarks, and deadlines toward meeting stormwater WLAs. This application shall be used to gauge the effectiveness of the County/City/Agency's NPDES stormwater program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

1. The County/City/Agency's NPDES stormwater program goals;

2. Program summaries for the permit term regarding:

   a. Illicit discharge detection and elimination results;

   b. Impervious Surface and Chesapeake Bay Restoration status including County/City/Agency totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting stormwater WLAs developed under EPA approved TMDLs;

   c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved;

   d. Other relevant data and information for describing County/City/Agency programs;

3. Program operation and capital improvement costs for the permit term; and

4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the County/City/Agency's efforts to comply with the conditions of this permit.

PART VI. SPECIAL PROGRAMMATIC CONDITIONS

A. Maryland's baseline programs, including the 1991 Forest Conservation Act, 1997 Priority Funding Areas Act, 2007 Stormwater Management Act, 2009 Smart, Green & Growing Planning Legislation, 2010 Sustainable Communities Act, 2011 Best Available Technology Regulation, and the 2012 Sustainable Growth & Agricultural Preservation Act effectively mitigate the majority of the impacts from new development. Any additional loads will be offset through Maryland's alignment for growth policies and procedures as articulated through Chesapeake Bay milestone achievement. The overriding goal shall be no net growth in loads and XXXXX County/City/Agency shall reflect these policies, programs, and implementation as part of its net WLA accounting as stipulated in Part IV.E.4.b.ii of this permit.

PART VII. ENFORCEMENT AND PENALTIES

A. Discharge Prohibitions and Receiving Water Limitations

XXXXX County/City/Agency shall prohibit non-stormwater discharges through its MS4. NPDES permitted non-stormwater discharges are exempt from this prohibition. Discharges from the following will not be considered a source of pollutants when properly managed: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration to separate storm sewers; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation waters; springs; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; de-chlorinated swimming pool discharges (not including filter backwash); street wash water; and firefighting activities.

Consistent with §402(p)(3)(B)(iii) of the CWA, the County/City/Agency shall take all reasonable steps to minimize or prevent the contamination or other alteration of the physical, chemical, or biological properties of any waters of the State, including a change in temperature, taste, color, turbidity, or odor of the waters or the discharge or deposit of any organic matter, harmful organism, or liquid, gaseous, solid, radioactive, or other substance into any waters of the State, that will render the waters harmful to:

1. Public health, safety, or welfare;

2. Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial use;

3. Livestock, wild animals, cats, or birds; and

4. Fish or other aquatic life.

B. Duty to Mitigate

XXXXX County/City/Agency shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

C. Duty to Comply

XXXXX County/City/Agency shall be responsible for complying with all conditions of this permit. Other entities may be used to meet various permit obligations provided that both the County/City/Agency and the other entity agree contractually. Regardless of any arrangement entered into however, the County/City/Agency remains responsible for permit compliance. In no case may this responsibility or permit compliance liability be transferred to another entity.

Failure to comply with a permit provision constitutes a violation of the CWA and is grounds for enforcement action; permit termination, revocation, or modification; or denial of a permit renewal application. The County/City/Agency shall comply at all times with the provisions of the Environment Article, Title 4, Subtitles 1, 2, and 4; Title 7, Subtitle 2; and Title 9, Subtitle 3 of the Annotated Code of

Maryland.

The County/City/Agency shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the County/City/Agency to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the County/City/Agency only when the operation is necessary to achieve compliance with the conditions of the permit.

D. Sanctions

1. Penalties Under the CWA - Civil and Criminal

Section 309(g)(2) of the CWA, 33 USC §1319(g)(2) provides that any person who violates any permit condition is subject to a civil penalty not to exceed $10,000 per day for each violation, not to exceed $125,000. Pursuant to the Civil Monetary Penalty Inflation Adjustment Rule, 40 CFR Part 19, any person who violates any NPDES permit condition or limitation is liable for an administrative penalty not to exceed $16,000 per day for each such violation, up to a total penalty of $177,500. Pursuant to Section 309(c) of the CWA, 33 USC §1319(c), any person who negligently violates any permit condition is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. Any person who knowingly violates any permit condition is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both.

2. Penalties Under the State's Environment Article - Civil and Criminal

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the County/City/Agency from civil or criminal responsibilities and/or penalties for a violation of Title 4, Title 7, and Title 9 of the Environment Article, Annotated Code of Maryland, or any federal, local, or other State law or regulation. Section 9-342 of the Environment Article provides that a person who violates any condition of this permit is liable to a civil penalty of up to $10,000 per violation, to be collected in a civil action brought by MDE, and with each day a violation continues being a separate violation. Section 9-342 further authorizes MDE to impose upon any person who violates a permit condition, administrative civil penalties of up to $5,000 per violation, up to $50,000.

Section 9-343 of the Environment Article provides that any person who violates a permit condition is subject to a criminal penalty not exceeding
$25,000 or imprisonment not exceeding 1 year, or both for a first offense. For a second offense, Section 9-343 provides for a fine not exceeding $50,000 and up to 2 years imprisonment.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who knowingly makes any false statement, representation, or certification in any records or other

document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

E. Permit Revocation and Modification

1. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by XXXXX County/City/Agency for a permit modification or a notification of planned changes or anticipated noncompliance does not stay any permit condition. A permit may be modified by MDE upon written request by the County/City/Agency and after notice and opportunity for a public hearing in accordance with and for the reasons set forth in COMAR 26.08.04.10.

A permit may be modified, suspended or revoked and reissued in whole or in part during this permit term by MDE a~~A~~fter notice and opportunity for a hearing and in accordance with COMAR 26.08.04.10, ~~MDE may modify, suspend, or revoke and reissue this permit in whole or in part during its term~~ for causes including, but not limited to the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. A change in any condition that requires either a temporary reduction or elimination of the authorized discharge;

d. A determination that the permitted discharge poses an immediate threat to human health or welfare or to the environment and can only be regulated to acceptable levels by permit termination or modification ~~or termination~~to incorporate additional controls that are necessary to ensure human health and safety are not impacted by the permitted effluent;

~~e. To incorporate additional controls that are necessary to ensure that the permit effluent limit requirements are consistent with any applicable TMDL WLA allocated to the discharge of pollutants from the MS4; or~~

f. As specified in 40 CFR §§122.62, 122.63, 122.64, and 124.5.

2. Duty to Provide Information

The County/City/Agency shall furnish to MDE, within a reasonable time, any information that MDE may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit. The County/City/Agency shall also furnish to MDE, upon request, copies of records required to be kept by this permit.

F. Inspection and Entry

XXXXX County/City/Agency shall allow an authorized representative of the State or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulatory activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and obtain copies at reasonable times of any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times, without prior notice, any construction site, facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or

5. parameters at any location.

G. Monitoring and Recordkeeping

Unless otherwise specified by this permit, all monitoring and records of monitoring shall be in accordance with 40 CFR §122.41(j).

H. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State or local law or regulations.

I. Severability

The provisions of this permit are severable. If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect. If the application of any provision of this permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

J. Signature of Authorized Administrator and Jurisdiction

Each application, report, or other information required under this permit to be submitted to MDE shall be signed as required by COMAR 16.08.04.01-1.
Signatories shall be a principal executive officer, ranking elected official, or other duly authorized employee.

_____ _____

Lee Currey, Director **Date**
Water and Science Administration

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 30 Dec 2019 16:34:29 +0000
To: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen Wiggen" <wiggenk@charlescounty.org>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>
Cc: "Janis Markusic" <pwmark02@aacounty.org>; "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "Joiner, Jeremy" <JJoiner@FrederickCountyMD.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "Richmond, Mark S" <msrichmond@howardcountymd.gov>; "Lowe, Christine" <cslowe@howardcountymd.gov>; "Heyn, Chris" <cheyn@carrollcountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "'Knapp, Les'" <lknapp@mdcounties.org>
Subject: MDE permit developments
Attachments: 2019 MS4 Accounting Guidance Document 12-23-19.pdf, Dec. 23 MDE letter.pdf

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

MS4 managers,

On Dec. 23, MDE released a revised Accounting Guidance document and sent letters to the five largest MS4s with a new deadline for their MEP portfolio submissions (Jan. 30), a proposal to hold individual meetings sometime in January, and an acknowledgement of a new schedule (albeit lacking any details) for issuing the permits.

The revised Accounting Guidance document was also sent to the members of the MS4 Guidance Committee. Both this transmission email and the Dec. 23 letter to the large MS4s seem to indicate that the Accounting Guidance document is still draft and subject to further revisions.

In other developments, Les Knapp was able to finalize a letter officially sending the group's comments on the MS4 permit template language to MDE on Dec. 23 (separate email).

I anticipate scheduling a group call for some time in January.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments

202-962-3350

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

RE: 2019 Accounting for Stormwater Wasteload Allocations and Impervious Acres

Dear NPDES MS4 Phase I Large Permittees:

Thank you for your letter to the Maryland Department of the Environment (Department) regarding the status of Phase I Large Municipal Separate Storm Sewer System (MS4) permitting in Maryland. The Department's Water and Science Administration (WSA) has been working through the necessary steps to finalize National Pollutant Discharge Elimination System (NPDES) MS4 Phase I Large permits. The next step in the permit development process is to share with you the 2019 *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* (MS4 Guidance). This updated MS4 Guidance uses an impervious acre credit to account for MS4 restoration achieved through stormwater BMP implementation. We improved upon the 2014 Guidance by adding fifteen new BMPs and updating the credits using the Phase 6 Chesapeake Bay Watershed Model. In addition, impervious surface restoration credits are now available for incorporating green infrastructure and climate resiliency into better BMP designs.

The MS4 Guidance also addresses the questions posed by the Maryland Association of Counties (MACo) in the October 22, 2019 letter to the Department regarding updates to the maximum extent practicable BMP portfolios (MEP portfolio). Accordingly, the Department requests that each MS4 permittee use the new MS4 Guidance to recalculate its MEP portfolio and provide this update by January 30, 2020. If a permittee chooses not to recalculate its MEP portfolio by January 30, 2020, the Department will use the MEP portfolio previously submitted as the basis for finalizing the jurisdiction's MS4 tentative determination permit.

We expect the next MS4 permit to be issued in late spring or early summer. This extension has allowed us to align the permit and restoration goals with the final Phase III Watershed Implementation Plan and incorporate more of your feedback into the MS4 Guidance. The Department will contact you soon to schedule a meeting in mid-January 2020. Thank you for your continued interest in this important program and if you have any questions, please contact me at 410-537-3567 or *lee.currey@maryland.gov*, or Jennifer Smith at 410-537-3543 or *jenniferm.smith@maryland.gov*.

Sincerely,

D. Lee Currey, Director
Water and Science Administration

Enclosure

cc: Jennifer M Smith, WSA
Raymond P. Bahr, WSA

Maryland
Department of
the Environment

Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated

Guidance for National Pollutant Discharge Elimination System Stormwater Permits

December 2019

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I. Introduction

The goals of Maryland's National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4) permits are to control stormwater pollution, improve water quality, and work toward meeting water quality standards. The permits require MS4 jurisdictions to implement restoration activities in order to meet stormwater wasteload allocations (SW-WLAs) included in Environmental Protection Agency (EPA) approved total maximum daily loads (TMDLs). The *2019 Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* (Guidance) reflects improved permit crediting to address impervious acre restoration and nutrient load reductions consistent with Maryland's Phase III Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL and 2025 nutrient load targets.

The Guidance also incorporates the Phase 6 Chesapeake Bay Watershed Model (Phase 6 Model), new and updated best management practices (BMPs) approved by the Chesapeake Bay Program (CBP) expert panels, and stormwater management co-benefits. This Guidance was developed with the contributions of environmental non-governmental organizations, MS4 jurisdictions, State agencies, and EPA. The 2019 MS4 restoration credits and accounting principles supersede the 2014 guidance.

II. Restoration Credits and Accounting Principles

Permittees must use an impervious acre credit to account for MS4 restoration achieved through stormwater BMP implementation. The impervious acre credit is the MS4 permit's surrogate parameter for level of implementation required to show progress in total nitrogen (TN), total phosphorus (TP), and total suspended sediment (TSS) load reductions toward meeting Chesapeake Bay and local TMDLs. MS4 jurisdictions must also report load reductions achieved through BMP implementation. The MS4 impervious acre credits, associated pollutant load reductions, and general accounting principles are summarized below and described in more detail in the body of this Guidance.

The impervious acre credit is used for accounting for upland BMPs that provide impervious acre water quality treatment. These BMPs are described in Chapters 3 and 5 of the *2000 Maryland Stormwater Design Manual* (Manual). The impervious acre credit is determined from three BMP variables: drainage area, impervious acres, and the rainfall depth treated. Impervious acres in the drainage area are considered treated 100% for water quality when the runoff from one inch of rainfall over the drainage area is captured and treated. More information on the impervious acre credit can be found in Section III. Impervious Acre Credits of Upland Best Management Practices.

Equivalent impervious acres (EIAs) are used in determining the impervious acre restoration credit for alternative BMPs that are not found in the Manual but offer permittees additional options for reducing stormwater pollutants. Alternative BMPs include street sweeping, storm drain cleaning, floating treatment wetlands, land cover conversion, urban soil restoration, septic practices, shoreline management, stream restoration, and elimination of discovered nutrient discharges from grey infrastructure. A method has been developed using the CBP land cover unit loads and the reduction in pollutant loads from alternative BMPs for determining an EIA conversion factor (EIA_f). The EIA_f for all alternative BMPs for MS4 restoration crediting are

presented in Table 1. More detailed information on the EIA credits is found in Section V. Alternative Best Management Practices.

TN, TP, and TSS load reductions are used for accounting for nutrient load reductions to be credited toward Chesapeake Bay and local TMDLs. All BMPs found in the Manual, i.e., Chapter 3 structural practices and Chapter 5 environmental site design (ESD) practices, plus alternative BMPs are acceptable for load reduction credits. The TN, TP, and TSS removal efficiencies for these BMPs must be calculated in accordance with the CBP expert panel reports, using the Phase 6 Model and delivery factors based on the BMP's proximity to the Chesapeake Bay. Additional information can be found in Section IV. Pollutant Load Reductions for Upland Best Management Practices.

Table 1. EIA_f and Load Reductions for Alternative BMPs

BMP	Load Reductions (lbs/unit/yr)			EIA_f
	TN	TP	TSS	
Advanced Sweeping				**Per Mile Swept**
1 pass/12 weeks	0.00	0.07	347	0.025
1 pass/8 weeks	0.25	0.14	693	0.055
1 pass/4 weeks	0.36	0.21	1040	0.083
Spring 1 pass/1-2 weeks else monthly	0.36	0.28	1213	0.100
Fall 1 pass/1-2 weeks else monthly	0.72	0.35	1733	0.140
1 pass/2 weeks	0.72	0.35	1906	0.147
1 pass/week	1.07	0.56	2773	0.222
2 passes/week	1.43	0.70	3639	0.287
Mechanical Broom Sweeping				**Per Mile Swept**
1 pass/4 weeks	0.00	0.00	17	0.001
1 pass/week	0.00	0.00	87	0.004
2 passes/week	0.00	0.00	173	0.007
Storm Drain Cleaning				**Per Ton Removed**
Organic	4.44	0.48	400	0.17
Inorganic	3.78	0.84	1400	0.26
Floating Treatment Wetlands (% of pond wet surface area covered by FTW)				**Per Impervious Acre**
FTW1 (10%)	0.10	0.02	76	0.009
FTW2 (11-20%)	0.22	0.05	155	0.018
FTW3 (21-30%)	0.32	0.07	231	0.027
FTW4 (31-40%)	0.43	0.10	304	0.035
FTW5 (41-50%)	0.53	0.12	380	0.044
Land Cover Conversion				**Per Acre of Land Cover Changed**
Forest Planting	11.08	1.80	696	1.0
Riparian Forest Planting	14.30	2.53	2,349	1.41
Conservation Landscaping	5.21	0.53	0.00	0.37
Riparian Conservation Landscaping	6.72	0.75	0.00	0.50
Forest Conservation	10.61	1.14	2,587	0.48

BMP	Load Reductions (lbs/unit/yr)			EIA_f
	TN	TP	TSS	
Table 1 Continued				
Impervious Surface Reduction	6.74	0.43	7,060	0.82
Street Trees	3.04	0.76	1,213	0.39
Urban Tree Canopy Planting	3.18	0.51	82	0.28
Urban Soil Restoration of Compacted Pervious Surfaces (soil excavation depth in inches)				**Per Acre of Soil Treatment**
Level 1 (15 inches)	4.4	0.72	278	0.40
Level 2 (20 inches)	8.9	1.44	557	0.80
Urban Soil Restoration of Removed Impervious Surfaces (soil excavation depth in inches)				**Per Acre of Soil Treatment**
Level 1 (15 inches)	13.7	0.7	1,696	0.91
Level 2 (20 inches)	15.0	0.77	1,864	1.00
Septic[1]				**Per System**
Septic Pumping	0.00	0.00	0.00	0.02
Septic Denitrification	0.00	0.00	0.00	0.16
Septic to WWTP Connection	0.00	0.00	0.00	0.36
Shoreline Management[2]/Stream Restoration[3]				**Per Linear Foot**
Shoreline Management (Default Rate)	0.086	0.061	164	0.02
Stream Restoration (Planning Rate)	0.075	0.068	248	0.02
Elimination of Discovered Nutrient Discharges from Grey Infrastructure[4]				**Per Discharge**
Elimination of Eight Approved Discharge Types	Protocol	Protocol	0.00	Individually Calculated

Notes:
[1] Actual load reductions must be reported through the local health department. Septic system credits only apply to the impervious acre restoration requirement.
[2] Default load reduction values can be used in cases when the shoreline management practice parameters are unavailable for the protocols recommended by the panel, such as in some planning efforts, historic projects, and/or nonconforming projects.
[3] Load reduction values and EIA_f are used for planning purposes only and must always be replaced with individual site-specific values prior to reporting for nutrient and sediment reduction credit and impervious acre restoration credit.
[4] TN and TP load reductions for individual discharges are calculated based on the protocols approved in the CBP's 2014 Grey Infrastructure Report. The EIA_f is determined using Equation 5, EIA_f Calculation for Alternative BMPs.

The BMPs approved by the CBP for TN, TP, and TSS reductions have been documented to provide reductions for other pollutants associated with local TMDLs. The 2015 report *Potential Benefits of Nutrient and Sediment Practices to Reduce Toxic Contaminants in the Chesapeake Bay Watershed* published by Chesapeake Stormwater Network substantiates that stormwater BMPs are also effective for reducing toxic pollutants. More information on the latest guidance for showing progress toward meeting local TMDLs are found on the Department's website: mde.maryland.gov/programs/Water/TMDL/DataCenter/Pages/TMDLStormwaterImplementation.aspx.

III. Impervious Acre Credits of Upland Best Management Practices

Upland BMPs are stormwater BMPs that meet the water quality criteria and design standards in the Manual. Upland BMPs include structural practices, nonstructural practices, alternative surfaces, and impervious acre credit achieved by redevelopment. BMPs must function properly to ensure that the expected water quality improvements are achieved. BMPs in the Manual must be regularly maintained and inspected a minimum of every three years.

1. Structural Practices

The impervious acre credit for structural practices is based on the impervious acres in a BMP's drainage area, the depth of rainfall treated, and the water quality volume (WQ_v) standards found in the Manual. For restoration and impervious acre crediting, the rainfall depth treated may be less than the 1 inch required for the WQ_v. For the purposes of this Guidance, the rainfall depth treated in restoration practices is referred to as the water quality treatment volume or "WQ_T". The treatment of 1 inch of rainfall across the drainage area of the BMP is required to receive full credit for the impervious acres in the BMP's drainage area. This WQ_T is considered the minimum treatment level for 1 impervious acre credit of restoration. Opportunities for restoration that treat less than 1 inch of rainfall (i.e., $WQ_T < 1$ inch) can be pursued where they make sense to an MS4 jurisdiction for local water quality, flooding, or co-benefits. Where the WQ_T is less than 1 inch, the impervious acre credit will be pro-rated on the fraction of the rainfall depth treated (see Equation 1).

Equation 1. Impervious Acre Credits for Structural Practices

$$[Impervious\ Acres\ in\ Drainage\ Area] \times ([Rainfall\ Depth\ Treated]/1\ inch) = Impervious\ Acre\ Credit$$

Examples:

A structural BMP with a drainage area of 10 impervious acres receives the following credit based on the rainfall depth treated:

$$[10\ Impervious\ Acres] \times ([1.0\ inch\ Rainfall\ Depth\ Treated]/1\ inch) = 10\ Impervious\ Acres\ Credit$$

$$[10\ Impervious\ Acres] \times ([0.75\ inch\ Rainfall\ Depth\ Treated]/1\ inch) = 7.5\ Impervious\ Acres\ Credit$$

$$[10\ Impervious\ Acres] \times ([0.5\ inch\ Rainfall\ Depth\ Treated]/1\ inch) = 5\ Impervious\ Acres\ Credit$$

2. Nonstructural Practices

Nonstructural practices acceptable for MS4 restoration must meet the design criteria found in Chapter 5 of the Manual. These practices include disconnection of rooftop runoff, disconnection of non-rooftop runoff, and sheetflow to conservation areas. Nonstructural practices combine relatively simple features, grading, and landscaping to divert runoff into

vegetated areas and away from conventional storm drain systems. Runoff flows over these areas, filters through the vegetation, and soaks into the ground.

Impervious acre credits for nonstructural practices are directly proportional to the amount of impervious acres in a watershed that are disconnected from the storm drain system (see Equation 2).

Equation 2. Impervious Acre Credits for Nonstructural Practices

$$[Impervious\ Acres\ in\ Drainage\ Area] \times [Percent\ Disconnect] = Impervious\ Acre\ Credit$$

Example

A drainage area of 10 impervious acres will receive the following credit based on the percentage of impervious acres that are disconnected:

$$[10\ Impervious\ Acres] \times [100\%\ Disconnect] = 10\ Impervious\ Acres\ Credit$$

$$[10\ Impervious\ Acres] \times [75\%\ Disconnect] = 7.5\ Impervious\ Acres\ Credit$$

$$[10\ Impervious\ Acres] \times [50\%\ Disconnect] = 5\ Impervious\ Acres\ Credit$$

3. Alternative Surfaces in Chapter 5 of the Manual

Alternative surfaces accepted for MS4 restoration must meet the design criteria found in Chapter 5 of the Manual. These practices include green roofs, permeable pavements, and reinforced turf. Replacing one acre of impervious surface with an approved alternative surface provides a credit of one acre of impervious area restoration.

4. Redevelopment

Any project that meets or exceeds the regulatory requirements for redevelopment can receive impervious acre credits. In 2010, State regulations required treatment for fifty percent of the untreated existing impervious acres within the project's limit of disturbance (LOD). Additional credit may be granted for any untreated existing impervious acres that are treated to meet or exceed the fifty percent requirement (see Equation 3).

Equation 3. Impervious Acre Credits for Redevelopment

$$[Existing\ Untreated\ Impervious\ Acres] \times [Percent\ of\ the\ Existing\ Untreated\ Impervious\ Acres\ Treated\ for\ Redevelopment] = Impervious\ Acres\ Restoration\ Credit$$

Examples

Below are examples of the credits that a redevelopment project would achieve for treating different percentages of an existing 10 acres of untreated impervious surface within the LOD.

$$[10\ Existing\ Untreated\ Impervious\ Acres] \times [50\%\ of\ the\ Existing\ Untreated\ Impervious\ Acres\ Treated\ for\ Redevelopment] = 5\ Impervious\ Acres\ Restoration\ Credit$$

$$[10\ Existing\ Untreated\ Impervious\ Acres] \times [75\%\ of\ the\ Existing\ Untreated\ Impervious\ Acres\ Treated\ for\ Redevelopment] = 7.5\ Impervious\ Acres\ Restoration\ Credit$$

$$[10\ Existing\ Untreated\ Impervious\ Acres] \times [100\%\ of\ the\ Existing\ Untreated\ Impervious\ Acres\ Treated\ for\ Redevelopment] = 10\ Impervious\ Acres\ Restoration\ Credit$$

IV. Pollutant Load Reductions for Upland Best Management Practices

Pollutant load reductions for upland BMPs are based on pollutant removal efficiencies recommended by the CBP. In order for MS4 jurisdictions to receive proper credit toward Chesapeake Bay TMDLs, restoration activities and reporting need to be consistent with CBP recommendations. BMP pollutant removal performance is determined using the CBP approved publication, *Recommendations of the Expert Panel to Define Removal Rates for New State Stormwater Performance Standards* (Schueler and Lane, 2012 and 2015). This report offers a series of pollutant removal adjustor curves (see Appendix A) for BMPs that are classified as runoff reduction (RR) and stormwater treatment (ST) to determine nutrient and sediment load reductions. Table 2 provides a list of upland BMPs, identifying each as RR or ST.

Table 2. Stormwater BMPs for Upland Applications

Runoff Reduction (RR) Practices		**Stormwater Treatment (ST) Practices**	
Manual Reference	**Practice**	**Manual Reference**	**Practice**
Infiltration		**Ponds**	
M-3	Landscape Infiltration	P-1	Micro-Pool Extended Detention (ED)
M-4	Infiltration Berm	P-2	Wet Pond
M-5	Dry Well	P-3	Wet ED Pond
Filtering Systems		P-4	Multiple Pond
F-6	Bioretention[1]	P-5	Pocket Pond
M-2	Submerged Gravel Wetland	**Wetlands[2]**	
M-6	Micro-Bioretention[1]	W-1	Shallow Wetland
M-7	Rain Garden	W-2	ED Shallow Wetland
M-9	Enhanced Filter	W-3	Pond/Wetland System
Open Channel Systems		W-4	Pocket Wetland
O-1	Dry Swale	**Infiltration[2]**	
M-8	Grass Swale	I-1	Infiltration Trench
M-8	Bio-Swale	I-2	Infiltration Basin
M-8	Wet Swale	**Filtering Systems**	
Alternative Surfaces		F-1	Surface Sand Filter
A-1	Green Roof	F-2	Underground Filter
A-2	Permeable Pavement	F-3	Perimeter Filter

Runoff Reduction (RR) Practices		Stormwater Treatment (ST) Practices	
Manual Reference	**Practice**	**Manual Reference**	**Practice**
A-3	Reinforced Turf	F-4	Organic Filter
Other Systems		F-5	Pocket Filter
M-1	Rainwater Harvesting		

Notes:
[1] Regenerative step pool stormwater conveyance systems (SPSCs) are alternative practices that may be used in upland applications. Where this occurs, SPSCs may be classified as bioretention or micro-bioretention practices for crediting purposes.
[2] Stormwater wetlands, infiltration trenches, and infiltration basins are ST practices unless designed according to Section VI.

For commonly used rainfall depths, Table 3 provides pollutant removal efficiencies for RR and ST practices based on the adjustor curves. The adjustor curves can also be used to determine pollutant removal efficiencies associated with redevelopment.

Table 3. TN, TP, and TSS Removal Efficiencies for Upland BMPs

Rainfall Depth Treated (inches)	TN Removal Efficiency (%)		TSS Removal Efficiency (%)		TP Removal Efficiency (%)	
	RR	ST	RR	ST	RR	ST
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	23.3	13.6	29.1	27.2	27.2	21.4
0.40	39.2	22.8	48.9	45.7	45.7	35.9
0.60	49.3	28.8	61.7	57.5	57.5	45.2
0.80	55.7	32.5	69.7	65.1	65.1	51.1
1.00	59.7	35.0	74.9	69.9	69.9	54.9
1.20	62.5	36.5	78.3	73.0	73.0	57.4
1.40	64.4	37.6	80.7	75.2	75.2	59.1
1.60	65.6	38.4	82.3	76.7	76.7	60.3
1.80	66.4	38.8	83.3	77.6	77.6	61.0
2.00	66.8	39.1	83.9	78.2	78.2	61.4
2.20	67.1	39.2	84.2	78.4	78.4	61.7
2.40	67.5	39.3	84.6	78.6	78.6	61.9
2.60[1]	67.9	39.4	85.0	78.8	78.8	62.1
2.80[1]	68.3	39.5	85.4	79.0	79.0	62.3
3.00[1]	68.6	39.6	85.8	79.2	79.2	62.5

Note:
[1] Values exceed the adjustor curves and are extrapolated from the CBP formulas.

The next step in this process is to apply the pollutant removal efficiencies to the appropriate urban land cover unit loads to calculate the load reductions. For this step, use No Action Scenario urban unit loads presented in Table 4 that best represent the BMPs drainage area land covers.

The final step in determining pollutant load reductions for the Chesapeake Bay TMDLs is to use the specific Phase 6 Model segment delivery factors presented in Appendix K. These factors

indicate how much of an edge-of-stream (EOS) load reduction is realized at the edge-of-tide (EOT). The delivery factors for a given project can be also found via the "EOT Factor Map" on the Department's water quality trading website under the Tools and Resources tab at: mde.maryland.gov/programs/Water/WQT/Pages/WQT_Tools_Resources.aspx.

Table 4. Statewide Edge-of-Stream Urban Unit Load Summary

Load Source[1]	Statewide EOS Urban Unit Load (lbs/acre/yr)		
	TN	TP	TSS
Aggregate Impervious	20.09	2.55	8,474
Impervious Road	35.79	6.95	17,328
Mixed Open	8.15	1.59	1,414
Septic	16.66	0.00	0.00
Tree Canopy over Impervious	32.75	6.19	16,115
Turf	13.35	2.12	1,414
Tree Canopy over Turf	10.18	1.62	1,332
True Forest	2.28	0.32	719
Total Urban	12.89	1.46	3,306

Note
[1] For more information on Load Sources in the Phase 6 Model, see Appendix B.

The general formula for calculating these load reductions is presented below. An example calculation can be found in Appendix B.

Equation 4. TN, TP, and TSS Load Reductions

$$Load\ Reduction\ (lbs/yr) = [Urban\ Unit\ Load\ (lbs/acre/yr)] \times [Impervious\ Surface\ in\ BMP\ Drainage\ Area\ (acres)] \times [BMP\ Efficiency/100] \times [Phase\ 6\ Modeling\ Segment\ Delivery\ Factor]$$

The Department has developed BMP specific calculators for its nutrient trading program that can be used by permittees to perform these calculations automatically. These calculators are located on the water quality trading webpage under the Tools and Resources tab. Users input geographic information for their project and other project specific data, such as BMP type, drainage area, land cover acres and water quality treatment. The calculators will automatically generate the load reduction credit. If an MS4 jurisdiction performs these calculations on its own, it must provide to the Department all supplemental information required to ensure that the pollutant load reductions are correct.

V. Alternative Best Management Practices

The Department has developed the EIA_f (i.e., equivalent impervious acre conversion factor) for translating the pollutant load reductions from an alternative BMP into an EIA (i.e., equivalent impervious acre) credit. This is based on the difference in pollutant loads between aggregate impervious and true forest land covers. For the purpose of this Guidance, aggregate impervious includes the Phase 6 Model impervious road and impervious non-road land covers and true forest is the statewide average forest cover. The Phase 6 Model estimates that the annual TN load in runoff from an aggregate impervious acre is 20.09 lbs while the annual TN load from an acre of true forest is 2.28 lbs. The difference, or delta, between the two land covers is 17.81 lbs of TN per year. The deltas for TN, TP, and TSS loads are shown in Table 5. These deltas are used to set a level of implementation that alternative practices must meet to be equivalent to the runoff from forest conditions.

Table 5. True Forest and Aggregate Impervious Pollutant Unit Load Deltas

Pollutant	Aggregate Impervious Unit Load (lbs/acre/yr)	True Forest Unit Load (lbs/acre/yr)	Delta (lbs/acre/yr)
TN	20.09	2.28	17.81
TP	2.55	0.32	2.23
TSS	8,474.18	718.57	7,756
Source: Phase 6 Model, Maryland aggregated statewide average unit loads without BMPs			

The pollutant load reduction for each alternative BMP is calculated from the land cover unit load and the approved BMP efficiency determined in the CBP expert panel reports. Alternative BMPs have different urban land cover unit loads. Some alternative BMPs, like street sweeping, are almost exclusively implemented on impervious surface areas (e.g., roads and parking lots). In these instances, the pollutant load associated with "impervious road" found in Table 4 is used to set the initial load rate and determine the pollutant load reduction. The efficiencies and land cover types to be used with each alternative BMP to calculate the TN, TP and TSS load reductions can be found in Appendix C.

Alternative BMPs also use different units of implementation to calculate pollutant load reduction. For example, some BMPs, like street sweeping, use a street lane mile unit per year while others, like land cover conversion, use a per acre unit per year.

The delta between aggregate impervious and true forest land cover load for TN, TP, and TSS is divided into each alternative BMP's annual pollutant load reduction for each pollutant and then averaged to determine a single weighted equivalent impervious acre conversion factor (see Equation 5). Further details on how the EIA_f is calculated can be found in Appendix D.

Equation 5. EIA_f Calculation for Alternative BMPs

$$EIA_f = \frac{\left(\frac{TN\ Load\ Red.}{I-F_{TN}}\right)+\left(\frac{TP\ Load\ Red.}{I-F_{TP}}\right)+\left(\frac{TSS\ Load\ Red.}{I-F_{TSS}}\right)}{3}$$

Where:

EIA_f = Equivalent impervious acre conversion factor
TN Load Red. = BMP load reduction for TN (lbs/unit/yr)
TP Load Red. = BMP load reduction for TP (lbs/unit/yr)
TSS Load Red. = BMP load reduction for TSS (lbs/unit/yr)
$I - F_{TN}$ = Aggregate impervious unit load minus true forest unit load for TN (lbs/acre/yr)
$I - F_{TP}$ = Aggregate impervious unit load minus true forest unit load for TP (lbs/acre/yr)
$I - F_{TSS}$ = Aggregate impervious unit load minus true forest unit load for TSS (lbs/acre/yr)

Additional information on EIA_f and pollutant load reduction credits for specific alternative practices is found below. Alternative BMPs must follow inspection frequencies as specified by the CBP expert panels, with the exception of land cover conversion BMPs, which require inspections at least every three years.

1. <u>Street Sweeping and Storm Drain Cleaning</u>

Street sweeping and storm drain cleaning are annual practices that must be tracked and reported each year to receive credit. The CBP recommended updates to acceptable street sweeping methods and the removal rates for nutrients and sediments, as described in the 2016 report *Recommendations of the Expert Panel to Define Removal Rates for Street and Storm Drain Cleaning Practices* (2016 Street Sweeping Report). The expert panel developed these estimates using the Source Loading and Management Model for Windows (WinSLAMM). The mass loading method is no longer an acceptable method to calculate pollution reduction. The previous estimated rates were dependent on a strict twice-monthly frequency, whereas the updated load reduction credits allow greater flexibility because MS4 jurisdictions may choose from a range of sweeping schedules listed in Table 6.

MS4 jurisdictions may generate credits by sweeping municipal and commercial parking lots when using advanced street sweeping technology (i.e., vacuum assisted sweepers and regenerative air sweepers). Mechanical sweeping of parking lots may not be used for credit because of the low amount of pollutants estimated to be collected. Credit will not be given for sweeping roads or parking lots without curbs and gutters.

MS4 jurisdictions must enter information into the MS4 Geodatabase on schedule, locations, and sweeper technology. Additionally, MS4 jurisdictions must retain documentation as proof of sweeping activities to receive credit. Documentation may include a sweeping summary table, copies of receipts or contracts if sweeping is contracted out, or sweeper equipment maintenance records. This information must be made available to the Department upon request. The EIA credit for street sweeping is based on the annual number of miles swept averaged over the span of the 5 year permit term. Table 6 provides the nutrient and sediment load reductions and EIA_f values for different street sweeping options.

Table 6. Load Reductions and EIA_f for Street Sweeping

BMP	Load Reduced (lbs/acre/yr)			EIA_f per Mile Swept
	TN	TP	TSS	
Advanced Sweeping				
1 pass/12 weeks	0.00	0.07	347	0.025
1 pass/8 weeks	0.25	0.14	693	0.055
1 pass/4 weeks	0.36	0.21	1040	0.083
Spring 1 pass/1-2 weeks else monthly	0.36	0.28	1213	0.100
Fall 1 pass/1-2 weeks else monthly	0.72	0.35	1733	0.140
1 pass/2 weeks	0.72	0.35	1906	0.147
1 pass/week	1.07	0.56	2773	0.222
2 passes/week	1.43	0.70	3639	0.287
Mechanical Broom				
1 pass/4 weeks	0.00	0.00	17	0.001
1 pass/week	0.00	0.00	87	0.004
2 passes/week	0.00	0.00	173	0.007

The CBP recommended a conservative approach for calculating credits attributed to storm drain cleaning. A credit is available when the mass of nutrient-rich catch basin sediments is measured and physically removed from the storm drain system. The EIA credit for storm drain cleaning is based on the annual aggregate load collected and averaged over the span of the 5 year permit term. Table 7 provides the nutrient and sediment load reductions and EIA_f values for storm drain cleaning options.

Table 7. Load Reductions and EIA_f for Storm Drain Cleaning

Material Removed	Load Reduced (lbs/ton)			EIA_f per Ton Material Removed
	TN	TP	TSS	
Organic	4.44	0.48	400	0.17
Inorganic	3.78	0.84	1400	0.26

There are three qualifying conditions to generate credit from storm drain cleaning:

1. To maximize nutrient load reductions, efforts should target catch basins that trap the greatest organic matter loads, streets with the greatest overhead tree canopy and/or outfalls with high sediment or debris loads.

2. The nutrient loads must be tracked and verified using a field protocol to measure the mass or volume of solids collected within the storm drain system. The local MS4 jurisdiction must demonstrate that it has instituted a standard operating procedure to keep track of the mass of the sediments and/or organic matter that is removed.

3. Material must be properly disposed of so it cannot migrate back into the storm drain system.

The storm drain cleaning credit does not apply to sediment removal operations that occur during ditch maintenance along open section roads. It does apply to operations that occur in open, concrete-lined conveyance channels.

2. Floating Treatment Wetlands

Floating Treatment Wetlands (FTWs) are installed in existing stormwater management ponds to provide additional nutrient and sediment removal. FTWs are buoyant rafts of wetland vegetation that are planted in growing media and whose roots extend below the water's surface. The CBP determined nutrient removal rates based on the percent of pond wet surface area that the FTW covers. Coverage must be at least 10% but not more than 50% of the pond's wet surface area measured at the design permanent pool elevation. Pollutant load reductions and EIA credits are reported separately from credits that the stormwater pond provides. Table 8 provides the nutrient and sediment load reductions and EIA_f values for floating treatment wetlands.

Table 8. Load Reductions and EIA_f for Floating Treatment Wetlands

BMP	% of Pond Wet Surface Area Covered by FTW	Load Reduced (lbs/acre/yr)			EIA_f per Impervious Acre
		TN	TP	TSS	
FTW1	10%	0.10	0.02	76	0.009
FTW2	11-20%	0.22	0.05	155	0.018
FTW3	21-30%	0.32	0.07	231	0.027
FTW4	31-40%	0.43	0.10	304	0.035
FTW5	41-50%	0.53	0.12	380	0.044

Equation 6 can be used to calculate the impervious acre credit. An example calculation is provided in Appendix F.

Equation 6. EIA_f for Floating Treatment Wetlands

$$[Total\ Impervious\ Acres\ in\ Stormwater\ Pond\ Drainage\ Area] \times [EIA_f\ from\ Table\ 8] = Equivalent\ Impervious\ Acre\ Credit$$

3. Land Cover Conversion BMPs

Land cover conversion BMPs are those that involve the conversion of one land cover to another. Nutrient and sediment reductions for land cover conversion BMPs are calculated based on the load reduction that results from the change in unit loads from the original land cover to another land cover. Land cover conversion BMPs fall into three categories: Non-riparian land cover conversion BMPs, riparian land cover conversion BMPs, and forest conservation.

The difference in unit loads between land cover types are driven primarily by a change in hydrology. To reflect this improved hydrology, crediting land cover conversion BMPs is aligned with other upland stormwater treatment practices. The EIA_f for a land cover conversion BMP is calculated using the load reductions from the conversion of land cover

divided by a "delta" equal to the treatment of 1 inch of rainfall on 1 acre of impervious land cover using stormwater treatment (ST) BMPs (Refer to Appendix D for more information).

a) Non-Riparian Land Cover Conversion BMPs

Land cover conversion that occurs completely outside of the riparian zone (within 100 feet of a waterbody) is calculated as the difference between the unit loads of the original and converted land covers. The land cover types used in calculating pollutant load reductions for each BMP can be found in Appendix C. Table 9 provides the pollutant load reductions and EIA_f for non-riparian land cover conversion BMPs. The following BMPs are eligible for credit.

1. *Forest Planting.* The conversion of pervious (turf) to a forested land cover. Urban forest planting includes any continuous tree planting on pervious except those used to establish riparian forest buffers. Forest planting practices should be documented in a planting and maintenance plan that meets State planting density and associated standards for establishing forest conditions. Planting should have a survival rate of 100 trees planted on one acre; at least 50% of trees have two inch diameter or greater (4.5 ft. above ground).

2. *Conservation Landscaping.* Land cover conversion from pervious to an unmanaged (unfertilized, unmowed) meadow condition. Conservation landscaping refers to areas of managed turf that are converted into perennial meadows using species that are native to the Chesapeake Bay region.

3. *Impervious Surface Reduction.* A reduction in impervious surfaces to promote infiltration and percolation of stormwater runoff.

4. *Street Trees*. Any tree planting that occurs over an impervious surface (such as trees planted in sidewalk boxes on a roadside curb). One tree planted is the equivalent of 0.003 acre. This BMP does not require trees to be planted in a contiguous area.

5. *Urban Tree Canopy*. The conversion of turf to tree canopy over turf. The urban tree canopy BMP is applicable where the resulting understory remains managed (regularly mowed and/or fertilized). One tree planted is the equivalent of 0.003 acre. This BMP does not require trees to be planted in a contiguous area.

Table 9. Load Reductions and EIA_f for Non-Riparian Land Cover Conversion BMPs

Non-Riparian Land Cover Conversion BMP	Load Reduced (lbs/acre/yr)			EIA_f per Acre of Land Cover Converted
	TN	TP	TSS	
Forest Planting	11.08	1.80	696	1.0
Conservation Landscaping	5.21	0.53	0.00	0.37
Impervious Surface Reduction	6.74	0.43	7,060	0.82
Street Trees[1]	3.04	0.76	1,213	0.39
Urban Tree Canopy Planting	3.18	0.51	82	0.28

Note
[1] Street trees do not receive a load reduction credit toward the TMDL because it is not a CBP approved credit. Load reductions shown are for EIA_f calculation purposes only.

b) Riparian Land Cover Conversion BMPs

Riparian land cover conversion BMPs are forest planting and conservation landscaping practices that occur within 100 feet of a perennial stream.

1. *Riparian Forest Buffers*. Linear wooded areas that help filter nutrients, sediments, and other pollutants from runoff as well as remove nutrients from groundwater. The recommended buffer width is 100 feet, with a 35 foot minimum width required (CAST 2019).

2. *Riparian Conservation Landscaping*. Grassland buffers that help filter nutrients, sediments, and other pollutants from runoff as well as remove nutrients from groundwater. These are buffers converted from managed turf land cover to an unmanaged meadow use.

These practices are eligible for enhanced land cover conversion credit. The riparian land cover conversion BMP EIA_f credit is based on a baseline land cover conversion credit that accounts for hydrologic changes (Table 9) plus an additional credit for the upland areas treated because they drain through the riparian buffer zone (Table 10). The additional riparian credit provided is based on a ratio of one acre of upland impervious acre treatment to one acre of land cover conversion.

The additional load reductions for riparian forest planting are calculated by applying CAST Forest Buffer upland treatment efficiencies to the statewide weighted urban unit load. Conservation landscaping that occurs in the riparian zone does not have a CAST upland treatment efficiency. Therefore, those efficiencies and resulting load reductions were determined using the same proportionate relationship between the forest planting and conservation landscaping nutrients and sediment load reductions for non-riparian BMPs. The additional load reductions for riparian land cover conversion BMPs are found in Table 10.

Table 10. Additional Load Reductions and EIA_f for Land Cover Conversion BMPs Implemented in a Riparian Area

Land Cover Conversion BMP	Efficiency			Load Reduced (lbs/acre/yr)			EIA_f per Acre of Upland Treatment
	TN	TP	TSS	TN	TP	TSS	
Forest Planting Upland Treatment	25%	50%	50%	3.22	0.73	1,653	0.42
Conservation Landscaping Upland Treatment	12%[1]	15%[2]	0%	1.52	0.22	0	0.12

Notes:
[1] Conservation Landscaping Upland TN efficiency = Forest Planting Upland TN Efficiency × (Conservation Landscaping TN reduction / Forest Planting TN reduction).
[2] Conservation Landscaping Upland TP efficiency = Forest Planting Upland TP Efficiency × (Conservation Landscaping TP reduction / Forest Planting TP reduction).

Riparian land cover conversion BMP credit is the sum of the base land cover conversion BMP credit (Table 9) and the additional upland treatment credit (Table 10). The enhanced load reductions and the EIA_f available for forest planting and conservation landscaping in riparian areas are provided in Table 11.

Table 11. Enhanced Load Reductions and EIA_f for Riparian Land Cover Conversion BMPs

Land Cover Conversion BMP	Total Load Reduced (lbs/acre/yr)			EIA_f per Acre of Land Cover Converted[1]
	TN	TP	TSS	
Riparian Forest Buffers	14.30	2.53	2,349	1.41
Riparian Conservation Landscaping	6.72	0.75	0.00	0.50

Note:
[1] EIA_f for a riparian land cover conversion BMP is the sum of the base land cover conversion BMP credit (Table 9) and the additional upland treatment credit (Table 10).

c) Forest Conservation

EIA credit for forest conservation is available for the permanent conservation of existing acres of forest. Forest land cover has the lowest Phase 6 Model unit loads for nutrients and sediment and established forest acres are vulnerable to development pressure. Credit is available to MS4 jurisdictions that have forest easement programs that go further than the programs incorporated into the Phase III WIP 2025 condition.

The Phase III WIP sets goals based on the projected growth in the State. *Maryland's Phase III Watershed Implementation Plan (August 2019)* utilizes the "Maryland Policy" Land Policy BMP in the projected 2025 conditions, which includes

assumptions about the continued conservation of forests due to existing policies in the State. State forest and agricultural conservation programs are estimated in projections out to the year 2025. Additional assumptions that were incorporated include conservation of shorelines, riparian buffers, and wetlands. If an MS4 jurisdiction can establish that its forest conservation program results in less development on forest than the WIP forecast, then it has successfully prevented a future load increase.

Requirements and Verification

Forest conservation credit is contingent upon the MS4 jurisdiction's ability to document that the easement or program exceeds the Phase III WIP Scenario criteria described in Table 12 and is not part of a sheetflow to conservation area BMP practice. Credit will only be allowed for the portion of the easement that exceeds the WIP scenario. For example, if an easement represents a 300 foot riparian buffer, only the portion of the buffer outside the 200 foot WIP assumption is creditable.

Table 12. Easement Criteria based on the Phase III WIP Scenario Assumptions that must be Exceeded to Qualify for Forest Conservation Credit

Easement cannot be within Resource Conservation Areas or Wetlands of Special State Concern.
Easement cannot be within 200 feet of a stream.
Easement cannot be within 200 feet of the shoreline.
Easement cannot be within a mapped (Phase 6 Model) wetland.
Easement cannot be a part of or reported to the following State programs: • Program Open Space • Rural Legacy • Maryland Agricultural Land Preservation Foundation (MALPF) • Maryland Environmental Trust (MET)
Easement cannot be within areas subject to 2100 1 meter sea level rise.
Easement cannot be within a 100 year floodplain area.
Easement cannot be within a Tier 2 watershed *unless* it is also within a Priority Funding Area.
Easement cannot be within a Priority Preservation Area.
Easement cannot be part of a sheetflow to conservation area BMP.

To receive credit, MS4 jurisdictions must submit the following:

1. A calculation of the current baseline forest acreage in the jurisdictional boundary. This can be accomplished by calculating the total forest (note that this is not tree canopy, but forest which meets the CBP's "True Forest" land-cover classification criteria) from the 2017 high-resolution land cover that exists inside the MS4 jurisdictional boundaries.

2. The permit term forest loss, i.e., the 2017 forest cover removed during the permit term.

3. Documentation demonstrating that the conservation programs or easements for which the MS4 jurisdiction seeks credit exceeds those included in the Phase III WIP.

Load reductions are based on the difference between a total urban unit load and the forest unit load (Table 13). Additional detail of the forest conservation load reduction and credit calculation can be found in Appendix F.

Table 13. Load Reductions and EIA_f for Forest Conservation BMPs

Land Conservation BMP	Load Reduced (lbs/acre/yr)			EIA_f per Acre of Forest Conserved
	TN	TP	TSS	
Forest Conservation	10.61	1.14	2,587	0.48

d) Urban Soil Restoration Credit

Soil restoration is the process of enhancing the porosity of soils compacted by human activity in urban areas. The technique involves the excavation or tilling of the compacted soils and amending the tilled soils, typically with compost. Soil restoration may be used to improve the performance of rooftop and non-rooftop disconnection applications, or as a filtering media within grass swales and bio-swales. Soil restoration techniques that are used in conjunction with another BMP do not receive separate credit. Rather, the application is considered as a part of that BMP.

Soil restoration may also be used as a standalone restoration technique to reduce runoff and increase recharge in urbanized areas. The pollutant removal efficiencies and EIA_f applied to this technique are based on the depth of soil excavation, the amount of amendments used, and the condition of the area prior to restoration. Soil restoration may be used to correct compacted pervious soils that have some, little, or no vegetation, or soils under impervious areas that have been removed. In each case, the level of restoration is determined by the depth of excavation and tilling. The following two levels of soil restoration are accepted for EIA credit:

- Level 1 is used where compaction is moderate. Compacted soils are ripped to a depth of 15 inches.

- Level 2 is used where compaction is severe or where a more permeable soil profile (e.g., hydrologic soil group B or C) is desired. Soils are excavated to a depth of 20 inches using the complete cultivation method.

Table 14 provides the pollutant removal efficiencies and EIA_f for each level and existing soil condition.

Table 14. Load Reductions and EIA_f for Urban Soil Restoration

Level	Depth (inches)	Load Reduced (lbs/acre/yr)			EIA_f per Acre of Soil Treatment
		TN	TP	TSS	
Compacted Pervious					
1	15	4.4	0.72	278	0.40
2	20	8.9	1.44	557	0.80
Impervious					
1	15	13.7	0.70	1,696	0.91
2	20	15.0	0.77	1,864	1.00

Soils where the depth to a water impermeable layer is less than 20 inches and/or the depth to the high water table is less than 24 inches are considered as hydrologic soil group (HSG) D when determining runoff characteristics. These soil characteristics are not available for the urban soil restoration credit. Appendix G provides the design criteria that must be met for each level of restoration.

4. Septic Practices

Impervious acre restoration credits for septic pumping, denitrification, and connections to a wastewater treatment plant (WWTP) can use the number of systems improved as the unit measure. Table 15 provides EIA_f for these septic practices. Septic pumping is an annual practice. The EIA credit for septic pumping is based on the annual number of systems pumped averaged over the span of the 5 year permit term. Septic connection to an Enhanced Nutrient Removal (ENR) WWTP assumes a Best Available Technology (BAT) baseline of 50% nitrogen removal according to the Phase 6 Model.

For septic pumping credits, a permittee can propose a comprehensive program for the Department's approval that includes septic system maintenance education and outreach, and homeowner registration and participation. Under this approach, each registered homeowner may be credited for every year of the permit term, without an annual pump-out, if the septic system is well maintained. The Department's approval is contingent upon the permittee's septic maintenance program being able to ensure that registered homeowners pump out their septic tank when their storage chambers reach capacity (i.e., bottom of the scum layer is within 6 inches of the bottom of the outlet, or top of the sludge layer is within 12 inches of the outlet), and the septic systems are inspected annually for maintenance verification.

Table 15. Load Reductions and EIA_f for Alternative Septic BMPs

BMP	Notes	Pollutant Removal Efficiency (%) [1]			EIA_f per System
		TN	TP	TSS	
Septic Pumping	Pumping system is maintained and verified for annual credit	0.00	0.00	0.00	0.02
Septic Denitrification	Permanent credit for installing enhanced septic denitrification	0.00	0.00	0.00	0.16
Septic Connection	Permanent credit for converting a septic system to a WWTP connection	0.00	0.00	0.00	0.36

Note:
[1] Actual load reductions must be reported through the local health department. Septic system credits only apply to impervious acre restoration requirements.

5. Shoreline Management

Shoreline management is defined by the expert panel report, *Recommendations of the Expert Panel to Define Removal Rates for Shoreline Management Projects*, amended June 2017 (2017 Shoreline Management Report), as any tidal shoreline practice that prevents and/or reduces tidal sediments to the Bay. Shoreline management should be implemented in areas where there is a demonstrated need to control erosion to the Bay and where there will be a water quality benefit from the practice. In accordance with Maryland's Living Shoreline Regulations (2013), improvements to protect a property against shoreline erosion must consist of marsh creation or other nonstructural shoreline stabilization measures that preserve the natural environment, and only under certain specific conditions shall structural measures be allowed (COMAR 26.24.04).

Hard shore armor negatively impacts nearshore habitats and are not the recommended shoreline management practice in the Bay. The State can determine, on a case-by-case basis, when the unintended negative impacts to wetlands and submerged aquatic vegetation caused by shoreline management techniques outweigh the benefits. Under these circumstances, the practice would not be reported to the CBP for model credit. Refer to the 2017 Shoreline Management Report for basic qualifying conditions.

The CBP Shoreline Management Panel developed four general protocols to define the pollutant load reductions. In cases when the shoreline management practice parameters are unavailable for the protocols, such as in some planning efforts, historic projects, and/or nonconforming projects, default reduction values can be used. The panel recommended that the shoreline management credits be limited to 5 years, although the credits can be renewed based on a field inspection that verifies the project still exists, is adequately maintained, and

is operating as designed. Table 16 provides the nutrient and sediment load reductions and EIA_f for the shoreline management default rate.

Table 16. Load Reductions and EIA_f for the Shoreline Management Default Rate

BMP	Load Reduced (lbs/ft/yr)			EIA_f per Linear Foot
	TN	TP	TSS	
Shoreline Management (Default Rate)	0.086	0.061	164	0.02

6. Stream Restoration

The stream restoration BMP was revised in 2014 to reflect four general protocols to define the pollutant load reductions associated with individual stream restoration projects with the understanding that every project is unique with respect to its design, stream order, landscape position, and function. In 2019, a fifth protocol was approved for outfall and gully stabilization. Details on the protocols, basic qualifying conditions, and reporting requirements can be found in the *Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Project*s.

Planning rates are used for estimating purposes only and must always be replaced with individual site-specific values prior to reporting for nutrient and sediment reduction credit and impervious acre restoration credit. The planning rates will not be accepted as a credit after a new project has been completed. Table 17 provides the pollutant load reductions and EIA_f for the stream restoration project planning rate. Appendix D provides the methodology used to calculate the EIA_f for alternative practices, including stream restoration. Appendix E provides the methodology for determining STB loads that were used in the EIA_f calculation.

Table 17. Load Reductions and EIA_f for Planning Stream Restoration Projects

BMP	Load Reduced (lb/ft/yr)			EIA_f per Linear Ft
	TN	TP	TSS	
Stream Restoration (Planning Rate)	0.075	0.068	248	0.02

7. Elimination of Discovered Nutrient Discharges from Grey Infrastructure

The CBP approved the *Recommendations of the Expert Panel to Define Removal Rates for the Elimination of Discovered Nutrient Discharges from Grey Infrastructure* (2014 Grey Infrastructure Report). This BMP is applicable to the Illicit Discharge Detection and Elimination (IDDE) program activities required under the MS4 permit. Nutrient reductions are calculated on a per-discharge basis and the calculation depends on the type of discharge eliminated. Refer to the 2014 Grey Infrastructure Report for the protocols required to calculate reductions for each type of discharge. The following individual discharges are eligible for TN and TP reductions within the Phase 6 Model:

N-1 Laundry Washwater
N-2 Commercial Car Washing

N-3 Floor Drains
N-4 Miscellaneous High Nutrient Non-Sanitary Discharges
N-5 Sanitary Direct Connections
N-6 Sewage Pipe Exfiltration
N-7 Drinking Water Transmission Loss
N-8 Dry Weather Sanitary Sewer Overflows

The Watershed Technical Workgroup (WTWG) developed a technical appendix to describe how the expert panel's recommendations would be integrated into the modeling tools. This BMP was developed and approved under the Phase 5 Model. The WTWG discussed Phase 6 Model implications, including a recommendation to cap nutrient reductions from this practice if the grey infrastructure loads are not explicitly simulated (*Appendix E: Technical Requirements for the Reporting and Crediting of the Elimination of Discovered Nutrient Discharges from Grey Infrastructure in Scenario Building and the Watershed Model*, page 108). Grey infrastructure loads are not explicitly simulated in the Phase 6 Model. The Department determined a maximum cumulative EIA credit per permit term based on assumptions provided in the 2014 Grey Infrastructure Report.

The 2014 Grey Infrastructure Report estimated that nutrient discharges from grey infrastructure potentially contribute 20% of the dry weather load. The expert panel defined the dry weather load as 20% of the total annual nitrogen and phosphorus discharged from urban pervious land, also known as the turf unit load. Furthermore, the expert panel limited the lifespan of an eliminated discharge to 10 years under the assumption that grey infrastructure will continue to deteriorate over time. For the purposes of calculating the maximum cumulative impervious acres that can be restored for eliminating individual discharges within a 5 year permit term, the estimated 10 year load is reduced by half. Below is a summary of assumptions:

- Dry Weather Load = 20% of the load from pervious land (i.e., turf unit load)
- Load Attributable to Grey Infrastructure = 20% of the Dry Weather Load
- Lifespan of the BMP as determined by the expert panel = 10 years
- Maximum cumulative EIA during the 5 year permit term = 50% of the maximum cumulative EIA over the 10 year lifespan of individual discharge credits

Consistent with the expert panel, an individual discharge credit must be taken off of the impervious acre restoration progress once it surpasses 10 years. In order to maintain impervious acres restored after the 10 year lifespan expires, new discharges will need to be eliminated and reported.

An example calculation to determine the maximum cumulative EIA for eliminating individual discharges during the permit term is found in Table 18. The following example assumes that 60,000 acres of the MS4 jurisdiction is pervious.

Table 18. Example Calculation of the Maximum Cumulative EIA Credit for the Elimination of Individual Discharges from Grey Infrastructure

	TN (lbs/acre/yr)	TP (lbs/acre/yr)	TSS (lbs/acre/yr)
Statewide Turf Unit Load (pervious unit load)	13.35	2.12	1,414
Total Pervious Load (turf unit load multiplied by the total pervious acres in an MS4 jurisdiction[1])	801,000	127,200	84.9 M
Total Dry Weather Load (20% of the total pervious load)	160,200	25,440	17 M
Maximum Load Attributable to Grey Infrastructure over 10 Years (20% of the dry weather load)	32,040	5,088	0.00[2]
Individual Maximum for a 5 Year Permit Term (50% of the maximum load calculated above)	16,020	2,544	0.00
	TN EIA	**TP EIA**	**TSS EIA**
Equivalent Impervious Acres (calculated using the aggregate impervious – true forest delta as explained in Section V.)	900	1,141	0.00
EIA Credit Maximum over a 5 Year Permit Term	**680 acres**		

Notes:
[1] For the purposes of this example, the calculation is based on an MS4 jurisdiction consisting of 60,000 pervious acres.
[2] No TSS reduction is assigned to this BMP by the 2014 Grey Infrastructure Report.

Equation 7 and Equation 8 provide a simplified 2-step process for calculating the maximum EIA.

Equation 7. Step 1 – Permit Term Maximum TN and TP Load Reductions Used to Determine the Maximum EIA Credit for Eliminating Individual Nutrient Discharges

$$Maximum\ Load\ Reduction\ in\ a\ 5\ Year\ Permit\ Term = [Statewide\ Turf\ Unit\ Load\ (TN\ or\ TP)] \times [Pervious\ Acres\ in\ the\ MS4\ Jurisdiction] \times 0.02)$$

Equation 8. Step 2 – Permit Term Maximum EIA Credit for Eliminating Individual Nutrient Discharges

$$Maximum\ EIA\ Credit\ in\ a\ Permit\ Term = \left[\left(\frac{[Maximum\ TN\ Load\ Reduction]}{[I-F_{TN}]}\right) + \left(\frac{[Maximum\ TP\ Load\ Reduction]}{[I-F_{TP}]}\right) + 0\right] \div 3$$

Where:

$I - F_{TN}$ = Aggregate impervious unit load minus true forest unit load for TN (i.e., 17.81 lbs/acre/yr)
$I - F_{TP}$ = Aggregate impervious unit load minus true forest unit load for TP (i.e., 2.23 lbs/acre/yr)

Qualifying Conditions

The following qualifying conditions must be met to receive an EIA for the elimination of individual illicit discharges:

- An MS4 jurisdiction must implement an advanced program as defined by the 2014 Grey Infrastructure Report (Table 7, page 30) to demonstrate that the jurisdiction's program is not merely meeting minimum permit requirements. The MS4 jurisdiction will need to provide documentation demonstrating that the program fulfills these criteria.
- The discharge must be discovered through active implementation of dry weather outfall screenings or commercial/industrial visual surveys under the IDDE program to demonstrate a proactive versus reactive program.
- The corrective measures taken must not be used to fulfill any other regulatory mandate (e.g., work conducted under a sanitary sewer consent decree).
- The values and calculations must follow the protocols assigned to each type of discharge as detailed in the 2014 Grey Infrastructure Report.

Reporting Requirements

The following information must be submitted with the MS4 jurisdiction's annual report to receive restoration credit:

- Type of discharge eliminated
- Total nitrogen and phosphorus removed (lbs)
- EIA credit
- Protocol used
- Nutrient concentration, pre and post elimination (mg/l)
- Discharge flow volume (gallons)
- Discharge flow rate (gallons per day)
- Estimated flow duration (up to a maximum of one year)
- River basin segment where the discharge was corrected
- Year that the discharge was eliminated

- Verification that the discharge was eliminated. Refer to the 2014 Grey Infrastructure Report for verification requirements assigned to each type of discharge
- On a case by case basis, the Department may request additional information deemed necessary to verify that nutrient reductions are calculated in accordance with the 2014 Grey Infrastructure Report

VI. Incentivizing Stormwater Management Co-Benefits

As discussed in Section IV. Pollutant Load Reductions for Upland Best Management Practices, pollutant load reduction crediting for stormwater BMPs is based on the CBP ST or RR adjustor curves (see Appendix A). The impervious acre credit for upland BMPs is based on the impervious acres in a BMP's drainage area and the depth of rainfall treated. Treatment of a rainfall depth of 1 inch (P_E = 1 inch) is required to receive credit equal to the impervious acres in the BMP's drainage area. This water quality treatment volume for a P_E of 1 inch is referred to as the WQ_T. When treating more than 1 inch of rainfall depth, or when providing greater temporary storage in the form of extended detention, or when enhancing the natural functions of a BMP, additional impervious acre credits may be available.

There are three ways of obtaining additional impervious acre credit using upland BMPs:

1. Providing WQ_T for a rainfall depth above 1 inch (P_E > 1 inch) in a practice that follows water quality design criteria for BMPs in the Manual;

2. Providing additional storage above a treated rainfall depth of 1 inch (P_E > 1 inch) via extended detention; or

3. Using green stormwater infrastructure.

1. Credit for Additional Water Quality Treatment Volume

There will be instances where an upland BMP or BMP retrofit provides water quality treatment for more than 1 inch of rainfall depth. Impervious acre credits are available for a water quality treatment volume (i.e., WQ_T) for a rainfall depth up to 3.0 inches. Following the CBP adjustor curves, there is a 1:1 linear relationship between rainfall depth treated and pollutant removal efficiencies up to a rainfall depth treated of 1 inch. However, for BMPs treating more than 1 inch of rainfall depth, the ratio of pollutant removal efficiency to rainfall depth treated decreases to 0.25:1. Specifically, for any additional WQ_T provided for a rainfall depth treated over 1 inch up to 3.0 inches, an additional 25% impervious acre credit is available.

Equation 9. WQ_T Credit for Rainfall Depths Greater than 1 Inch and Less than or Equal to 3 Inches

$$WQ_T\ Credit = [[1\ inch\ Rainfall\ Depth\ Treated + [(Rainfall\ Depth\ Treated - 1\ \text{inch}) \times 0.25]/1\ \text{inch}] \times Impervious\ Acres\ in\ Drainage\ Area$$

2. Credit for Additional Storage (Watershed Management Credit)

Upland BMPs with greater storage volume may be more resilient to changing weather patterns such as increasing annual precipitation and more frequent, intense short duration storms. The Department provides an additional impervious acre credit when the rainfall depth treated for Watershed Management (WM) is greater than the minimum 1 inch ($P_E > 1$ inch) using extended detention according to Appendix D.11 of the Manual. The WM credit incentivizes additional storage volume that helps to reduce downstream flooding and channel erosion. WM credits are available for this temporary storage volume for a rainfall depth between 1.0 inch and 3.0 inches. Specifically, for any additional rainfall depth treated for WM over 1 inch using 24 hour extended detention, an additional 25% impervious acre credit is available. This credit is added to the WQ_T credit. The WM credit applies only to the extended detention volume above the WQ_T for the practice. As shown below, Equation 10 calculates the additional credit available for the extended detention storage volume for a P_E greater than 1.0 inch and less than or equal to 3.0 inches.

Equation 10. WM Credit for Rainfall Depths Greater than 1 Inch and Less than or Equal to 3.0 Inches Managed with Extended Detention

$$WM\ Credit = [[(Total\ Rainfall\ Depth\ Treated - Rainfall\ Depth\ Treated\ for\ WQ_T) \times 0.25]/1\ \text{inch}] \times Impervious\ Acres\ in\ Drainage\ Area$$

3. Green Stormwater Infrastructure Credit

The Green Stormwater Infrastructure (GSI) credit is provided when a BMP provides water quality treatment and incorporates natural processes using vegetation and soils. BMPs with enhanced design features that use natural processes provide healthy, sustainable, and functional ecosystems. BMPs with these features also mimic the pollutant load reduction efficiencies of RR practices. BMPs considered RR practices by the CBP are 35% more effective at removing TN, TP, and TSS than ST practices (see the CBP's BMP Removal Rate Adjustor Curves in Appendix A). Therefore, these practices achieve a GSI credit equal to 1.35 × impervious acre credit achieved through water quality treatment. As noted in Section III. Impervious Acre Credits of Upland Best Management Practices, all Chapter 5 BMPs constructed to meet the required design criteria listed in the Manual are considered RR practices and therefore automatically receive the GSI credit.

A subset of Chapter 3 BMPs (see Table 19) constructed to meet the required design criteria in the Manual can incorporate the additional enhanced design features listed in Table 20 to achieve the GSI credit.

Table 19. Eligibility for Green Stormwater Infrastructure Credits

Upland BMPs	Must Meet Required Manual Design Criteria	Must Meet Required Manual Design Criteria and Provide Enhanced Features

Chapter 5 Practices		
Green Roofs	X	
Permeable Pavements	X	
Reinforced Turf	X	
Disconnection of Rooftop Runoff	X	
Disconnection of Non-Rooftop Runoff	X	
Sheetflow to Conservation Areas	X	
Rainwater Harvesting	X	
Submerged Gravel Wetlands	X	
Landscape Infiltration	X	
Dry Wells	X	
Micro-Bioretention and Rain Gardens	X	
Bio-Swales, Grass Swales, Wet Swales, Dry Swales	X	
Chapter 3 Practices (Sections 3.1 and 3.2 of the Manual)		
Micropool Extended Detention Pond		X
Wet Pond		X
Wet Extended Detention Pond		X
Multiple Pond System		X
Pocket Pond		X
Shallow Wetland		X
Extended Detention Shallow Wetland		X
Pond/Wetland System		X
Pocket Wetland		X
Chapter 3 Practices (Sections 3.3 and 3.4 of the Manual Except Otherwise Noted[1])		
Infiltration Trench		X
Infiltration Basin		X
Surface Sand Filter		X
Organic Filter		X
Pocket Sand Filter		X
Bioretention		X
Note: [1] Infiltration trenches under pavement, underground sand filters, and perimeter sand filters are not eligible for GSI credit.		

Table 20. Green Stormwater Infrastructure Enhanced Features

Chapter 3.1 - 3.2 Stormwater Ponds and Wetlands
Required
1. Flow paths must be 1.5:1 (length relative to width). 2. Surface area of the wetland must be at least 1.5% of the total drainage area to the facility. 3. Any extended detention volume must not comprise more than 50% of the total wet pool volume, and the maximum extended detention water surface elevation must not extend more than three feet above the normal pool.

4. There must be at least 3 separate hydrologic zones (e.g., deep water pool, shallow water bench, shoreline fringe, riparian fringe; see Appendix A of the Manual).
5. These hydrologic zones must be planted throughout with at least 5 wetland species and include a variety of plant types (e.g., grasses, shrubs, trees). For more information on plant types, see *Vegetation in Stormwater Best Management Practices* (MDE, November 2019).
6. Vegetation must be established to cover a minimum of 50% of the pond surface, as measured at the permanent pool design water surface elevation.
7. The landscaping plan must include plants (i.e., aquatic, emergent, upland) along the aquatic bench, safety bench, and side slopes.
8. A vegetated buffer must extend 25 feet outward from the maximum water surface elevation with an additional 15 foot setback to structures (e.g., houses, sheds, roads).

Recommended

1. At least 25% of the total design volume (P_E) should be in deepwater zones with a minimum depth of 4 feet.
2. A minimum of 35% of the total surface area should have a depth of 6 inches or less.
3. At least 65% of the total surface area should be shallower than 18 inches.
4. The vegetated buffer and interior side slopes should be managed as a meadow or forest (mowing twice per year at a maximum).

Chapter 3.3 - 3.4 Stormwater Infiltration and Filtering Systems

Required

1. A minimum 85% vegetation cover must be established within 3 years including at least 5 species and a variety of plant types (grasses, shrubs, trees). For more information, see *Vegetation in Stormwater Best Management Practices* (MDE, November 2019).
2. The landscaping plan must not include invasive species or vines, and these must be removed as they are discovered during maintenance.
3. A vegetated buffer must extend 25 feet outward from the maximum design water surface elevation with an additional 15 foot setback to structures.

Recommended

1. Native plant species are strongly encouraged in the landscaping plan.
2. The vegetated buffer and interior side slopes should be managed as a meadow or forest (mowing twice per year at a maximum).

The following equations are used to calculate the GSI credits:

Equation 11. GSI Credit for Chapter 5 Practices Meeting all Required Design Criteria

$$GSI\ Credit = 1.35 \times [Impervious\ Acre\ Credit\ Achieved\ through\ WQ_T]$$

Equation 12. Credit for Chapter 3 Practice Meeting all Required Design Criteria

$$Impervious\ Acre\ Credit = [Impervious\ Acre\ Credit\ Achieved\ through\ WQ_T]$$

Equation 13. GSI Credit for Subset of Chapter 3 Practices Meeting all Required Design Criteria and all Required Enhanced Features

$$GSI\ Credit = 1.35 \times [Impervious\ Acre\ Credit\ Achieved\ Through\ WQ_T]$$

4. Combining Water Quality Treatment Credits, GSI Credits, and WM Credits

Upland BMPs may include additional WQ_T, greater WM storage volume, or enhanced GSI design features, or a combination of any of the three credits. If the GSI credit is applicable, it replaces the WQ_T credit. If an upland BMP can claim the WM credit and the GSI credit, the WM credit above the WQ_T volume is added to the GSI credit for the total available credit for the project. Example scenarios of all three credits and how to combine credits can be found in Appendix H.

For water quality practices with extended detention, the volume of storage provided in extended detention that is equal to the wet pool WQ_T can be credited as WQ_T. Instead of using WM credits, this volume can be used for WQ_T credits up to a total treatment volume for a P_E of 3.0 inches (i.e., when the wet pool WQ_T is 1.5 inches and the extended detention volume is an additional 1.5 inches). This is because 50% of the total water quality volume provided in these BMPs can be in the form of extended detention. While the total value of credits calculated using this approach is the same, using this alternative method to calculate the credits becomes especially beneficial if the BMP receives GSI credit. An example of this scenario can be found in Appendix H.

VII. Water Quality Trading

MS4 jurisdictions may acquire TN, TP, and TSS credits in accordance with the requirements of the Maryland Water Quality Trading Program (WQTP), COMAR 26.08.11, to meet impervious acre restoration requirements in their MS4 permits.

1. Calculating Credits

In order to use nutrient credits acquired through the WQTP to meet the MS4 permit impervious acre restoration requirements, the impervious acres must be translated into WQTP credits. This is a two-step process, where the impervious acres are first translated into EOS load reductions and then the load reductions are converted into WQTP credits.

The translation of the impervious acres into TN, TP, and TSS load reductions follows the same method used to account for alternative practices through an EIA_f. Using this method, a treated impervious acre is estimated to be equivalent to the TN, TP, and TSS load reductions achieved from converting one acre of aggregate impervious land into true forest. Thus, the requirement to treat an impervious acre can be met through the WQTP under this permit by acquiring 17.81 lbs of TN (EOS), 2.23 lbs of TP (EOS), and 7,756 lbs of TSS (EOS).

Because a WQTP credit is defined as a pound of TN, TP, or TSS delivered to the Bay, referred to as EOT, the EOS load must be converted to an EOT load. MS4 jurisdictions can use the conversion factors shown in Table 21. These factors were calculated based on jurisdiction-wide weighted average watershed delivery factors. The MDOT/SHA delivery factors are based on statewide-weighted averages.

Table 21. Conversion Factors for EOT Loads used for Water Quality Trading Program Calculations

EOS-EOT conversion factor	Anne Arundel	Baltimore	Baltimore City	Carroll	Charles	Frederick	Harford	Howard	Montgomery	Prince George's	State Highway Administration
TN	0.91	0.69	0.81	0.49	0.83	0.73	0.85	0.49	0.62	0.78	0.80
TP	0.86	0.66	0.82	0.46	0.77	0.60	0.75	0.49	0.51	0.73	0.74
TSS	0.74	0.51	0.70	0.35	0.66	0.53	0.60	0.22	0.39	0.47	0.56

Equation 14. Calculating TN, TP, and TSS Trading Credits for Impervious Acre Restoration

$$TN\ Credits\ to\ be\ Acquired = [Impervious\ Acres\ to\ be\ Acquired] \times [17.81\ (lbs/acre)] \times [TN\ EOS\text{-}EOT\ Conversion\ Factor]$$

$$TP\ Credits\ to\ be\ Acquired = [Impervious\ Acres\ to\ be\ Acquired] \times [2.23\ (lb/acre)] \times [TP\ EOS\text{-}EOT\ Conversion\ Factor]$$

$$TSS\ Credits\ to\ be\ Acquired = [Impervious\ Acres\ to\ be\ Acquired] \times [7{,}756\ (lb/acre)] \times [TSS\ EOS\text{-}EOT\ Conversion\ Factor]$$

Permittees can meet their restoration requirements by acquiring credits of TN, TP, and TSS using Equation 14. Alternatively, the requirements can be achieved by acquiring an excess amount of one of the pollutants in lieu of acquiring another. Under this option, 17.81 lbs of TN (EOS) is equivalent to 2.23 lbs of TP (EOS), or 7,756 lbs of TSS (EOS). For example, if an MS4 jurisdiction opted to meet the restoration requirements through the WQTP by purchasing nitrogen credits alone, it would need to purchase 53.43 lbs of TN (EOS) per EIA.

2. Credit Vintage

To meet its restoration requirements with WQTP credits, a permittee must secure the required number of credits from the same year (vintage year) as that of the permit expiration.

3. Qualifying Credit

The WQTP crediting procedures should not be used to acquire credits from practices implemented within an MS4's jurisdictional boundary. The Department recommends that any restoration projects and credits within an MS4's jurisdictional boundary, include a memorandum of understanding, or other legal document, that formalizes credit ownership and long-term maintenance responsibility. Nutrient credits for BMPs implemented within an MS4's jurisdictional boundary, but from which credits have been certified and traded to another entity through the WQTP, cannot be claimed by that jurisdiction as restoration credit (i.e., double-counting of nutrient credits).

BMPs in this Guidance that are implemented on agricultural land must comply with the following:

- Federal and State cost share funds, such as Conservation Reserve Enhancement Program (CREP) and Maryland Agricultural Water Quality Cost-Share (MACS) Program, must not be used to acquire MS4 credit.
- To acquire MS4 credit for work performed on land with an Agricultural Use Assessment as determined by the Department of Assessments and Taxation, farming operations must first be compliant with State laws and regulations (e.g., nutrient management plans, excluding livestock from stream setbacks, phosphorus management requirements).
- Any federal or State cost share conservation practices disturbed or removed as a result of construction must be re-established consistent with the Natural Resources Conservation Service (NRCS) standard and specifications as determined by a local soil conservation district.
- Credit will not be given for new conservation practices to offset the removal of existing ones.

4. Geography

Nutrient credits acquired for MS4 compliance must be generated by a source located within a trading region that overlaps with the MS4's jurisdictional boundary. A dynamic map showing watershed and county boundaries can be accessed at: arcg.is/1TKjqG.

5. Generating Tradeable Credit

An MS4 jurisdiction may generate tradeable credit for the WQTP once it has fully met its impervious acre restoration requirement.

VIII. Expert Panel Updates and Innovative Practices

1. Future Chesapeake Bay Program Expert Panel Updates

The CBP periodically approves new BMPs or revises efficiencies of existing BMPs. The Department will share this information with Maryland's MS4 regulated community, provide guidance on proper application in Maryland, and place Technical Memorandums on the Department's webpage as an addendum to this Guidance.

2. Proposal of Innovative BMPs for MS4 Credit

MS4 jurisdictions are encouraged to continue to explore innovative practices and new solutions to improve water quality. Several new BMPs were discussed with MS4 jurisdictions and environmental non-governmental organizations during the Guidance committee meetings. These BMPs include non-forested riparian buffer protection, forest regeneration, and self-converted wetland ponds. Additional programmatic BMPs that have been of interest include pet waste reduction, stormwater education, and trash removal.

When monitoring data exist to support additional credits for new practices, MS4 jurisdictions may submit that information to the Department for consideration. The Department can approve certain practices when proper documentation and monitoring are provided to verify pollutant removal efficiencies. The policies and procedures for the approval of new and innovative technologies may be found on the Department's website. These must be followed for all MS4 jurisdictions interested in pursuing new practices or products either for approval as an acceptable BMP for new development and redevelopment or for use in retrofit applications. The Department's approval for using these practices to meet MS4 restoration requirements is subject to the following:

1. Any MS4 jurisdiction requesting approval of an innovative stormwater practice for restoration must submit to the Department documentation demonstrating practice effectiveness. At a minimum, this documentation must include:

    a. Clear representations of the specific pollutant removal efficiencies for the device in a typical mode of use and under conditions that would be expected normally within the jurisdiction;

b. Pollutant removal efficiencies that are supported using one or more of the following:

   i. Monitoring data collected under typical field conditions using a methodology consistent with the standards described in the Department's *Alternative/Innovative Technology Review Checklist* (MDE, October 2019);

   ii. Monitoring studies conducted by the MS4 jurisdiction and approved by the Department; or

   iii. Review and approval of the practice by EPA or the CBP.

c. Product specifications, installation requirements, and operation and maintenance procedures;

d. Hydraulic performance specifications (e.g., treatment volume, throughput);

e. References and examples of actual installations of the practice;

f. Minimum and recommended maintenance requirements for the practice and any components;

g. Discussion of any special licensing, hauling, or access requirements, and safety issues associated with the operation and maintenance of the practice; and

h. Proof that the practice has been submitted to the CBP Water Quality Goal Implementation Team (WQGIT) or Urban Stormwater Workgroup (USWG) for consideration as an EPA-recognized stormwater BMP.

2. If credit is sought under an MS4 jurisdiction's WIP or MS4 permit, the practice must be documented in that jurisdiction's TMDL implementation plan;

3. All practices must be maintained in accordance with State requirements as defined in the Code of Maryland Regulations (COMAR) 26.17.02;

4. The MS4 jurisdiction is responsible for determining the appropriate impervious acre reduction for MS4 restoration efforts for the specific practices based on the methodology described in this Guidance; and

5. If formal documentation listed in Section 1.b above is absent, interim pollutant removal efficiencies may be established by the Department based on any supporting documentation provided by the applicant until monitoring is conducted. These interim efficiencies will be recognized for a period not to exceed two years. If no further monitoring is provided after two years, the practice will be disallowed as an acceptable stormwater retrofit BMP.

The Department will evaluate all information to make a determination on credit toward meeting pollutant load reduction targets under established TMDLs and impervious acre treatment requirements. The Department will work closely with the CBP workgroups to determine a credit system that is equitable and consistent with other activities in the Chesapeake Bay region. As new technology, innovative practices, monitoring, and research offer additional information, the Department will make that information available to the MS4 regulated community.

IX. Acronyms

BAT	Best Available Technology
BMP	Best Management Practice
CAST	Chesapeake Assessment Scenario Tool
CBP	Chesapeake Bay Program
CEAP	Conservation Affects Assessment Project
COMAR	Code of Maryland Regulations
CREP	Conservation Reserve Enhancement Program
Department, the	Maryland Department of the Environment
ED	Extended Detention
EIA	Equivalent Impervious Acre
EIA_f	Equivalent Impervious Acre Conversion Factor
EOS	Edge-of-Stream
EOT	Edge-of-Tide
EPA	U.S. Environmental Protection Agency
ESD	Environmental Site Design
FTW	Floating Treatment Wetlands
GSI	Green Stormwater Infrastructure
HSG	Hydrologic Soil Group
I – F	Aggregate Impervious Unit Load – True Forest Unit Load
IA	Impervious Acre
IDDE	Illicit Discharge Detection and Elimination
LOD	Limit of Disturbance
MACS	Maryland Agricultural Water Quality Cost-Share Program
MALPF	Maryland Agricultural Land Preservation Foundation
Manual, the	Maryland Stormwater Design Manual (2000)
MEP	Maximum Extent Practicable
MET	Maryland Environmental Trust
MS4	Municipal Separate Storm Sewer System
NH3	Ammonia
NO3	Nitrate
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
ORGN	Organic Nitrogen
ORGP	Organic Phosphorus
PCB	Polychlorinated Biphenyl
Pdesign	Rainfall Treated by Stormwater Management Practices (inches)
P_E	Rainfall Target Used to Size ESD Practices
PO4	Phosphate
Q	Rainfall Depth Treated per Impervious Acre (inches)
RR	Runoff Reduction Practices
SPARROW	Spatially Referenced Regressions On Watershed Attributes
SPSC	Regenerative Step Pool Stormwater Conveyance System
ST	Stormwater Treatment Practices
STB	Stream Bed and Bank Load

SW-WLA	Stormwater Wasteload Allocations
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Sediment
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Society
USWG	Urban Stormwater Workgroup
WinSLAMM	Source Loading and Management Model for Windows
WIP	Watershed Implementation Plan
WM	Watershed Management
WQGIT	Water Quality Goal Implementation Team
WQ_T	Water Quality Treatment Volume
WQTP	Maryland Water Quality Trading Program
WQ_V	Water Quality Volume
WRTDS	Weighted Regressions on Time, Discharge and Season
WTWG	Watershed Technical Workgroup
WWTP	Wastewater Treatment Plant

X. References

This Guidance reflects the contributions of multiple stakeholders. In 2018, the Department convened a committee representing environmental non-governmental organizations and medium and large MS4 jurisdictions. Monthly meetings covered accounting for stormwater management co-benefits, incentivizing green infrastructure, encouraging restoration activities in upland areas, new BMP efficiencies, restoration cost considerations, and new BMPs not currently credited. The Department thanks the Audubon Naturalist Society; Blue Water Baltimore; Chesapeake Bay Foundation; Clean Water Action; Maryland League of Conservation Voters; Potomac Conservancy; Anne Arundel, Baltimore, Carroll, Harford, and Montgomery Counties; Baltimore City; and the EPA for their time, expertise, invaluable ideas, and commitment to improving water quality in the Chesapeake Bay and Maryland's local streams.

In addition, the Guidance incorporates information from the following sources:

Chesapeake Bay Program. Modeling. chesapeakebay.net/what/programs/modeling. (Accessed August 23, 2019).

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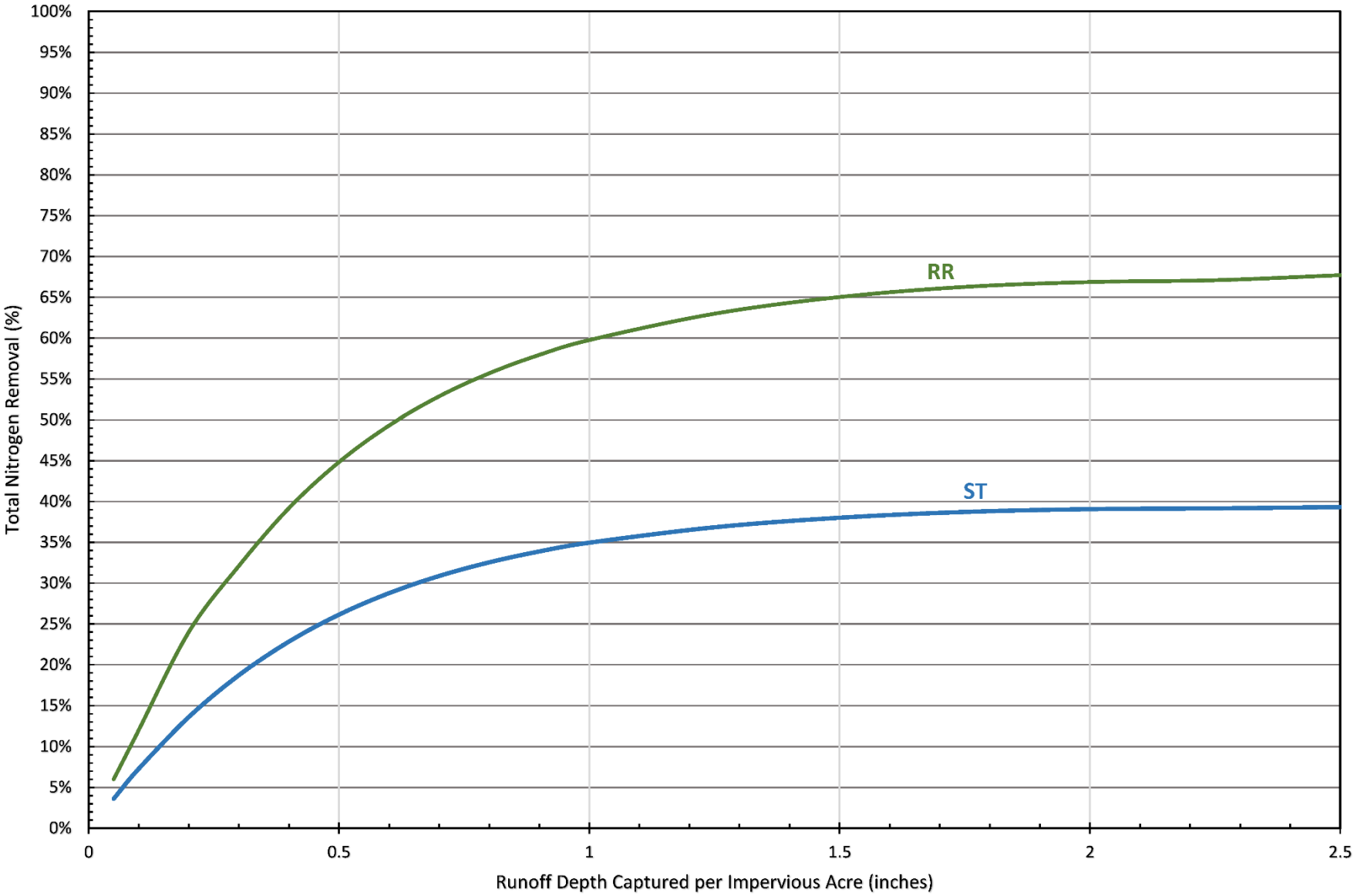
Appendix A: Adjustor Curves

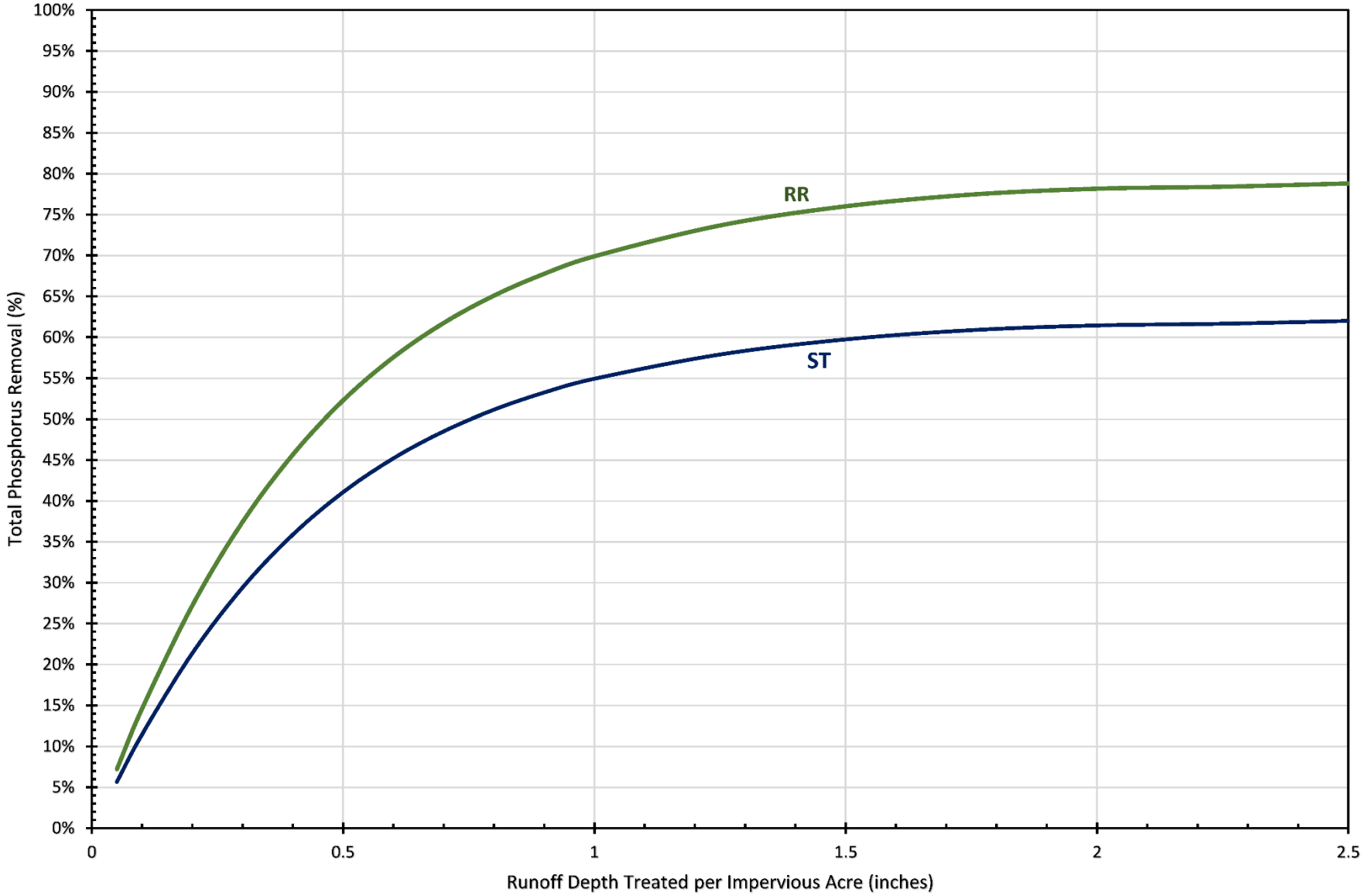
The following pollutant removal adjustor curves are from the Chesapeake Bay Program (CBP) publication *Recommendations of the Expert Panel to Define Removal Rates for New State Stormwater Performance Standards* (Schueler and Lane, 2012 and 2015). The curves provide pollutant removal efficiencies for nutrient and sediment load reductions for best management practice (BMP) implementation. BMPs are classified as either runoff reduction (RR) or stormwater treatment (ST) as outlined in Table 2 (see Section IV).

Throughout the Guidance, the impervious acre credit is used to account for MS4 restoration achieved through BMP implementation. The impervious acre credit is also the surrogate parameter for showing progress in total nitrogen (TN), total phosphorus (TP) and total suspended sediment (TSS) load reductions for meeting Chesapeake Bay and local TMDLs. For an impervious surface, the runoff depth captured is 95% of the rainfall depth treated by a BMP. Therefore, when using these adjustor curves, the rainfall depth treated may be used as a substitute for the runoff depth captured (X axis) when determining pollutant removal efficiencies.

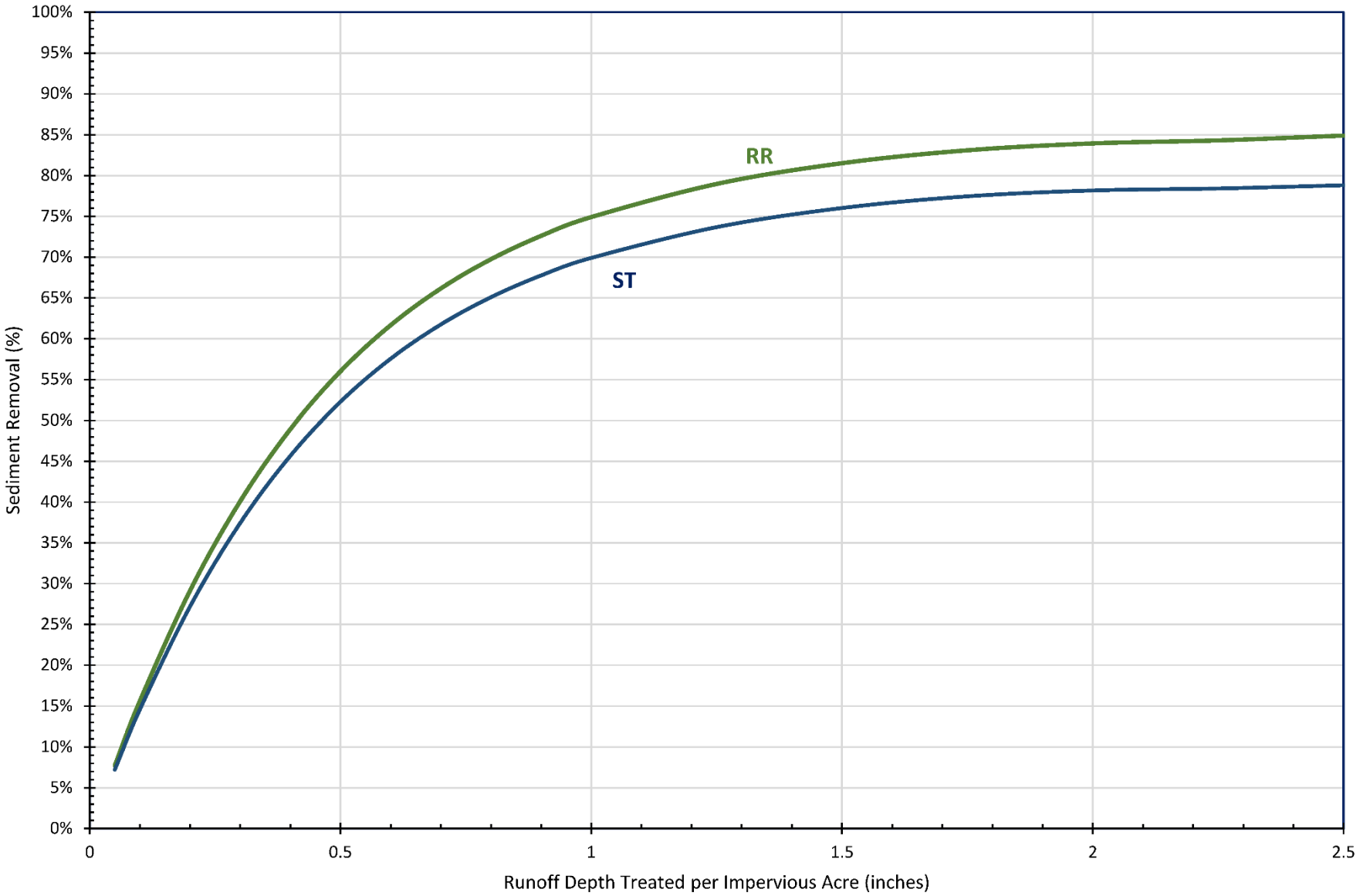
Total Nitrogen (TN) Removal
for Runoff Reduction (RR) and Stormwater Treatment (ST) Stormwater Practices



Total Phosphorus (TP) Removal
for Runoff Reduction (RR) and Stormwater Treatment (ST) Stormwater Practices



Total Suspended Sediment (TSS) Removal for Runoff Reduction (RR) and Stormwater Treatment (ST) Stormwater Practices



Appendix B: Phase 6 Model Chesapeake Bay Program Land Cover Runoff Loads

As part of the Chesapeake Bay total maximum daily load (TMDL) midpoint assessment, the Chesapeake Bay Program (CBP) transitioned from the Phase 5 to the Phase 6 Model. The new model was developed using a multiple model approach, drawing upon total nitrogen (TN), total phosphorus (TP), and total suspended sediment (TSS) loading estimates from the U.S. Geological Society's (USGS) SPARROW model (an empirical regression model), the Phase 5 Chesapeake Bay Watershed Model, and the U.S. Department of Agriculture's (USDA) Conservation Affects Assessment Project (CEAP) model. The overall calibration of input loads to the Bay using USGS's Weighted Regressions on Time, Discharge and Season (WRTDS) observations represents an improvement over Phase 5. The Phase 6 Model also includes significant improvements in the resolution and accuracy of model inputs. These improvements include the following:

- High resolution (i.e., 1 meter) land cover data were used as the base dataset for developing the model land cover.
- Refined Load Sources with unique unit loads were incorporated, particularly in the developed sector. The Phase 5 Model simulated aggregate impervious and pervious urban land cover classifications. The Phase 6 Model simulates both road and non-road impervious surfaces, tree canopy over impervious, turfgrass, and tree canopy over turfgrass.
- In the Phase 5 Model, stream bed and bank (STB) loads were implicitly included in all land cover loads, due to the nature of the data used to inform the unit loads. The Phase 6 Model explicitly simulates streambank and bed loads as a discreet source, as well as tidal shoreline loads.
- The Phase 6 Model incorporates updated and refined historic best management practice (BMP) data. The CBP partnership spent several years collecting updated information on historic BMPs for model incorporation.
- The Phase 6 Model incorporates many new BMPs for which expert panel reports were developed and approved, and it includes refinements to the TN, TP, and TSS reduction efficiencies for existing BMPs.

This Guidance refers to two primary spatial scales at which loads are estimated. In the Phase 6 Model, edge-of-stream (EOS) loads represent the input loads to smaller, headwater streams in a watershed and edge-of-tide (EOT) loads represent the input loads to the tidal Chesapeake Bay. To ensure consistency in the calculation of equivalent impervious acres (EIA), the Department developed a revised total EOS unit load, which is the sum of the STB load attributed to each Load Source and the Load Source's terrestrial load. More information on the methodology and reasoning behind the development of the revised unit loads and how they are used in calculating the EIA_f (i.e., equivalent impervious acre conversion factor) can be found in Appendix D. Revised EOS loads in Phase 6 are used for estimating loads to local, non-tidal watersheds.

EOT loads correspond to Delivered Loads in the Phase 5 Model. Chesapeake Bay TMDLs and WIPs are presented in terms of EOT loads. The EOT load can be calculated outside of the model as follows:

Equation 15. Edge-of-Tide Loads

$$EOT\ Load\ (lbs/yr) = [EOS\ Load\ (lbs/yr)] \times [DeliveryFactor]$$

The delivery factor is unique per Phase 6 modeling segment and are also provided in Appendix K of this Guidance. Generally speaking, the greater the proximity of a modeling segment to the tidal Bay, the greater the TN, TP, and TSS delivery. Delivery factors also decrease for modeling segments draining to impoundments. In addition to Appendix K, these factors can be found via the "EOT Factor Map" on the Department's water quality trading website: mde.maryland.gov/programs/Water/WQT/Pages/WQT_Tools_Resources.aspx.

Load Sources are aggregated for the purposes of calculating pollutant load reduction credits in this Guidance, since the distinction between some individual Load Sources in the model is merely arbitrary. For example, any minimal differences between "MS4" and "Non-Regulated" unit loads within a modeling segment are merely a product of model calibration and do not reflect actual differences in relative unit loads.

There are two major types of impervious surface simulated in the Phase 6 Model: road impervious and non-road impervious. In order to keep data collection efforts for load reduction credit calculations simple, these calculations will be based off an aggregate impervious surface unit load. Therefore, MS4 jurisdictions do not need to collect data on how much road and non-road impervious surface drains to a given BMP. There are certain BMPs, however, such as "Street Trees" (i.e., land cover conversion BMP representing a shift from Impervious Road to Tree Canopy over Impervious) and street sweeping, which make the assumption that only Impervious Road surface is being treated. In these instances, the calculations apply the specific Impervious Road surface unit load (see Table 4). Appendix C presents the specific Load Sources used in the formulas for each BMP.

When crediting TN, TP, and TSS load reductions toward permit and TMDL goals, these reductions should be calculated from a No Action, or No BMP, modeling scenario. Statewide average, No Action TN, TP, and TSS EOS revised unit loads (i.e., loading rates) for applicable urban and natural Load Sources are presented in Table 4. Steps for calculating load reductions for TN are listed below.

TN Load Reductions of Stormwater Best Management Practices

Steps for calculating EOT TN load reductions:

1. Determine the Phase 6 modeling segment delivery factor.

2. Determine the impervious drainage area treated by the practice.

3. If the project is a retrofit, determine the pre-restoration stormwater BMP type, inches of rainfall depth treated, and the corresponding upland BMP efficiency. Otherwise, use the drainage area to calculate the TN load without a BMP efficiency.

4. Calculate the pre-restoration TN load reduction using Equation 4 of this Guidance, and repeated below.

$$Load\ Reduction\ (lbs/yr) = [Aggregate\ Impervious\ Unit\ Load\ (lbs/acre/yr)] \times [Impervious\ Surface\ in\ BMP\ Drainage\ Area\ (acres)] \times [BMP\ Efficiency/100] \times [Phase\ 6\ Modeling\ Segment\ Delivery\ Factor]$$

5. Determine the post-restoration stormwater BMP type, inches of rainfall depth treated, and the corresponding upland BMP TN efficiency.

6. Calculate the post-restoration TN load reduction using Equation 4.

7. Subtract the result from the pre-restoration TN load to determine the TN credit obtained from the stormwater BMP:

$$TN\ Credit\ (lbs/yr) = [Pre\ Restoration\ TN\ Load\ Reduction\ (lbs/yr)] - [Post\ Restoration\ TN\ Load\ Reduction\ (lbs/yr)]$$

Example – Wet pond in modeling segment H24021PM1_3510_4000:

1. Phase 6 Modeling Segment Delivery Factor = 0.65 (See Appendix K)

2. Drainage Area = 100 acres "Impervious"

3. Pre-Restoration stormwater BMP type = None, 0 inches rainfall depth treated

4. Upland BMP TN efficiency = 0% (see Table 3)

5. $Pre\text{–}Restoration\ TN\ Load = 20.09\ (lbs/acre)/yr) \times 0.65 = 1{,}305.85\ (lbs/yr)$

6. Post-Restoration stormwater BMP type = Stormwater treatment (ST) practice, 1 inch rainfall depth treated

7. Upland BMP TN efficiency = 35%

8. $Post\text{–}Restoration\ TN\ Load = 20.09\ (lbs/acre/yr) \times 100\ (acres) \times 35/100 \times 0.65 = 457.05\ (lbs/yr)$

9. $TN\ Credit\ Calculation = 1{,}305.85\ (lb/yr) - 457.05\ (lbs/yr) = 848.80\ (lb/yr)$

Appendix C: Best Management Practice Load Reduction Formulas and Pollutant Removal Efficiencies

BMP	Load Reduction Formula	TN Efficiency/Per Unit Load Reduction	TP Efficiency/Per Unit Load Reduction	TSS Efficiency/Per Unit Load Reduction
Efficiency BMPs				
Structural				
Stormwater Treatment (ST)	[Aggregate Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × ST Efficiency]	ST efficiency variable by P_E (see Table 3)	ST efficiency variable by P_E (see Table 3)	ST efficiency variable by P_E (see Table 3)
Runoff Reduction (RR)	[Aggregate Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × RR Efficiency]	RR efficiency variable by P_E (see Table 3)	RR efficiency variable by P_E (see Table 3)	RR efficiency variable by P_E (see Table 3)
Nonstructural				
Street Sweeping - Advanced Technology				
1 pass/12 weeks	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	0%	1%	2%
1 pass/2 weeks	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	2%	5%	11%
1 pass/4 weeks	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	1%	3%	6%
1 pass/8 weeks	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	1%	2%	4%
1 pass/week	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	3%	8%	16%
2 passes/week	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	4%	10%	21%
Fall 1 pass/1-2 weeks else monthly	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	2%	5%	10%
Spring 1 pass/1-2 weeks else monthly	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	1%	4%	7%
Street Sweeping - Mechanical Broom Technology				

BMP	Load Reduction Formula	TN Efficiency/Per Unit Load Reduction	TP Efficiency/Per Unit Load Reduction	TSS Efficiency/Per Unit Load Reduction
1 pass/4 weeks	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	0%	0%	0%
1 pass/week	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	0%	0%	1%
2 passes/week	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	0%	0%	1%
Urban Soil Restoration - Impervious				
Level 1	[Aggregate Imp. Unit Reduction (lbs/acre/yr) × Imp. Area (acres)]	13.7 lbs/acre/yr	0.70 lbs/acre/yr	1,696 lbs/acre/yr
Level 2	[Aggregate Imp. Unit Reduction (lbs/acre/yr) × Imp. Area (acres)]	15 lbs/acre/yr	0.77 lbs/acre/yr	1,864 lbs/acre/yr
Urban Soil Restoration - Turf				
Level 1	[Turf Unit Reduction (lbs/acre/yr) × Turf Area (acres)]	4.4 lbs/acre/yr	0.72 lbs/acre/yr	278 lbs/acre/yr
Level 2	[Turf Unit Reduction (lbs/acre/yr) × Turf Area (acres)]	8.9 lbs/acre/yr	1.44 lbs/acre/yr	557 lbs/acre/yr
Floating Treatment Wetlands				
10% Pond Surface Area Coverage	[Urban Unit Load (lbs/acre/yr) × Urban Area (acres) × Efficiency]	1%	2%	2%
11-20% Pond Surface Area Coverage	[Urban Unit Load (lbs/acre/yr) × Urban Area (acres) × Efficiency]	2%	3%	5%
21-30% Pond Surface Area Coverage	[Urban Unit Load (lbs/acre/yr) × Urban Area (acres) × Efficiency]	3%	5%	7%
31-40% Pond Surface Area Coverage	[Urban Unit Load (lbs/acre/yr) × Urban Area (acres) × Efficiency]	3%	7%	9%
41-50% Pond Surface Area Coverage	[Urban Unit Load (lbs/acre/yr) × Urban Area (acres) × Efficiency]	4%	8%	12%
Load Reduction BMPs				

BMP	Load Reduction Formula	TN Efficiency/Per Unit Load Reduction	TP Efficiency/Per Unit Load Reduction	TSS Efficiency/Per Unit Load Reduction
Stream Restoration/Outfall Stabilization				
Planning Rate[1]	[Length of Stream Restored (ft) × Unit Load Reduction (lbs/ft)]	0.075 lbs/ft	0.068 lbs/ft	248 lbs/ft
Protocols	See expert panel report	N/A	N/A	N/A
[1] Planning rate cannot be used for determining final project credit.				
Shoreline Management				
Planning/Default Rate[2]	[Length of Shoreline Restored (ft) × Unit Load Reduction (lbs/ft)]	0.086 lbs/ft	0.061 lbs/ft	164 lbs/ft
Protocols	See expert panel report	N/A	N/A	N/A
[2] Planning/Default rate should only be used for planning purposes or for non-conforming projects (see expert panel report for definition of non-conforming projects).				
Storm Drain Vacuuming/Inlet Cleaning				
Organic[3]	[Mass of wet solids collected (ton/yr) × conversion factor (lbs/ton)]	4.44 lbs/ton	0.48 lbs/ton	400 lbs/ton
Inorganic[4]	[Mass of wet solids collected (ton/yr) × conversion factor (lbs/ton)]	3.78 lbs/ton	0.84 lbs/ton	1400 lbs/ton
[3] Wet weight to dry weight conversion is built into conversion factor. [4] Wet weight to dry weight conversion is built into conversion factor.				
Land-Cover Conversion BMPs				
Non-Riparian				
Imp. Surface Reduction (Imp. to Turf)	[Imp. Unit Load (lbs/acre/yr) – Turf Unit Load (lbs/acre/yr)] × Area Converted (acres)]	6.74 lbs/acre/yr	0.43 lbs/acre/yr	7060 lbs/acre/yr

BMP	Load Reduction Formula	TN Efficiency/Per Unit Load Reduction	TP Efficiency/Per Unit Load Reduction	TSS Efficiency/Per Unit Load Reduction
Street Trees (Imp. to Tree Canopy over Imp.)	[[Road Imp. Unit Load (lbs/acre/yr) – Tree Canopy Over Imp. Unit Load (lbs/acre/yr)] × Area Converted (acres)]	3.04 lbs/acre/yr	0.76 lbs/acre/yr	1213 lbs/acre/yr
Urban Tree Canopy Planting (Turf to Tree Canopy over Turf)	[[Turf Unit Load (lbs/acre/yr) – Tree Canopy Over Turf Unit Load (lbs/acre/yr)] × Area Converted (acres)]	3.18 lbs/acre/yr	0.51 lbs/acre/yr	82 lbs/acre/yr
Forest Planting (Turf to Forest)	[[Turf Unit Load (lbs/acre/yr) – True Forest Unit Load (lbs/acre/yr)] × Area Converted (acres)]	11.08 lbs/acre/yr	1.8 lbs/acre/yr	696 lbs/acre/yr
Forest Conservation (Urban to Forest)	[[Urban Unit Load (lbs/acre/yr) – True Forest Unit Load (lbs/acre/yr)] × Area Converted (acres)]	10.61 lbs/acre/yr	1.1 lbs/acre/yr	2,587 lbs/acre/yr
Conservation Landscaping (Turf to Mixed Open)	[[Turf Unit Load (lbs/acre/yr) – Mixed Open Unit Load (lbs/acre/yr)] × Area Converted (acres)]	5.21 lbs/acre/yr	0.53 lbs/acre/yr	0 lbs/acre/yr
Riparian				
Forest Planting (Turf to Forest)	[[Turf Unit Load (lbs/acre/yr) – True Forest Unit Load (lbs/acre/yr)] × Area Converted (acres)] + [Urban Unit Load (lbs/acres/yr) × Area Converted (acres) × Efficiency]	11.1 lbs/acre/yr & 25%	1.8 lbs/acre/yr & 50%	696 lbs/acre/yr & 50%
Conservation Landscaping (Turf to Mixed Open)	[[Turf Unit Load (lbs/acre/yr) – Mixed Open Unit Load (lbs/acre/yr)] × Area Converted (acres)] + [Urban Unit Load (lbs/acre/yr) × Area Converted (acres) × Efficiency]	5.21 lbs/acre/yr & 12.5%	0.53 lbs/acre/yr & 25%	0 lbs/acre/yr & 25%
Septic BMPs				
Connections[5]	[Septic Unit Load (lbs/system) × Efficiency]	50%	N/A	N/A
Denitrification	[Septic Unit Load (lbs/system) × Efficiency]	50%	N/A	N/A

BMP	Load Reduction Formula	TN Efficiency/Per Unit Load Reduction	TP Efficiency/Per Unit Load Reduction	TSS Efficiency/Per Unit Load Reduction
Pumping	[Septic Unit Load (lbs/system) × Efficiency]	5%	N/A	N/A
[5] Creditable connection efficiency set to BAT upgrade efficiency based on MDE Wastewater crediting policy.				

Appendix D: Methodology for Calculating Equivalent Impervious Acres

The Department is using the Phase 6 Model land cover pollutant unit loads and best management practice (BMP) load reduction rates to determine total nitrogen (TN), total phosphorus (TP), and total suspended sediment (TSS) reductions. These pollutant unit loads and reduction rates are also being used to determine the equivalent impervious acre (EIA) credits provided by alternative BMPs. The Phase 6 Model is more detailed in its calculation of pollutant loads than Phase 5. As a result, the discrepancy between the model phases must be accounted for to ensure consistent load reduction and equivalent impervious acre conversion factor (EIA_f) calculations.

Terrestrial vs. Stream Bed and Bank Loads

The Phase 6 Model significantly differs from the Phase 5 Model in how loads are attributed. In the Phase 5 Model, the total unit loads per land cover Load Source reflect inputs from both terrestrial loads (i.e. over land) and stream bed and bank loads (STB). However, the total unit loads per land cover Load Source in the Phase 6 Model only reflect terrestrial loads. To ensure consistency in the calculation of EIAs between the two models, the Department estimated a total unit load, which is the sum of the Load Source's terrestrial load and STB load attributed to that Load Source. The method for calculating the STB load attributed to each Load Source can be found in Appendix E.

Calculating Deltas

Calculating the EIA_f for each alternative BMP is a two-step process. First, the pollutant load reductions for TN, TP, and TSS are calculated for the alternative BMP. Next, these pollutant load reductions are divided by the delta between aggregate impervious and true forest unit loads for TN, TP, and TSS. The difference between true forest and aggregate impervious loads signifies maximum restoration potential. The Aggregate Impervious – True Forest delta for TN, TP and TSS is shown in Table 22 and is calculated by subtracting the Total Forest Unit Load from the Total Impervious Unit Load.

Table 22. Aggregate Impervious – True Forest Delta Calculation using Revised Phase 6 Model Pollutant Unit Loads

		TN (lb/acre/yr)	TP (lb/acre/yr)	TSS (lb/acre/yr)
1.	Impervious STB	5.43	1.83	6,806
2.	Impervious Terrestrial	14.66	0.72	1,668
3.	**Total – Aggregate Impervious (1 + 2)**	**20.09**	**2.55**	**8,474**
4.	True Forest STB	0.85	0.27	690
5.	True Forest	1.43	0.05	28
6.	**Total – True Forest (4 + 5)**	**2.28**	**0.32**	**719**
7.	**Aggregate Impervious – True Forest delta (3 – 6)**	**17.81**	**2.23**	**7,756**

All alternative BMPs except land use conversion practices use the Aggregate Impervious unit load – True Forest unit load deltas in their EIA_f calculation as shown in Equation 5 of this Guidance and repeated below.

$$EIA_f = \frac{\left(\frac{TN\ Load\ Red.}{I-F_{TN}}\right)+\left(\frac{TP\ Load\ Red.}{I-F_{TP}}\right)+\left(\frac{TSS\ Load\ Red.}{I-F_{TSS}}\right)}{3}$$

Where:

EIA_f = Equivalent impervious acre conversion factor
TN Load Red. = BMP load reduction for TN (lbs/unit/yr)
TP Load Red. = BMP load reduction for TP (lbs/unit/yr)
TSS Load Red. = BMP load reduction for TSS (lbs/unit/yr)
$I - F_{TN}$ = Aggregate impervious unit load minus true forest unit load for TN (lbs/acre/yr)
$I - F_{TP}$ = Aggregate impervious unit load minus true forest unit load for TP (lbs/acre/yr)
$I - F_{TSS}$ = Aggregate impervious unit load minus true forest unit load for TSS (lbs/acre/yr)

Land use conversion practices are calculated using the upland stormwater management practice method for determining an equivalent impervious acre. This method uses the stormwater treatment (ST) 1 inch performance delta instead of the Aggregate Impervious unit load – True Forest unit load for its EIA_f calculation (see Table 23). The ST 1 inch delta calculation is shown in Equation 16. This is the ST 1 inch treatment efficiency multiplied by the Total Impervious Unit Load.

Table 23. ST 1 Inch Delta Calculation using Revised Phase 6 Model Impervious Unit Loads

		TN (lbs/acre/yr)	TP (lbs/acre/yr)	TSS (lbs/acre/yr)
1.	**ST 1 Inch Pollutant Removal Efficiency**	**0.35**	**0.55**	**0.70**
2.	Impervious STB Unit Load	5.43	1.83	6,806
3.	Impervious Terrestrial Unit Load	14.66	0.72	1,668
4.	**Total Impervious Unit Load (2+3)**	**20.09**	**2.55**	**8,474**
5.	**ST 1 Inch Delta (1×4)**	**7.03**	**1.40**	**5,932**

Equation 16. EIA_f Calculation for Land Use Conversion Practices

$$EIA_f = \frac{\left(\frac{TN\ Load\ Red.}{ST1"\ delta_{TN}}\right)+\left(\frac{TP\ Load\ Red.}{ST1"delta_{TP}}\right)+\left(\frac{TSS\ Load\ Red.}{ST1"delta_{TSS}}\right)}{3}$$

Where:

TN Load Red. = Land Cover Conversion load reduction for TN (lbs/unit/yr)
TP Load Red. = Land Cover Conversion load reduction for TP (lbs/unit/yr)
TSS Load Red. = Land Cover Conversion load reduction for TSS (lbs/unit/yr)

ST1"delta TN = ST1 inch pollutant efficiency applied to Total Impervious Unit Load for TN
ST1"delta TP = ST1 inch pollutant efficiency applied to Total Impervious Unit Load for TP
ST1"delta TSS = ST1 inch pollutant efficiency applied to Total Impervious Unit Load for TSS

Appendix E: Calculating the Stream Bed and Bank Load

The method for calculating the stream bed and bank load (STB) attributed to each Load Source is performed outside of the Phase 6 Model but follows the same principles that are used in the Chesapeake Assessment Scenario Tool (CAST.) This methodology was provided to the Department by Chesapeake Bay Program (CBP) staff. For each pollutant, the Load Source-specific ratio was calculated between the CAST scenario edge-of-stream (EOS) load output not including STB and the calibration average EOS load not including STB. Next, the calculated ratio was multiplied by the STB base source-specific load. For the total suspended sediment (TSS) STB load only, an additional 4/3 of the CAST scenario EOS impervious TSS load was added, consistent with the Phase 6 Model methodology. These equations are summarized below:

Equation 17. Calculations for STB Loads for TN, TP, and TSS

$$TN\ STB\ Load = \left(\frac{[Scenario\ EOS\ without\ STB\ TN]}{[CAL\ EOS\ without\ STB\ TN]}\right) \times [STB\ Base\ TN]$$

$$TP\ STB\ Load = \left(\frac{[Scenario\ EOS\ without\ STB\ TP]}{[CAL\ EOS\ without\ STB\ TP]}\right) \times [STB\ Base\ TP]$$

$$TSS\ STB\ Load = \left(\left(\frac{[Scenario\ EOS\ without\ STB\ TSS]}{[CAL\ EOS\ without\ STB\ TSS]}\right) \times [STB\ Base\ TSS]\right) + (4/3 \times [Scenario\ Impervious\ TSS])$$

Where:

TN = Total nitrogen
TP = Total phosphorus
TSS = Total suspended sediment
STB = Stream bed and bank load source
EOS = Edge-of-stream
CAL = Calibration average

The STB base load used in each equation is a set load determined during the development and calibration of the Phase 6 Model. It is presented in terms of nitrate (NO3) organic nitrogen (ORGN) and ammonia (NH3) for TN and phosphate (PO4) and organic phosphorus (ORGP) for TP. However, the results are summed to TN and TP for convenience. The calibration average EOS load is the average of the annual calibration scenarios from 1984 to 2013. Both the STB base load and the calibration average EOS load are not CAST outputs and were provided by CBP. All calculations are performed at the land river modeling segment scale and include the agencies as defined in CAST. Counties and municipalities are implicitly included.

STB Load Normalization

Because a single STB base load exists for all Load Sources, the STB source-specific load calculated using Equation 17 is an overestimation. This overestimation was accounted for and corrected by the Department using the following steps:

1. Calculate the ratio of the CAST scenario EOS load output to the calibration average EOS load for the aggregate of all other Load Sources and sum the result with the Load Source-specific ratio calculated above.

2. To account for Load Source group breakouts, renormalize the Load Source-specific ratio by first dividing it by the sum of the ratios calculated in Step 1 and then multiplying the result by the CAST scenario EOS load output to the calibration average EOS load ratio for the aggregate of all Load Sources.

3. Disaggregate the final STB load by multiplying the Load Source-specific STB base load by the renormalized ratio. If calculating the TSS STB load, add in 4/3 of the CAST scenario impervious EOS load. The impervious load includes CAST MS4 and Non-Regulated Buildings and Other, and Roads.

Appendix F: Examples of Calculating Equivalent Impervious Acre Credits for Alternative Best Management Practices

Street Sweeping

Equivalent Impervious Acre Conversion Factors (EIA_f) for Street Sweeping

BMP	EIA_f per Mile Swept
Advanced Sweeping	
1 pass/12 weeks	0.025
1 pass/8 weeks	0.055
1 pass/4 weeks	0.083
Spring 1 pass/1-2 weeks else monthly	0.100
Fall 1 pass/1-2 weeks else monthly	0.140
1 pass/2 weeks	0.147
1 pass/week	0.222
2 passes/week	0.287
Mechanical Broom	
1 pass/4 weeks	0.001
1 pass/week	0.004
2 passes/week	0.007

1. Determine the number of lane miles swept and the street sweeping best management practice (BMP) type.

2. Find the corresponding EIA_f according to Table 1 (and repeated above).

3. Multiply that EIA_f by the number of lane miles swept.

   Note: Street Sweeping is an annual BMP. Equivalent impervious acre (EIA) credit is based on the annual number of miles swept averaged over the span of the 5 year permit term.

$$[Number\ of\ Miles\ Swept] \times \left[EIA_f\right] = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction is using advanced sweeping technology and sweeping 100 lane miles once every 12 weeks.

2. The EIA_f for advanced sweeping – 1 pass/12 weeks is 0.025.

3. Multiply the EIA_f of 0.025 by the number of lane miles swept (i.e., 100 lane miles). The EIA credit for 100 lane miles of street sweeping is 2.5 acres.

$$[100\ Lane\ Miles] \times \left[0.025\ EIA_f\right] = 2.5\ Equivalent\ Impervious\ Acres\ Credit$$

Storm Drain Cleaning

EIA_f for Storm Drain Cleaning

Material Removed	EIA_f per Ton of Material Removed
Organic	0.17
Inorganic	0.26

1. Determine if material is organic or inorganic based on the majority content of solids.
2. Find the corresponding EIA_f according to Table 1 (and repeated above).
3. Measure the mass (tons) of solids/organic matter that are captured and properly disposed of by the storm drain cleaning practice on an annual basis.
4. Multiply the EIA_f by the mass collected.

Note: Storm drain cleaning is an annual BMP. EIA credit is based on the annual aggregate load captured over the span of the 5 year permit term.

$$[Mass\ Collected\ (tons)] \times [EIA_f] = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. The MS4 jurisdiction has determined that the majority content of solids vacuumed from the storm drain are organic.
2. The EIA_f for removing 1 ton of organic material is 0.17.
3. The amount of solids removed is 2,000 lbs or 1 ton.
4. Multiply the EIA_f of 0.17 by the mass of material removed in tons (i.e., 1 ton). The EIA credit for removing 1 ton of organic material is 0.17 acres.

$$[1\ ton] \times [0.17] = 0.17\ Equivalent\ Impervious\ Acres\ Credit$$

Floating Treatment Wetland

EIA_f for Floating Treatment Wetlands (FTW)

BMP	% of Pond Wet Surface Area Covered by FTW	EIA_f per Impervious Acre
FTW1	10%	0.009
FTW2	11-20%	0.018
FTW3	21-30%	0.027
FTW4	31-40%	0.035
FTW5	41-50%	0.044

1. Determine the number of impervious acres draining to the stormwater pond.
2. Determine the percent of the pond's wet surface area that is covered by the FTW and the corresponding EIA_f according to Table 1 (and repeated above).
3. Multiply that EIA_f by the impervious acres within the pond's drainage area.

   $$[Total\ Impervious\ Acres\ within\ the\ Pond's\ Drainage\ Area] \times EIA_f = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. A stormwater pond receives drainage from 50 acres of impervious surfaces.
2. The FTW design covers 30% of the pond's wet surface area, so the corresponding EIA_f is 0.027.
3. Multiply the EIA_f of 0.027 by the total impervious acres in the pond's drainage area (i.e., 50 acres). The EIA credit for the FTW is 1.35 acres.

   $$[50\ Impervious\ Acres] \times [0.027\ EIA_f] = 1.35\ Equivalent\ Impervious\ Acres\ Credit$$

Non-Riparian Land Cover Conversion

EIA_f for Non-Riparian Land Cover Conversion BMPs

Land Cover Conversion BMP	EIA_f per Acre of Land Cover Converted
Forest Planting	1.0
Conservation Landscaping	0.37
Impervious Surface Reduction	0.82
Street Trees	0.39
Urban Tree Canopy Planting	0.28

1. Determine the number of acres to be converted and the type of land cover conversion.
2. Find the corresponding EIA_f according to Table 1 (and repeated above).
3. Multiply that EIA_f by the number of converted acres.

$$[Acres\ of\ Land\ Converted\ ] \times \left[EIA_f\right] = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction is planning to implement a forest planting BMP and convert 100 acres of turf to forest.
2. The EIA_f for forest planting without a riparian buffer is 1.0.
3. Multiply the EIA_f of 1.0 by the converted acres (i.e., 100 acres). The EIA credit for 100 acres of forest planting is 100 acres.

$$[Acres\ of\ Land\ Converted\ from\ Turf\ to\ Forest] \times \left[1.0\ EIA_f\right] = 100\ Equivalent\ Impervious\ Acres\ Credit$$

Riparian Land Cover Conversion

EIA_f for Riparian Land Cover Conversion BMPs

Land Cover Conversion BMP	EIA_f per Acre of Land Cover Converted
Riparian Forest Buffers	1.41
Riparian Conservation Landscaping	0.50

1. Determine the number of acres to be converted and the type of land cover conversion. The only land cover conversion BMPs that offer additional credit for a riparian buffer are forest planting and conservation landscaping.
2. Find the corresponding EIA_f according to Table 1 (and repeated above).

3. Multiply that EIA_f by the number of converted acres.

$$[Acres\ of\ Land\ Converted\ within\ a\ Riparian\ Buffer] \times [EIA_f] = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction is planning to implement a forest planting BMP as a riparian buffer and convert 100 acres of turf to forest.

2. The EIA_f for forest planting with a riparian buffer is 1.41.

3. Multiply EIA_f of 1.41 by the converted acres (i.e., 100 acres). The EIA of 100 acres of forest planting is 141 acres.

$$[100\ Acres\ of\ Land\ Converted\ to\ Forest\ within\ a\ Riparian\ Buffer] \times [1.41\ EIA_f] = 141\ Equivalent\ Impervious\ Acres\ Credit$$

Forest Conservation

1. Determine the number of forest acres to be conserved.

2. Multiply the number of forest acres by the EIA_f, from Table 1 (i.e., 0.48).

$$[Acres\ of\ Forest\ Preserved] \times [0.48\ EIA_f] = Equivalent\ Impervious\ Acre\ Credit$$

Example

1. An MS4 jurisdiction is planning to conserve 100 acres of forest.

2. Multiply the EIA_f of 0.48 by the conserved forest acres eligible for credit (i.e. 100 acres). The EIA credit for 100 acres of forest conservation is 48 acres.

$$[100\ Acres\ of\ Forest\ Preserved] \times [0.48\ EIA_f] = 48\ Equivalent\ Impervious\ Acres\ Credit$$

Septic Practices

EIA_f for Alternative Septic BMPs

BMP	EIA_f per System
Septic Pumping	0.02
Septic Denitrification	0.16
Septic to WWTP Connection	0.36

1. Determine the number of septic systems pumped, septic systems converted to a wastewater treatment plant (WWTP) connection, or denitrification systems installed.
2. Find the corresponding EIA_f according to Table 1 (and repeated above).
3. Multiply that EIA_f by the number of septic systems as determined in Step 1.

$$[Number\ of\ Septic\ Systems] \times [EIA_f] = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction has pumped 100 septic systems.
2. The EIA_f for septic pumping is 0.02.
3. Multiply 0.02 acres by the number of septic systems (i.e., 100). The EIA credit for 100 septic systems pumped out is 2 acres.

$$[100\ Septic\ Systems\ Pumped] \times [0.02\ EIA_f] =$$
$$2\ Equivalent\ Impervious\ Acres\ Credit$$

Shoreline Management (Default Rate)

1. Determine the number of feet of shoreline managed.
2. Multiply the EIA_f from Table 1 (i.e., 0.02 acres) by the number of shoreline feet.

$$[Number\ of\ Feet\ of\ Shoreline\ Managed] \times [0.02\ EIA_f] =$$
$$Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction is managing 100 feet of shoreline.
2. Multiply the EIA_f of 0.02 acres by the feet of shoreline managed (i.e., 100). The EIA credit for 100 feet of shoreline management is 2 acres.

$$[100\ Feet\ of\ Shoreline\ Managed] \times [0.02\ EIA_f] = 2\ Equivalent\ Impervious\ Acres\ Credit$$

Stream Restoration (Planning Purposes Only)

1. Determine the number of stream feet to be restored.

2. Multiply the EIA_f from Table 1 (i.e., 0.02 acres) by the number of stream feet.

$$[Length\ of\ Planned\ Stream\ Restoration\ in\ Feet] \times \left[0.02\ EIA_f\right] = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction is restoring 100 stream feet.

2. Multiply the EIA_f of 0.02 acres by the stream feet restored (i.e., 100 feet). The EIA credit for 100 feet of stream restoration is 2 acres.

$$[Stream\ Restoration\ \ of\ 100\ Feet] \times \left[0.02\ EIA_f\right] = 2\ Equivalent\ Impervious\ Acres\ Credit$$

Note that the 0.02 equivalent impervious acre is a stream restoration planning rate. Once stream restoration projects are completed, the actual monitoring data and pollutant load reductions shall be used in establishing the EIA credit.

Appendix G: Design Criteria for Urban Soil Restoration

Feasibility and Testing:

- Soil amendments must not be applied where:
    - The depth to the seasonal high water table, bedrock, hard pan, or other confining layer is less than two feet below the soil surface;
    - Average slope exceeds ten percent; or
    - Soils are saturated or seasonally wet.
- Soil testing must be conducted at two stages:
    - Prior to construction to a depth of 1 foot below the proposed application area to determine soil properties related to saturation, bulk density, pH, salts, and nutrients. This will determine what soil amendments may be needed; and
    - One week after amendment incorporation to determine if any additional nutrient requirements, and pH and/or organic adjustments, are needed to further plant growth.

Design Criteria:

- When used to restore compacted soils and improve soil porosity, the area must be excavated or ripped to the depth and soil amendments added according to the degree of compaction (i.e., Level 1, 2).
- Soil restoration to depths up to 15 inches requires removal of the existing soil and physical mixing of the soil with compost (excavation and mixing method, see below). Soil restoration to depths greater than 15 inches requires complete cultivation (see below).
- When used in conjunction with another best management practice (BMP):
    - Soil must be excavated to the design depth (e.g., for filtering practices, between 12 to 24 inches); and amendments added using an excavation and mixing method; and
    - For media depths greater than 15 inches, the complete cultivation method should be used.
- Once the soil restoration has been completed, the site should be planted and stabilized immediately.
- Excavation and Mixing Method:
    - Remove the compacted soils, working in strips perpendicular to the slope/flowpath and using multiple lifts if necessary;
    - Separate and remove a minimum of 25% of the densest subsoil for removal. Stockpile the remaining soil next to the excavated area;
    - Scarify the bottom of the excavated area;
    - Replace the soil in a minimum of two lifts. More lifts may be needed depending on the equipment used. For each lift:
        - Replace soil by loosening, aerating and mixing; and
        - Incorporate the required soil amendments uniformly throughout each lift.
    - Rake to level the amended area, removing woody debris and any rocks larger than 1 inch in diameter;

    - The finished grade of the amended area must be a minimum of 4 inches above the existing grade to account for settlement. The finished grade must be adjusted to account for field conditions and soil texture; final grades should match original grade three months after installation.
- Complete Cultivation Method:
    - Remove the top layer of soil to a depth of 6 inches to 12 inches. Drop the removed material next to the excavated area. Removed soil that is in large lumps or is blocky may require further breaking up.
    - Cultivation of the second layer can be started after completing the removal of the upper layer. Cultivation is accomplished by lifting and raking the soil in place. Long teeth on the bucket can assist in this process. If the material is not easily crumbled (i.e., is friable) by lifting and raking, then scrape in soil in 6 inch to 12 inch layers. Lifting and dropping the material in place can also be used to break up blockier soils.
    - Mix any soil amendments into the stockpiled soil (see above). After soil amendments have been added, pull the top, stockpiled layer back into the excavation. Level the amended area as needed;
    - Incorporate soil amendments with a 6 inch rototiller;
    - Rake to level the amended area, removing woody debris and any rocks larger than 1 inch in diameter;
    - The finished grade of the amended area must be a minimum of 4 inches above the existing grade to account for settlement. The finished grade must be adjusted to account for field conditions and soil texture; final grades should match original grade three months after installation.

Appendix H: Impervious Acre Calculations for the Water Quality Treatment, Watershed Management, and Green Stormwater Infrastructure Credits

Water Quality Treatment (WQ_T) and Watershed Management (WM) Credits

Example 1:

Wet retention pond with a permanent pool water quality treatment volume for rainfall depth of 1 inch. Impervious area in the drainage area to the pond is 10 acres.

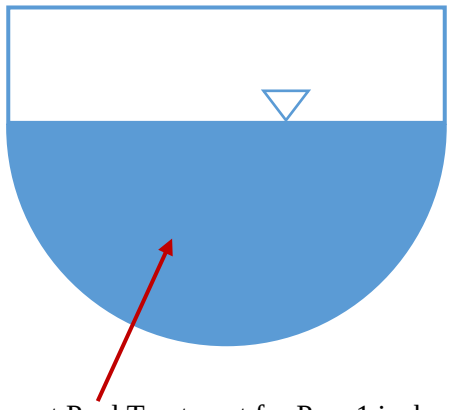
Solution:

Since the rainfall depth treated (P_E) = 1 inch, the WQ_T credit is:

$$WQ_T\ Credit = [[Rainfall\ Depth\ Treated\ ]/\ 1\ inch] \times [Impervious\ Acres\ in\ Drainage\ Area]$$

$$WQ_T\ Credit = [1\ inch/1\ inch] \times [10\ acres]\ = \mathbf{10\ acres}$$

Example 1. Wet Retention Pond



Permanent Pool Treatment for P_E = 1 inch

Example 2:

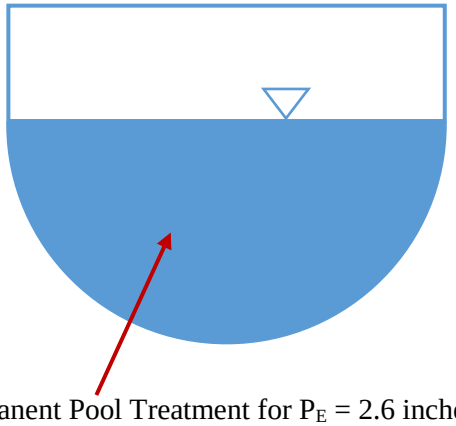
Wet retention pond with a permanent pool water quality treatment volume for rainfall depth of 2.6 inches. Impervious area in the drainage area to the pond is 10 acres.

Solution:

Since the rainfall depth treated (P_E) is > 1 inch, the WQ_T credit is:

$$WQ_T\ Credit = [[1\ inch\ Rainfall\ Depth\ Treated + [(Rainfall\ Depth\ Treated - 1\ inch) \times 0.25]/1\ inch] \times Impervious\ Acres\ in\ Drainage\ Area$$

Example 2. Wet Retention Pond



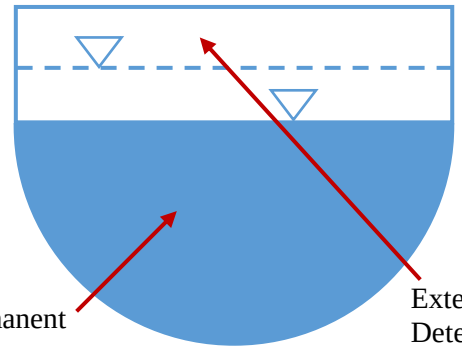
Permanent Pool Treatment for P_E = 2.6 inches

$$WQ_T\ Credit = [[1\ inch + [(2.6\ inches - 1\ inch) \times 0.25]/1\ inch] \times 10\ acres = \mathbf{14\ acres}$$

Example 3:

Wet extended detention pond with a permanent pool treatment volume for rainfall depth of 1 inch and extended detention volume for an additional rainfall depth of 2 inches. The total rainfall depth managed is 3 inches. Impervious area in the drainage area to the pond is 10 acres.

Example 3. Wet Extended Detention Pond



Solution:

Since the rainfall depth treated (P_E) in the permanent pool = 1 inch, the WQ_T credit is:

$$WQ_T\ Credit = [[Rainfall\ Depth\ Treated\ ]/1\ inch] \times [Impervious\ Acres\ in\ Drainage\ Area]$$

$$WQ_T\ Credit = [1\ inch/1\ inch] \times [10\ acres]\ = \mathbf{10\ acres}$$

WM credit is available for extended detention volume above the permanent pool volume for up to a total rainfall depth treated of 3 inches:

$$WM\ Credit = Impervious\ Acre\ Credit = [[(Total\ Rainfall\ Depth\ Treated - Rainfall\ Depth\ Treated\ for\ WQ_T) \times 0.25]/1\ inch] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WM\ Credit = [[(3\ inches - 1\ inch) \times 0.25]/1\ inch] \times 10\ acres\ = \mathbf{5\ acres}$$

$$Total\ Credit = WQ_T\ Credit + WM\ Credit = \ 10\ acres + 5\ acres = \mathbf{15\ acres}$$

Alternative Solution:

Alternatively, a portion of the extended detention volume equal to the permanent pool volume is eligible for WQ_T credit. The remaining extended detention volume is then eligible for WM credit:

P_E treated by permanent pool = 1 inch (use toward WQ_T)
P_E treated by extended detention used toward water quality treatment = 1 inch (use toward WQ_T)
Remaining P_E treated by extended detention = 1 inch (use for WM credit)

$$WQ_T\ Credit = [[1\ inch\ Rainfall\ Depth\ Treated + [(Rainfall\ Depth\ Treated - 1\ inch) \times 0.25]/1\ inch] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WQ_T\ Credit = [[1\ inch\ + [(2\ inches - 1\ inch) \times 0.25]/1\ inch] \times 10\ acres = \mathbf{12.5\ acres}$$

$$WM\ Credit = [[(Total\ Rainfall\ Depth\ Treated - Rainfall\ Depth\ Treated\ for\ WQ_T) \times 0.25]/1\ inch] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WM\ Credit = [[(3\ inches - 2\ inches) \times 0.25]/1\ inch] \times 10\ acres = \mathbf{2.5\ acres}$$

$$Total\ Credit = WQ_T\ Credit + WM\ Credit = 12.5\ acres + 2.5\ acres = \mathbf{15\ acres}$$

Note: While these two solutions result in the same total credit, the difference will become important when applying green infrastructure credits to the project.

Adding Green Stormwater Infrastructure Credits (GSI)

Using the same examples (1-3) above and adding green infrastructure features:

Example 4:

Wet retention pond with a permanent pool water quality treatment volume for a rainfall depth of 1 inch. The impervious area in the drainage area to the pond is 10 acres. Green infrastructure features are added to meet GSI credit requirements.

Solution:

Since the rainfall depth treated in the permanent pool = 1 inch, the WQ_T credit is:

$$WQ_T\ Credit = [[Rainfall\ Depth\ Treated\ ]/1\ inch] \times [Impervious\ Acres\ in\ Drainage\ Area]$$

$$WQ_T\ Credit = [[1\ inch]/1\ inch] \times [10\ acres]\ = \mathbf{10\ acres}$$

$$GSI\ Credit = 1.35 \times [\ Impervious\ Acre\ Credit\ from\ WQ_T] = \mathbf{13.5\ acres}$$ (This is the total credit for the project)

Example 5:

Wet retention pond with a permanent pool treatment volume for a rainfall depth of 2.6 inches. The impervious area in the drainage area to the pond is 10 acres. Green infrastructure features are added to meet GSI credit requirements.

Solution:

Since the rainfall depth treated in the permanent pool is > 1 inch, the WQ_T credit is:

$$WQ_T\ Credit = [[1\ inch\ Rainfall\ Depth\ Treated + [(Rainfall\ Depth\ Treated - 1\ inch) \times 0.25]/1\ inch] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WQ_T\ Credit = [[1\ inch + [(2.6\ inches - 1\ inch) \times 0.25]/1\ inch] \times 10\ acres = \mathbf{14\ acres}$$

$$GSI\ Credit = 1.35 \times [Impervious\ Acres\ Credit\ from\ WQ_T] = \mathbf{18.9\ acres}$$ (This is the total credit for the project)

Example 6:

Wet extended detention pond with a permanent pool treatment volume for rainfall depth of 1 inch and extended detention volume for an additional rainfall depth of 2 inches. Total rainfall depth treated is 3 inches. Impervious area in drainage area to pond is 10 acres. Green infrastructure features are added as required to meet GSI credit requirements.

Solution:

Since the rainfall depth treated (P_E) in the permanent pool = 1 inch, the WQ_T credit is:

$$WQ_T\ Credit = [[Rainfall\ Depth\ Treated\ ]/1\ inch] \times [Impervious\ Acres\ in\ Drainage\ Area]$$

$$WQ_T\ Credit = [1\ inch/1\ inch] \times [10\ acres]\ = \mathbf{10\ acres}$$

WM credit is available for extended detention volume above the permanent pool volume for up to a total rainfall depth treated of 3 inches:

$$WM\ Credit = Impervious\ Acre\ Credit = [[(Total\ Rainfall\ Depth\ Treated - Rainfall\ Depth\ Treated\ for\ WQ_T) \times 0.25]/1\ inch] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WM\ Credit = [[(3\ inches - 1\ inch) \times 0.25]/1\ inch] \times 10\ acres\ = \mathbf{5\ acres}$$

$$GSI\ Credit = 1.35 \times [Impervious\ Acres\ Credit\ from\ WQ_T] = \mathbf{13.5\ acres}$$ (This credit replaces the impervious acre credit)

$$Total\ Credit = \ GSI\ Credit + WM\ Credit = 13.5\ acres + 5\ acres = \mathbf{18.5\ acres}$$

Alternative Solution:

Alternatively, a portion of the extended detention volume equal to the permanent pool volume is eligible for WQ_T credit. Only the remaining extended detention volume is then eligible for WM credit:

P_E treated by permanent pool = 1 inch (use toward WQ_T)
P_E treated by extended detention used toward impervious acre credit = 1 inch (use toward WQ_T)
Remaining P_E treated by extended detention = 1 inch (use for WM credit)

$$WQ_T\ Credit = [[1\ inch\ Rainfall\ Depth\ Treated + [(Rainfall\ Depth\ Treated - 1\ \text{inch}) \times 0.25]/1\ inch] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WQ_T\ Credit = [[1\ inch\ + [(2\ inches - 1\ inch) \times 0.25]/1\ inch] \times 10\ acres = \mathbf{12.5\ acres}$$

$$WM\ Credit = [[(Total\ Rainfall\ Depth\ Treated - \text{Rainfall Depth Treated for } WQ_T) \times 0.25]/1\ \text{inch}] \times Impervious\ Acres\ in\ Drainage\ Area$$

$WM\ Credit = [[(3\ \text{inches} - 2\ \text{inches}) \times 0.25]/1\ \text{inch}] \times 10\ \text{acres} = \mathbf{2.5\ acres}$

$GSI\ Credit = 1.35 \times [Impervious\ Acre\ Credit\ from\ WQ_T] = \mathbf{16.88\ \boldsymbol{acres}}$ (This credit replaces the WQ_T)

$Total\ Credit = GSI\ Credit + WM\ Credit = 16.88\ acres + 2.5\ acres = \mathbf{19.38\ \boldsymbol{acres}}$

Appendix I: Data Reporting and Verification

Municipal Separate Storm Sewer System (MS4) permits require that the MS4 Geodatabase include data for all best management practices (BMPs) implemented for new development, redevelopment, and MS4 restoration. In addition, the impervious acres credit must be calculated from the approved plans for each restoration or redevelopment project and recorded in the MS4 Geodatabase. MS4 jurisdictions can refer to the Department's User's Guide for specific instructions on the reporting and use of the MS4 Geodatabase. The below reporting structure provides BMP classification codes that must be used for reporting.

The MS4 Geodatabase also contains information regarding inspection and maintenance. Successful restoration requires that BMPs function properly to ensure that the expected water quality improvements are achieved. Therefore, BMP inspection and routine maintenance need to be conducted in order for MS4 jurisdictions to claim credit. Otherwise, the credits will be removed until proper performance is verified. All runoff reduction (RR) and stormwater treatment (ST) BMPs must be regularly maintained and inspected a minimum of every three years. Alternative BMPs must follow inspection frequencies as specified by the Chesapeake Bay Program (CBP) expert panels. The BMP database must include the last inspection date and whether the facility has been properly maintained. A "failed" designation assigned to any BMP indicates that the facility is not functioning as designed.

Table 24. BMP Classification Codes for RR and ST Practices

Manual	Description	Class	Code
Ponds			
P-1	Micro-Pool Extended Detention (ED)	S	PMED
P-2	Wet Pond	S	PWET
P-3	Wet ED Pond	S	PWED
P-4	Multiple Pond	S	PMPS
P-5	Pocket Pond	S	PPKT
Wetlands			
W-1	Shallow Wetland	S	WSHW
W-2	ED Shallow Wetland	S	WEDW
W-3	Pond/Wetland System	S	WPWS
W-4	Pocket Wetland	S	WPKT
Infiltration			
I-1	Infiltration Trench	S	ITRN
I-2	Infiltration Basin	S	IBAS
M-3	Landscape Infiltration	E	MILS
M-4	Infiltration Berm	E	MIBR
M-5	Dry Well	E	MIDW
Filtering Systems			
F-1	Surface Sand Filter	S	FSND
F-2	Underground Filter	S	FUND
F-3	Perimeter Filter	S	FPER
F-4	Organic Filter	S	FORG
F-5	Pocket Filter	S	FPKT

Manual	Description	Class	Code
F-6	Bioretention[1]	S	FBIO
M-2	Submerged Gravel Wetland	E	MSGW
M-6	Micro-Bioretention[1]	E	MMBR
M-7	Rain Garden[1]	E	MRNG
M-9	Enhanced Filter[2]	E	MENF
Open Channel Systems			
O-1	Dry Swale	S	ODSW
O-2	Wet Swale	S	OWSW
M-8	Grass Swale	E	MSWG
M-8	Bio-Swale	E	MSWB
M-8	Wet Swale	E	MSWW
Alternative Surfaces			
A-1	Green Roof, Extensive[3]	E	AGRE
A-2	Permeable Pavement[3]	E	APMP
A-3	Reinforced Turf[3]	E	ARTF
Nonstructural Techniques			
N-1	Rooftop Disconnect	E	NDRR
N-2	Non-Rooftop Disconnect	E	NDNR
N-3	Sheetflow to Conservation Area	E	NSCA
Other Systems			
M-1	Rainwater Harvesting	E	MRWH

Notes
[1] Can be an infiltration practice
[2] Not a standalone practice
[3] Typically a proprietary system

Table 25. BMP Classification Codes for Alternative Practices

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

There are several new alternative BMPs (see Table 26 below) where the classification codes are not recognized by the MS4 Geodatabase. For these practices, please enter the corresponding class code (i.e., "A") in the *BMP_CLASS* field, the code "OTH" in the *BMP_TYPE* or *ALTBMP_TYPE* field, and the code from Table 26 in the *GEN_COMMENTS* field. This will allow for the reporting of these practices until the MS4 Geodatabase is updated.

Table 26. BMP Classification Codes for New Alternative Practices

Alternative BMP (Class A)	Code
Advanced Street Sweeping	ADSS
Storm Drain Cleaning	SDV
Floating Treatment Wetlands	XFTW
Riparian Forest Planting	RFP
Conservation Landscaping	CLTM
Riparian Conservation Landscaping	RCL
Forest Conservation	FCO
Street Trees	STCI
Urban Tree Canopy	UTC
Urban Soil Restoration (Compacted Pervious Surfaces)	USRP
Urban Soil Restoration (Removed Impervious Surfaces)	USRI
Elimination of Discovered Nutrient Discharges from Grey Infrastructure (IDDE)	IDDE

Appendix J: Reporting New Development

Best management practices (BMPs) implemented to meet new development requirements may not be used for credit toward stormwater wasteload allocations (SW-WLAs) or impervious acre restoration. However, local governments are required to report data for new development, redevelopment, and restoration projects on the Department's MS4 Geodatabase so that net pollutant loads will be calculated in the Chesapeake Bay Watershed Model. The discussion below will provide guidance on the proper reporting of urban BMP data.

Current Maryland regulations require that environmental site design (ESD) be used to the maximum extent practicable (MEP) to reduce the runoff from new development and replicate the hydrologic characteristics of forested conditions. To meet this requirement on a new development project, ESD practices must be used either exclusively or, where necessary, in combination with structural practices to provide sufficient treatment and reduce the volume of runoff from the 1 year, 24 hour design storm. For new development projects, this standard is based on the median value of the 1 year storm for Maryland, or 2.7 inches of rainfall.

Pollutant removal rates for upland stormwater practices are determined using the Adjustor Curves from the Chesapeake Bay program (CBP) publication *Recommendations of the Expert Panel for New State Stormwater Performance Standards* (Schueler and Lane, 2012 and 2015) that are found in Appendix A. These curves are a function of the type of practices used and the rainfall depth treated per impervious acre. On these curves, BMPs are classified as either runoff reduction (RR) or stormwater treatment (ST) practices as outlined in Table 2 (see Section IV).

Maryland's ESD sizing criteria (see Ch. 5, pp 5.18-19 of the Manual) mandates that ESD practices be used to treat the runoff from 1 inch of rainfall (i.e., P_E = 1 inch) on all new developments where stormwater management is required. After all reasonable opportunities for using ESD practices are exhausted, structural practices (i.e., those found in Ch. 3 of the Manual) may be used to address any remaining requirements. As discussed in Section IV, the ESD practices listed in the Manual are considered as RR practices when using the adjustor curves. Likewise, the structural practices found in Chapter 3 of the Manual are considered as ST practices.

When using the adjustor curves to determine removal efficiency for each pollutant (i.e., TN, TP, and TSS), the runoff depth (in inches) per impervious acre treated is used to determine the RR and ST pollutant removal efficiencies. Also, the most significant difference between the RR and ST curves for each pollutant is from 0 to 1 inch of runoff depth. For runoff depths greater than 1 inch, there is little difference in the slopes of the two RR and ST curves.

The ESD sizing criteria are based on capturing and treating the runoff from 2.7 inches of rainfall. For an impervious surface, the runoff depth from 2.7 inches of rainfall is approximately 2.6 inches. Therefore, new development projects that fully meet the ESD to the MEP mandate should use 2.6 inches for the runoff depth treated per impervious acre.

Because ESD practices must be used to treat at least 1 inch of rainfall, the RR curves are used to determine pollutant removal rates up to a runoff depth of 1 inch. However, and as noted above, there is little to no difference between the RR and ST slopes/curves beyond 1 inch. Therefore,

the RR curves may be used to determine pollutant removal efficiencies where ESD and structural practices are used to address new development stormwater management requirements. Where the ESD to the MEP requirements are fully addressed (i.e., the P_E is fully addressed), the runoff depth of 2.6 inches is used in conjunction with the curves. Equation 20 may be used to determine the runoff depth treated where the ESD requirements are not fully addressed.

Equation 18. Calculation of Rainfall Depth Treated per Impervious Acre to Account for ESD to the MEP

$$Q = (P_{design}/P_E) \times 2.6\ inches$$

Where:

Q = runoff depth treated per impervious acre (inches) to be used with the adjustor curves
P_{design} = the rainfall treated by stormwater management practices (inches)
P_E = the rainfall target used to size ESD practices

Table 27 provides the pollutant removal rates for stormwater management meeting ESD to MEP.

Table 27. Pollutant Removal Rates for ESD to the MEP

Sediment	85%
Total Phosphorus	78.8%
Total Nitrogen	67.9%

Appendix K: Phase III Watershed Implementation Plan - Maryland Delivery Factor Summary Table (Edge-of-Stream to Edge-of-Tide Conversion Factors)

Land River Segment	TN	TP	TSS
H24021PM1_3510_4000	0.65	0.57	0.51
H24021PM3_3040_3340	0.55	0.50	0.49
H24021PM4_3340_3341	0.55	0.36	0.31
H24023PU2_4720_4750	0.80	0.56	0.08
H24023PU3_4451_4450	0.77	0.61	0.08
N24001PU0_3871_3690	0.59	0.18	0.14
N24001PU1_3100_3690	0.63	0.46	0.30
N24001PU1_3580_3780	0.64	0.47	0.47
N24001PU1_3850_4190	0.81	0.64	0.11
N24001PU1_3940_3970	0.55	0.52	0.55
N24001PU2_3140_3680	0.94	0.36	0.33
N24001PU2_3180_3370	0.56	0.28	0.26
N24001PU2_3370_4020	0.66	0.33	0.28
N24001PU3_3680_3890	0.75	0.44	0.48
N24001PU4_3780_3930	0.78	0.45	0.39
N24001PU4_3890_3990	0.92	0.74	0.72
N24001PU4_3970_3890	0.78	0.70	0.38
N24001PU4_3990_3780	0.94	0.85	0.69
N24001PU4_4440_3970	0.87	0.85	0.84
N24001PU5_3930_4170	0.69	0.27	0.22
N24001PU5_4170_4020	0.78	0.39	0.11
N24001PU6_3870_3690	0.83	0.38	0.27
N24001PU6_4020_3870	0.70	0.26	0.15
N24003WL0_4390_0000	0.94	0.98	1.00
N24003WL0_4391_0000	1.00	1.00	1.00
N24003WL0_4392_0000	1.00	1.00	1.00
N24003WL0_4393_0000	1.00	1.00	1.00
N24003WL0_4394_0000	1.00	1.00	1.00
N24003WL0_4420_0000	0.78	0.44	0.19
N24003WL0_4421_0000	0.95	1.00	1.00
N24003WL0_4422_0000	1.00	1.00	1.00
N24003WL0_4423_0000	1.00	1.00	1.00
N24003WL0_4424_0000	1.00	1.00	1.00
N24003WL0_4425_0000	1.00	1.00	1.00
N24003WL0_4600_0000	0.86	0.85	0.78
N24003WL0_4601_0000	1.00	1.00	1.00
N24003WL0_4602_0000	0.96	1.00	1.00
N24003WL0_4603_0000	1.00	1.00	1.00
N24003WL0_4770_0000	1.00	1.00	1.00

Land River Segment	TN	TP	TSS
N24003WL0_4771_0000	0.81	0.82	0.78
N24003WL0_4772_0000	0.92	1.00	1.00
N24003WM0_3961_0000	0.92	0.82	0.36
N24003WM0_3962_0000	1.00	1.00	1.00
N24003WM0_3963_0000	1.00	1.00	1.00
N24003WM0_3966_0000	1.00	1.00	1.00
N24003WM3_4060_0001	0.66	0.35	0.18
N24003XL3_4710_0000	0.83	0.67	0.41
N24003XL3_4711_0000	0.84	0.72	0.49
N24003XL3_4712_0000	0.86	0.68	0.39
N24003XL3_4713_0000	0.78	0.69	0.45
N24003XL3_4950_0000	0.72	0.62	0.42
N24003XU2_4270_4650	0.76	0.81	0.22
N24003XU2_4480_4650	0.74	0.77	0.16
N24003XU3_4650_0001	0.80	0.57	0.16
N24005SL2_2910_3060	0.95	0.68	0.37
N24005WM0_3650_0001	0.72	0.58	0.38
N24005WM0_3740_0001	0.39	0.62	0.41
N24005WM0_3741_0000	0.82	0.71	0.44
N24005WM0_3742_0000	1.00	1.00	1.00
N24005WM0_3743_0000	1.00	1.00	1.00
N24005WM0_3744_0000	1.00	1.00	1.00
N24005WM0_3745_0000	0.80	0.93	1.00
N24005WM0_3881_3880	0.00	0.00	0.00
N24005WM0_3964_0000	1.00	1.00	1.00
N24005WM0_3965_0000	1.00	1.00	1.00
N24005WM1_3660_3910	0.46	0.55	0.38
N24005WM1_3910_0001	0.54	0.54	0.32
N24005WM3_3880_4060	0.54	0.37	0.22
N24005WM3_4060_0001	0.63	0.40	0.21
N24005WU0_3021_3020	0.14	0.15	0.00
N24005WU0_3540_0000	1.00	1.00	1.00
N24005WU0_3541_0000	1.00	1.00	1.00
N24005WU0_3542_0000	1.00	1.00	1.00
N24005WU0_3670_0001	0.28	0.49	0.34
N24005WU0_3671_0000	0.91	0.80	0.48
N24005WU0_3820_0000	1.00	1.00	1.00
N24005WU0_3821_0000	1.00	1.00	1.00
N24005WU1_3350_3490	0.31	0.38	0.06
N24005WU1_3482_0001	0.70	0.51	0.35
N24005WU1_3490_3480	0.31	0.37	0.06
N24005WU2_3020_3320	0.39	0.34	0.06

Land River Segment	TN	TP	TSS
N24005WU2_3320_3480	0.41	0.41	0.07
N24005WU3_3480_3481	0.44	0.39	0.06
N24005WU3_3481_0001	0.81	0.59	0.22
N24009WL0_4772_0000	0.90	1.00	1.00
N24009WL0_4920_0000	1.00	1.00	1.00
N24009WL0_4921_0000	1.00	1.00	1.00
N24009WL0_4922_0000	1.00	1.00	1.00
N24009WL0_4923_0000	1.00	1.00	1.00
N24009WL0_4925_0000	1.00	1.00	1.00
N24009XL0_4954_0000	0.82	0.93	1.00
N24009XL0_5320_0001	0.76	0.51	0.31
N24009XL0_5341_0000	0.87	0.73	0.31
N24009XL0_5342_0000	0.80	0.52	0.37
N24009XL0_5343_0000	1.00	1.00	1.00
N24009XL0_5345_0000	1.00	1.00	1.00
N24009XL0_5346_0000	1.00	1.00	1.00
N24009XL0_5348_0000	1.00	1.00	1.00
N24009XL0_5350_0000	0.80	0.61	0.37
N24009XL3_4713_0000	0.84	0.70	0.43
N24009XL3_4950_0000	0.78	0.67	0.43
N24009XL3_4951_0000	0.79	0.63	0.37
N24009XL3_4952_0000	0.88	0.80	0.36
N24011EL0_4591_0000	0.90	0.78	0.18
N24011EL2_4590_0001	0.47	0.80	0.08
N24011EL2_4630_0000	0.83	0.78	0.22
N24011EM0_4322_0000	0.92	0.88	0.36
N24011EM0_4323_0000	0.85	0.76	0.31
N24011EM0_4324_0000	0.90	0.74	0.15
N24011EM0_4327_0000	0.82	0.68	0.15
N24011EM2_3980_0001	0.43	0.65	0.11
N24011EM2_4100_0001	0.48	0.79	0.15
N24011EM2_4101_0000	0.91	0.80	0.29
N24011EM3_4320_0000	0.88	0.73	0.18
N24011EM3_4321_0000	0.92	0.76	0.24
N24011EM3_4325_0000	0.91	0.79	0.22
N24011EM4_4740_0000	1.00	1.00	1.00
N24013PM1_3120_3400	0.73	0.61	0.61
N24013PM1_3450_3400	0.74	0.66	0.64
N24013PM1_3711_3710	0.55	0.28	0.22
N24013PM2_2860_3040	0.74	0.70	0.52
N24013PM2_3400_3340	0.86	0.85	1.00
N24013PM3_3040_3340	0.66	0.61	0.47

Land River Segment	TN	TP	TSS
N24013SL0_2831_2830	0.18	0.45	0.13
N24013SL3_2460_2430	0.33	0.17	0.14
N24013WM0_3881_3880	0.00	0.00	0.00
N24013WM1_3882_3880	0.46	0.38	0.23
N24013WM3_3880_4060	0.62	0.58	0.47
N24013WU0_3021_3020	0.14	0.17	0.00
N24013WU1_3350_3490	0.32	0.52	0.09
N24015EU0_2940_0000	0.89	1.00	1.00
N24015EU0_2941_0000	0.87	0.73	0.84
N24015EU0_2985_0000	0.79	0.46	0.22
N24015EU0_3010_0000	0.94	1.00	1.00
N24015EU0_3050_0000	1.00	1.00	1.00
N24015EU0_3130_0000	1.00	1.00	1.00
N24015EU0_3131_0000	1.00	1.00	1.00
N24015EU0_3200_0000	0.90	0.82	0.48
N24015EU0_3201_0000	0.92	0.81	0.39
N24015EU0_3202_0000	1.00	1.00	1.00
N24015EU0_3203_0000	1.00	1.00	1.00
N24015EU0_3300_0000	0.80	1.00	1.00
N24015EU0_3301_0000	1.00	1.00	1.00
N24015EU0_3302_0000	1.00	1.00	1.00
N24015EU0_3360_0000	1.00	1.00	1.00
N24015EU0_3361_0000	0.90	0.79	0.35
N24015EU0_3362_0000	1.00	1.00	1.00
N24015EU0_3363_0000	1.00	1.00	1.00
N24015EU0_3364_0000	1.00	1.00	1.00
N24015EU1_2650_0001	1.00	0.97	0.77
N24015EU1_2810_0001	0.86	1.00	0.56
N24015EU1_2980_0000	0.79	0.61	0.36
N24015EU1_2981_0000	0.80	0.59	0.35
N24015EU1_2982_0000	0.91	0.84	0.35
N24015EU1_2983_0000	0.88	0.72	0.34
N24015EU1_2984_0000	1.00	1.00	1.00
N24015SL2_2480_0001	0.86	0.71	0.43
N24015SL9_2720_0001	0.79	0.45	0.26
N24015SL9_2970_0000	1.00	1.00	1.00
N24015SL9_2971_0000	0.93	0.69	0.46
N24017PL0_5290_0000	1.00	1.00	1.00
N24017PL0_5390_0000	1.00	1.00	1.00
N24017PL0_5391_0000	1.00	1.00	1.00
N24017PL0_5392_0000	1.00	1.00	1.00
N24017PL0_5440_0000	0.75	0.58	0.24

Land River Segment	TN	TP	TSS
N24017PL0_5450_0000	0.67	0.42	0.15
N24017PL0_5510_0001	0.47	0.49	0.25
N24017PL0_5530_5710	0.77	0.63	0.30
N24017PL0_5580_0000	1.00	1.00	1.00
N24017PL0_5581_0000	1.00	1.00	1.00
N24017PL0_5582_0000	0.66	0.43	0.16
N24017PL0_5583_0000	0.73	0.50	0.21
N24017PL0_5584_0000	1.00	1.00	1.00
N24017PL0_5585_0000	0.90	1.00	1.00
N24017PL0_5670_0000	1.00	1.00	1.00
N24017PL0_5671_0000	1.00	1.00	1.00
N24017PL0_5710_0001	0.81	0.61	0.18
N24017PL0_5720_0001	0.46	0.35	0.10
N24017PL0_5790_0000	1.00	1.00	1.00
N24017PL0_5791_0000	1.00	1.00	1.00
N24017PL0_5860_0000	1.00	1.00	1.00
N24017PL0_5930_0000	1.00	1.00	1.00
N24017PL1_5230_0001	0.50	0.70	0.63
N24017PL2_5300_5630	0.57	0.59	0.60
N24017PL2_5630_0001	0.67	0.43	0.37
N24017PL2_5800_0000	0.80	0.57	0.25
N24017XL0_5340_0000	0.78	0.58	0.34
N24019EL0_4591_0000	0.92	0.77	0.17
N24019EL0_4592_0000	0.82	0.65	0.14
N24019EL0_4593_0000	0.91	0.86	0.32
N24019EL0_4598_0000	1.00	1.00	1.00
N24019EL0_4892_0000	1.00	1.00	1.00
N24019EL0_5151_0000	0.62	0.52	0.11
N24019EL0_5262_0000	1.00	1.00	0.83
N24019EL0_5280_0000	0.84	0.81	0.47
N24019EL0_5281_0000	0.96	1.00	1.00
N24019EL0_5282_0000	1.00	1.00	1.00
N24019EL0_5283_0000	1.00	1.00	1.00
N24019EL0_5284_0000	1.00	1.00	1.00
N24019EL0_5285_0000	1.00	1.00	1.00
N24019EL0_5590_0000	1.00	1.00	1.00
N24019EL0_5766_0000	1.00	1.00	1.00
N24019EL0_5890_0000	1.00	1.00	1.00
N24019EL1_5150_0001	0.58	0.84	0.26
N24019EL2_4630_0000	0.87	0.83	0.39
N24019EL2_4634_0000	0.84	0.62	0.09
N24019EM0_4322_0000	0.93	0.89	0.54

Land River Segment	TN	TP	TSS
N24019EM0_4880_0000	1.00	1.00	1.00
N24019EM0_4881_0000	1.00	1.00	1.00
N24019EM0_4883_0000	1.00	1.00	1.00
N24019EM0_4884_0000	1.00	1.00	1.00
N24019EM0_4885_0000	1.00	1.00	1.00
N24019EM0_4886_0000	0.74	0.55	0.05
N24019EM0_4887_0000	1.00	1.00	1.00
N24019EM0_4888_0000	1.00	1.00	1.00
N24019EM0_4889_0000	1.00	1.00	1.00
N24019EM0_4890_0000	0.98	1.00	1.00
N24019EM0_4891_0000	1.00	1.00	1.00
N24019EM0_5260_0000	1.00	1.00	1.00
N24019EM0_5261_0000	1.00	1.00	1.00
N24019EM0_5263_0000	1.00	1.00	1.00
N24021PM1_3450_3400	0.72	0.60	0.65
N24021PM1_3510_4000	0.66	0.62	0.56
N24021PM1_3710_4040	0.77	0.55	0.47
N24021PM1_3711_3710	0.63	0.31	0.24
N24021PM1_4000_4290	0.77	0.66	0.54
N24021PM2_2860_3040	0.81	0.85	1.00
N24021PM2_3400_3340	0.86	0.85	1.00
N24021PM3_3040_3340	0.68	0.63	0.46
N24021PM4_3340_3341	0.73	0.62	0.44
N24021PM4_3341_4040	0.76	0.68	0.49
N24021PM4_4040_4410	0.75	0.54	0.48
N24021PM7_4150_4290	0.86	0.62	0.45
N24021PM7_4200_4410	0.80	0.59	0.43
N24021PM7_4290_4200	0.92	0.69	0.67
N24021PM7_4410_4620	0.74	0.52	0.45
N24023PU1_3850_4190	0.67	0.32	0.04
N24023PU1_3940_3970	0.53	0.47	0.57
N24023PU1_4190_4300	0.69	0.27	0.03
N24023PU1_4300_4440	0.77	0.54	0.68
N24023PU2_4720_4750	0.84	0.65	0.08
N24023PU2_4750_4451	0.87	0.69	0.10
N24023PU3_4450_4440	0.78	0.51	0.61
N24023PU3_4451_4450	0.77	0.51	0.08
N24025SL0_2721_2720	0.73	0.43	0.37
N24025SL2_2750_2720	0.77	0.57	0.48
N24025SL2_2910_3060	0.93	0.67	0.32
N24025SL2_3060_0001	0.94	0.76	0.34
N24025SL9_2720_0001	0.79	0.48	0.31

Land River Segment	TN	TP	TSS
N24025SL9_2970_0000	1.00	1.00	1.00
N24025SL9_2971_0000	1.00	0.99	0.83
N24025WU0_3160_0000	0.72	0.58	0.12
N24025WU0_3161_0000	0.94	1.00	1.00
N24025WU0_3162_0000	1.00	1.00	1.00
N24025WU0_3163_0000	0.88	1.00	1.00
N24025WU0_3164_0000	1.00	1.00	1.00
N24025WU0_3250_0001	0.55	0.59	0.40
N24025WU0_3251_0000	1.00	1.00	1.00
N24025WU0_3252_0000	1.00	1.00	1.00
N24025WU0_3253_0000	0.84	0.69	0.45
N24025WU0_3254_0000	0.92	0.88	0.69
N24025WU0_3255_0000	1.00	1.00	1.00
N24025WU0_3540_0000	1.00	1.00	1.00
N24025WU1_3240_3331	0.76	0.47	0.24
N24025WU1_3330_0001	0.81	0.44	0.18
N24025WU1_3331_3330	0.82	0.47	0.22
N24025WU1_3482_0001	0.71	0.57	0.32
N24025WU2_3020_3320	0.39	0.40	0.07
N24027WM1_3882_3880	0.51	0.35	0.23
N24027WM3_3880_4060	0.55	0.39	0.26
N24027WM3_4060_0001	0.60	0.35	0.22
N24027XU0_4090_4270	0.73	0.69	0.35
N24027XU0_4091_4270	0.71	0.72	0.39
N24027XU0_4092_4090	0.19	0.59	0.10
N24027XU0_4130_4070	0.12	0.14	0.01
N24027XU2_4070_4330	0.14	0.15	0.01
N24027XU2_4270_4650	0.75	0.91	0.40
N24027XU2_4330_4480	0.30	0.29	0.05
N24027XU2_4480_4650	0.77	0.80	0.43
N24029EU0_3360_0000	1.00	1.00	1.00
N24029EU0_3361_0000	0.86	0.70	0.24
N24029EU0_3362_0000	0.92	0.95	0.79
N24029EU0_3363_0000	1.00	1.00	1.00
N24029EU0_3570_0000	1.00	1.00	1.00
N24029EU0_3571_0000	1.00	1.00	1.00
N24029EU0_3572_0000	0.86	0.75	0.36
N24029EU0_3573_0000	1.00	1.00	1.00
N24029EU0_3700_0000	1.00	1.00	1.00
N24029EU0_3720_0000	0.90	0.83	0.47
N24029EU0_3724_0000	0.86	0.77	0.41
N24029EU0_3725_0000	0.87	0.78	0.40

Land River Segment	TN	TP	TSS
N24029EU0_3726_0001	0.42	0.56	0.22
N24029EU0_4010_0000	0.88	0.83	0.40
N24029EU0_4011_0000	1.00	1.00	1.00
N24029EU0_4012_0000	0.92	0.83	0.45
N24029EU0_4013_0000	1.00	1.00	1.00
N24029EU0_4014_0000	1.00	1.00	1.00
N24029EU0_4015_0000	1.00	1.00	1.00
N24029EU0_4016_0000	1.00	1.00	1.00
N24029EU0_4120_0000	1.00	1.00	1.00
N24029EU0_4122_0000	1.00	1.00	1.00
N24029EU0_4123_0000	1.00	1.00	1.00
N24029EU0_4125_0000	1.00	1.00	1.00
N24029EU2_3520_0001	0.52	0.79	0.25
N24031PL0_4510_0001	0.68	0.89	0.67
N24031PL1_4460_4780	0.66	0.62	0.36
N24031PL1_4540_0001	0.84	0.92	1.00
N24031PL1_4780_0001	0.91	0.92	0.82
N24031PM0_4640_4820	0.17	0.58	0.51
N24031PM1_4250_4500	0.75	0.59	0.47
N24031PM1_4251_4250	0.68	0.12	0.13
N24031PM1_4252_4250	0.67	0.17	0.11
N24031PM1_4500_4580	0.75	0.60	0.44
N24031PM4_4040_4410	0.65	0.36	0.44
N24031PM7_4410_4620	0.79	0.60	0.44
N24031PM7_4580_4820	0.77	0.50	0.47
N24031PM7_4620_4580	0.74	0.53	0.23
N24031PM7_4820_0001	0.87	0.70	0.53
N24031XU0_4130_4070	0.12	0.14	0.01
N24031XU2_4070_4330	0.15	0.16	0.01
N24031XU2_4330_4480	0.27	0.24	0.04
N24033PL0_4510_0001	0.71	1.00	0.68
N24033PL0_4961_0000	0.80	0.69	0.47
N24033PL0_5070_0001	0.67	0.58	0.27
N24033PL0_5290_0000	0.88	1.00	1.00
N24033PL0_5390_0000	0.88	0.70	0.14
N24033PL1_4540_0001	0.82	1.00	0.85
N24033PL1_5060_0000	0.74	0.58	0.33
N24033PL1_5061_0000	1.00	1.00	1.00
N24033PL1_5230_0001	0.52	0.74	0.51
N24033PL2_4810_0000	0.80	0.70	0.44
N24033PL2_4811_0000	0.93	0.83	0.55
N24033PL2_5300_5630	0.55	0.53	0.32

Land River Segment	TN	TP	TSS
N24033PL7_4960_0000	0.89	0.84	0.46
N24033PL7_4980_0000	1.00	1.00	1.00
N24033XL0_5340_0000	0.79	0.59	0.31
N24033XL1_4690_0001	0.40	0.70	0.39
N24033XL1_4691_0000	0.83	0.80	0.36
N24033XL3_4710_0000	0.83	0.67	0.41
N24033XL3_4711_0000	0.90	0.77	0.43
N24033XL3_4712_0000	0.87	0.62	0.40
N24033XL3_4713_0000	0.76	0.58	0.33
N24033XL3_4950_0000	0.81	0.64	0.38
N24033XL3_4951_0000	0.79	0.56	0.32
N24033XL3_4952_0000	0.91	0.71	0.53
N24033XU2_4330_4480	0.32	0.38	0.07
N24033XU2_4480_4650	0.74	0.84	0.28
N24033XU3_4650_0001	0.84	0.79	0.35
N24035EM2_3980_0001	0.41	0.60	0.11
N24035EM2_4100_0001	0.45	0.69	0.15
N24035EM2_4101_0000	0.87	0.74	0.32
N24035EU0_3700_0000	1.00	1.00	1.00
N24035EU0_3720_0000	0.93	0.73	0.23
N24035EU0_3721_0000	0.80	0.68	0.26
N24035EU0_3722_0000	0.83	0.68	0.22
N24035EU0_3830_0001	0.69	0.89	0.51
N24035EU0_4030_0000	0.89	0.88	0.56
N24035EU0_4120_0000	1.00	1.00	1.00
N24035EU0_4121_0000	1.00	1.00	1.00
N24035EU0_4122_0000	1.00	1.00	1.00
N24035EU0_4124_0000	1.00	1.00	1.00
N24035EU0_4260_0000	0.88	0.78	0.32
N24035EU0_4470_0000	0.84	0.72	0.30
N24035EU0_4471_0000	1.00	1.00	1.00
N24035EU0_4472_0000	0.89	0.78	0.34
N24035EU0_4473_0000	1.00	1.00	1.00
N24035EU0_4474_0000	1.00	1.00	1.00
N24035EU0_4475_0000	0.85	0.84	0.66
N24035EU0_4490_0000	1.00	1.00	1.00
N24035EU0_4491_0000	1.00	1.00	1.00
N24035EU0_4610_0000	1.00	1.00	1.00
N24035EU0_4872_0000	1.00	1.00	1.00
N24035EU2_3520_0001	0.55	0.74	0.13
N24037PL0_5510_0001	0.44	0.55	0.33
N24037PL0_5670_0000	1.00	1.00	1.00

Land River Segment	TN	TP	TSS
N24037PL0_5671_0000	0.77	0.50	0.33
N24037PL0_5672_0000	0.78	0.58	0.33
N24037PL0_5750_0001	0.56	0.57	0.39
N24037PL0_5830_0001	0.52	0.47	0.28
N24037PL0_5950_0000	0.97	1.00	1.00
N24037PL0_5951_0000	1.00	1.00	1.00
N24037PL0_5952_0000	0.80	0.59	0.23
N24037PL0_5960_0000	1.00	1.00	1.00
N24037PL0_5961_0000	0.79	0.54	0.28
N24037PL0_5962_0000	0.83	0.61	0.36
N24037PL0_5980_0000	1.00	1.00	1.00
N24037PL0_5981_0000	0.81	0.58	0.29
N24037PL0_5982_0000	1.00	1.00	1.00
N24037PL0_5983_0000	1.00	1.00	1.00
N24037PL0_6020_0000	1.00	1.00	1.00
N24037PL0_6060_0000	1.00	1.00	1.00
N24037PL0_6110_0000	1.00	1.00	1.00
N24037PL1_5910_0001	0.69	1.00	0.82
N24037WL0_4924_0000	1.00	1.00	1.00
N24037WL0_5880_0000	1.00	1.00	1.00
N24037WL0_5881_0000	1.00	1.00	1.00
N24037XL0_4953_0000	0.86	0.68	0.40
N24037XL0_4955_0000	0.94	1.00	1.00
N24037XL0_4956_0000	1.00	1.00	1.00
N24037XL0_5340_0000	0.84	0.78	0.69
N24037XL0_5344_0000	1.00	1.00	1.00
N24037XL0_5347_0000	1.00	1.00	1.00
N24037XL0_5349_0000	1.00	1.00	1.00
N24039EL0_5761_0000	1.00	1.00	1.00
N24039EL0_5762_0000	0.85	0.68	0.15
N24039EL0_5763_0000	0.90	0.92	0.77
N24039EL0_5765_0000	1.00	1.00	1.00
N24039EL0_5890_0000	1.00	1.00	1.00
N24039EL0_5891_0000	1.00	1.00	1.00
N24039EL0_5892_0000	1.00	1.00	1.00
N24039EL0_5893_0000	1.00	1.00	1.00
N24039EL0_5894_0000	1.00	1.00	1.00
N24039EL0_6001_0000	0.79	0.70	0.23
N24039EL0_6002_0000	0.80	0.76	0.41
N24039EL0_6003_0000	0.98	1.00	1.00
N24039EL0_6004_0000	1.00	0.97	1.00
N24039EL0_6010_0000	0.93	0.97	1.00

Land River Segment	TN	TP	TSS
N24039EL0_6011_0000	1.00	1.00	1.00
N24039EL1_5570_0001	0.50	0.85	0.36
N24039EL1_6000_0001	0.46	0.68	0.12
N24039EL3_5970_0000	0.91	0.83	0.34
N24039EL3_5971_0000	0.90	0.91	0.76
N24039EL3_5974_0000	0.94	1.00	1.00
N24041EM0_4324_0000	0.81	0.70	0.33
N24041EM0_4551_0000	1.00	1.00	1.00
N24041EM0_4870_0000	1.00	1.00	1.00
N24041EM0_4871_0000	1.00	1.00	1.00
N24041EM0_4874_0000	1.00	1.00	1.00
N24041EM0_4875_0000	1.00	1.00	1.00
N24041EM0_4876_0000	1.00	1.00	1.00
N24041EM0_4882_0000	1.00	1.00	1.00
N24041EM2_4101_0000	0.90	0.78	0.33
N24041EM4_4740_0000	1.00	1.00	1.00
N24041EU0_4470_0000	0.92	0.81	0.44
N24041EU0_4474_0000	1.00	1.00	1.00
N24041EU0_4475_0000	0.90	0.75	0.31
N24041EU0_4550_0000	1.00	1.00	1.00
N24041EU0_4700_0000	0.93	0.98	0.70
N24041EU0_4873_0000	1.00	1.00	1.00
N24043PM7_4150_4290	0.87	0.59	0.64
N24043PU0_3000_3090	0.83	0.69	0.67
N24043PU0_3601_3602	0.92	0.62	0.51
N24043PU0_3611_3530	0.84	0.42	0.46
N24043PU0_3751_3752	0.83	0.65	0.59
N24043PU1_3030_3440	1.00	0.85	1.00
N24043PU1_3100_3690	0.64	0.39	0.42
N24043PU2_2840_3080	0.87	0.50	0.46
N24043PU2_3080_3640	0.87	0.46	0.42
N24043PU2_3090_4050	0.86	0.68	0.60
N24043PU2_4050_4180	0.94	0.62	0.58
N24043PU3_2510_3290	0.57	0.09	0.33
N24043PU3_3290_3390	1.00	0.82	0.93
N24043PU3_3390_3730	0.92	0.66	0.55
N24043PU6_3440_3590	0.88	0.50	0.42
N24043PU6_3530_3440	0.84	0.44	0.46
N24043PU6_3590_3640	0.91	0.51	0.47
N24043PU6_3600_3602	0.94	0.62	0.49
N24043PU6_3602_3730	1.00	0.76	0.76
N24043PU6_3610_3530	0.95	0.66	0.76

Land River Segment	TN	TP	TSS
N24043PU6_3640_3600	0.95	0.62	0.48
N24043PU6_3690_3610	0.75	0.27	0.24
N24043PU6_3730_3750	1.00	0.80	0.68
N24043PU6_3750_3752	1.00	0.79	0.82
N24043PU6_3752_4080	1.00	0.79	0.84
N24043PU6_4080_4180	1.00	0.78	0.79
N24043PU6_4180_4150	0.95	0.57	0.51
N24045EL0_4593_0000	0.88	0.67	0.08
N24045EL0_4594_0000	0.76	0.68	0.20
N24045EL0_4595_0000	0.86	0.76	0.24
N24045EL0_4596_0000	0.97	1.00	1.00
N24045EL0_4597_0000	0.90	0.68	0.10
N24045EL0_4598_0000	1.00	1.00	1.00
N24045EL0_4633_0000	0.62	0.49	0.09
N24045EL0_5040_0000	0.82	0.73	0.20
N24045EL0_5400_0001	0.38	0.59	0.10
N24045EL0_5760_0000	0.91	0.87	0.30
N24045EL0_5761_0000	0.99	1.00	1.00
N24045EL0_5762_0000	0.85	0.74	0.19
N24045EL0_5764_0000	1.00	1.00	1.00
N24045EL0_5767_0001	0.61	0.69	0.29
N24045EL1_5430_0001	0.50	0.93	0.27
N24045EL1_5570_0001	0.47	0.85	0.16
N24045EL2_4630_0000	0.97	0.97	0.96
N24045EL2_4634_0000	1.00	1.00	1.00
N24045EL2_5110_5270	0.28	0.71	0.13
N24045EL2_5270_0001	0.45	0.75	0.16
N24045EL2_5272_5270	0.30	0.65	0.08
N24047EL0_5271_0000	0.97	0.94	0.59
N24047EL1_5430_0001	0.53	0.84	0.17
N24047EL1_5570_0001	0.47	0.72	0.21
N24047EL1_5660_0000	0.88	0.70	0.20
N24047EL2_5110_5270	0.31	0.83	0.22
N24047EL2_5270_0001	0.47	0.75	0.16
N24047EL3_5870_0000	0.88	0.73	0.23
N24047EL3_5970_0000	0.95	0.94	0.44
N24047EL3_5971_0000	0.98	0.96	0.59
N24047EL3_5972_0000	0.70	0.59	0.15
N24510WM0_3650_0001	0.76	0.71	0.43
N24510WM0_3740_0001	0.41	0.65	0.44
N24510WM0_3741_0000	0.85	0.81	0.60
N24510WM0_3960_0000	1.00	1.00	1.00

Land River Segment	TN	TP	TSS
N24510WM0_3961_0000	1.00	1.00	1.00
N24510WM0_3962_0000	1.00	1.00	1.00
N24510WM0_3964_0000	1.00	1.00	1.00
N24510WM1_3910_0001	0.60	0.67	0.43
N24510WM3_4060_0001	0.67	0.52	0.42

From: "Karl Berger" <kberger@mwcog.org>
Sent: Mon, 30 Dec 2019 16:39:05 +0000
To: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen Wiggen" <wiggenk@charlescounty.org>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>
Cc: "Janis Markusic" <pwmark02@aacounty.org>; "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "Joiner, Jeremy" <JJoiner@FrederickCountyMD.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "Richmond, Mark S" <msrichmond@howardcountymd.gov>; "Lowe, Christine" <cslowe@howardcountymd.gov>; "Heyn, Chris" <cheyn@carrollcountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: FW: Draft MS4 Comment Letter
Attachments: Letter 2019-12-24 Letter to MDE on MS4 Workgroup Concerns (MACo).pdf

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

MS4 managers,

Here's a copy of the correspondence from MACo relaying the group's permit comments to MDE.

- Karl

From: Leslie Knapp <Lknapp@mdcounties.org>
Sent: Monday, December 23, 2019 10:13 AM
To: Lee Currey -MDE- <lee.currey@maryland.gov>
Cc: Alex Butler <abutler@mdcounties.org>; Karl Berger <kberger@mwcog.org>
Subject: Draft MS4 Comment Letter

Lee,

Attached is the formal version of the comments Karl previously sent you from the county MS4 workgroup. Let me or Karl know if you have any questions/concerns.

Hope you are able to take some time off and have a restful and happy holiday season.

Les

Leslie Knapp Jr.
Legal & Policy Counsel
Maryland Association of Counties (MACo)
169 Conduit Street, Annapolis, MD 21401
410.269.0043
Lknapp@mdcounties.org

MARYLAND Association of COUNTIES

December 24, 2019

D. Lee Currey
Director, Water & Science Administration
Maryland Department of the Environment
Montgomery Park Business Center
1800 Washington Blvd.
Baltimore, MD 21230

Dear Director Currey,

The Maryland Association of Counties (MACo) and the County Municipal Separate Stormwater Sewer System (MS4) Workgroup are providing the following comments on the Maryland Department of the Environment's draft language, dated August 19, 2019, of a new MS4Municipal Separate Storm Sewer System (MS4) permit for the five largest Phase I permittees.

The Workgroup comments were developed by the technical managers of Maryland's Phase I MS4 permittees and reflect the group consensus of the Workgroup members and MACo. Individual MS4 permittees reserve the right to comment to individually on their draft permits.

Both MACo and the Workgroup appreciate MDE's efforts to develop restoration requirements for the new permits that are both financially and programmatically achievable. These comments are provided in the spirit of that cooperation. Thank you for considering these concerns and issues. If you have any questions, do not hesitate to contact me at lknapp@mdcounties.org or Karl Berger at kberger@mwcog.org.

Sincerely,

Leslie Knapp Jr.

Leslie Knapp Jr.
Legal and Policy Counsel
MACo

169 Conduit Street, Annapolis, MD 21401
410.269.0043 BALT/ANNAP ◆ 301.261.1140 WASH DC ◆ 410.268.1775 FAX
www.mdcounties.org

MARYLAND DEPARTMENT OF THE ENVIRONMENT
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

PART I. IDENTIFICATION

A. Permit Number: XX-XX-XXXX XXXXXXXXX

B. Permit Area

This permit covers all stormwater discharges from the municipal separate storm sewer system (MS4) owned or operated jurisdiction-wide by XXXXX County/City/Agency, Maryland.

C. Effective Date: To be determined (TBD)

D. Expiration Date: TBD

PART II. DEFINITIONS

Terms used in this permit are defined in relevant chapters of Title 40 of the Code of Federal Regulations (CFR) Parts 122 - 124 or the Code of Maryland Regulations (COMAR) 26.08.01, 26.17.01, and 26.17.02. Terms not defined in CFR or COMAR shall have the meanings attributed by common use.

PART III. WATER QUALITY

XXXXX County/City/Agency must manage, implement, and enforce stormwater management programs in accordance with the Clean Water Act (CWA) and corresponding stormwater National Pollutant Discharge Elimination System (NPDES) regulations, 40 CFR Part 122, to meet the following requirements:

1. Effectively prohibit pollutants in stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with Maryland's receiving water quality standards;

2. Attain applicable stormwater wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with Title 33 of the U.S. Code (USC) §1342(p)(3)(B)(iii); 40 CFR §122.44(k)(2) and (3); and

3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with all the conditions contained in PARTs IV through VII of this permit shall constitute compliance with §402(p)(3)(B)(iii) of the CWA and adequate progress toward compliance with Maryland's receiving water quality standards and EPA approved stormwater WLAs for this permit term.

PART IV. STANDARD PERMIT CONDITIONS

A. Permit Administration

XXXXX County/City/Agency shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County/City/Agency shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County/City/Agency shall submit in its annual reports to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

B. Legal Authority

XXXXX County/City/Agency shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR §122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County/City/Agency shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County/City/Agency's annual report.

C. Source Identification

Sources of pollutants in stormwater runoff jurisdiction-wide shall be identified by XXXXX County/City/Agency and linked to specific water quality impacts on a watershed basis. A georeferenced database shall be submitted annually in accordance with *Maryland Department of the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017)*, hereafter (MS4 Geodatabase) that includes information on the following:

Commented [KB1]: Outdated and must be updated for the requirements of this permit

1. Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;

2. Industrial and commercial sources: industrial and commercial land uses and sites that the County/City/Agency has determined have the potential to contribute significant pollutants;

3. Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;

4. Impervious surfaces: public and private land cover delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;

5. Monitoring locations: locations established by the County/City/Agency for chemical, biological, and physical monitoring of watershed restoration efforts and the *2000 Maryland Stormwater Design Manual*, or as part a pooled monitoring approach as described in Part IV.F; and

6. Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.

D. Management Programs

The following management programs shall be implemented within its MS4 permit area by XXXXX County/City/Agency. These management programs are designed to control stormwater discharges and reduce associated pollutant loadings to the maximum extent practicable (MEP) and shall be maintained for the term of this permit.
Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. Annual Reports for the County's/City's/Agency's management programs shall be in accordance with Part V.A of this permit and the MS4 Geodatabase.

Commented [KB2]: The permit applies to the MS4, not the entire jurisdiction.

1. Stormwater Management

An acceptable stormwater management program shall be maintained by the County/City/Agency in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the *2000 Maryland Stormwater Design Manual*. This includes:

   i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;
   ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and
   iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.

b. Maintaining programmatic and implementation information including, but not limited to:

   i. Number of Concept, Site Development, and Final plans

received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;

ii. Number of redevelopment projects received;

iii. Number of stormwater exemptions issued; and

iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by the County/City/Agency.

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County/City/Agency's annual reports.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall be maintained by the County/City/Agency and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County/City/Agency shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the County/City/Agency's erosion and sediment control enforcement authority;

b. Ensuring that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE; and

c. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity

for the preceding three months.

3. Illicit Discharge Detection and Elimination

The County/City/Agency shall implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:

a. Field screening at least 150 outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit. An alternative program may be submitted by the County/City/Agency for MDE approval that methodically identifies, investigates, and eliminates illegal discharges to the County/City/Agency's MS4;

b. Conducting annual visual surveys of privately-owned commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;

c. Conduct annual visual surveys of improved properties (i.e. contains buildings or paved areas) owned in-fee by County/City/Agency and not subject to the Maryland General Permit for Discharges of Stormwater Associated with Industrial Activity, for purposes of discovering, documenting, and eliminating upland pollutant sources. Any identified pollutant sources shall be appropriately managed or eliminated and good housekeeping practices (GHP) employed from that time forward per Part IV.D.5.b. Properties with identified pollutant sources shall be resurveyed on a routine basis to ensure GHP implementation. Areas surveyed and survey results shall be reported annually;

Commented [KB3]: Proposed ONLY IN LIEU OF the full Good Housekeeping Plan requirements found in Part IV.D.5.b of the 8/19/19 Draft MS4 Phase I Permit.

It is understood that these are properties the County owns outright (owned in fee), not leased properties.

d. Maintaining written standard operating procedures for outfall screenings, illicit discharge investigations, annual visual surveys of commercial and industrial areas, annual visual surveys of County-owned improved properties, responding to illicit discharge complaints, and enforcement implementation;

e. Maintaining a program to address, and if necessary, respond to illegal discharges, dumping, and spills; and

f. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. When a suspected illicit discharge discovered within the City/County/Agency's jurisdiction is either originating from or discharging to an adjacent MS4, the City/County/Agency must coordinate with that MS4 to resolve the investigation. Significant discharges shall be reported to MDE for enforcement and/or

permitting.

4. Litter and Floatables

a. The County/City/Agency shall evaluate current litter control problems associated with discharges from portions of its MS4 that are not already addressed under a TMDL for trash (litter and floatables). Actions to address documented litter control problems shall be submitted to MDE and updated annually.

Commented [KB4]: Duplicative of 4.a. Also, watershed assessments are complete per requirements of Gen 4 MS4 Permit. It is our understanding that additional watershed assessments will not be required in the Gen 5 Ms4 Permit.

5. Property Management and Maintenance

a. Coverage under Maryland's NPDES General Permit for Discharges of Stormwater Associated with Industrial Activity (SW Industrial GP) is typically required at facilities where the following activities are performed: maintenance or storage of vehicles or equipment; use, handling, transport, or storage of fertilizers, pesticides, landscaping materials, hazardous materials, or other materials that could pollute stormwater runoff. The County/City/Agency shall:

i. Ensure that a Notice of Intent (NOI) has been submitted to MDE for each County/City/Agency owned industrial facility requiring coverage under the SW Industrial GP; and

ii. Submit with the annual report a list of County/City/Agency properties requiring industrial stormwater permitting. Data to be submitted are the facility name and type, location (grid coordinates in NAD 83 meters), SW Industrial GP number, and NOI registration number.

Commented [KB5]: MDE- please revise the GDB requirements for Municipal Facilities to match the revised permit requirements. Make QTR_INSP, LAST_INSP_DATE, QUARTER, SWPPP, SWPPP_TRAINING, and ANNUAL_REVIEW fields optional. These data and narrative files are shared between the individual permitted facility and MDEs industrial permit compliance staff. Reporting these same data via the MS4 geodatabase is duplicative.

b. No later than the expiration date of this permit, the County/City/Agency shall install and maintain markings on all stormdrain inlets located on County/City/Agency owned and built property not subject to the SW Industrial GP, having greater than 2 acres of impervious surface, and where materials or activities occur and are expected to have exposure to stormwater resulting from rain, snow, snowmelt or runoff.

Commented [KB6]: Propose inclusion IN LIEU OF the full GHP section.

c. The County/City/Agency shall develop, implement, and maintain a good housekeeping plan (GHP) for those County/City/Agency owned properties identified, via Part IV.D.3 c of this permit, as in need of a GHP. A standard GHP may be developed for those County-owned properties identified, via Part IV.D.3 c of this permit, or separate GHPs may be developed for properties with similar use, e.g., recreation and parks properties, school properties. The GHP shall include, but not be limited to:

Commented [KB7]: Let's focus our resources and efforts on identifying problems that really exist and fixing those, rather than deploying preventative measures for problems that may not really exist. Both options have a cost. Identifying problems and fixing them will ensure the cost provides a clear and demonstrable benefit. Prevention without diagnosis of a real problem is much more difficult to justify.

i. A description of property management activities subject to GHP;
ii. A map of the property areas covered by the GHP;
iii. A list of potential pollutants and their sources that may result from facility activities;
iv. Written procedures designed to reduce the potential for stormwater pollution from property activities, including illicit discharges, dumping, and spills;

Commented [KB8]: For evidence of GHP implementation, refer back to the routine re-screening of these properties via the IDDE program.

d. The County/City/Agency shall continue to implement a program to reduce pollutants associated with the maintenance of County/City/Agency-owned properties including local roads and parks. The maintenance program shall include the following activities where applicable:

i. Street sweeping;
ii. Inlet inspection and cleaning;
iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management;
iv. Litter removal; and
v. Pet waste removal.

e. The County/City/Agency shall manage the use of winter weather deicing and anti-icing materials by developing a County/City/Agency Salt Management Plan (SMP) to be submitted to MDE in its third year annual report and implemented thereafter. The SMP shall be based on the guidance provided on best road salt management practices described in *the Maryland Department of Transportation, State Highway Administration's Maryland Statewide Salt Management Plan, October 2017*. The County/City/Agency's SMP shall include, but not be limited to:

i. A plan for testing, evaluation of new equipment and strategies for continual improvement;
ii. Training and outreach:
- Creating a local "Salt Academy" that annually provides County/City/Agency winter weather operator personnel and contractors with the latest training in deicer and anti-icer management, or the participation of County/City/Agency personnel and contractors in a "Salt Academy" administered by another MS4 permittee or State agency; and
- Developing best salt management practices outreach for educating homeowners within the County/City/Agency; and

iii. Tracking and reporting:
- Starting with the fourth annual report, during storm events where deicing or anti-icing materials are applied

Commented [KB9]: This language is consistent with SHA plan (see Section 13).

to County/City/Agency roads, track and record the amount of materials used and snowfall per event; and

- Report the deicing or anti-icing application by event or date, and the monthly and annual tonnage used per lane mile per inch of snow.

f. The County/City/Agency shall report annually on the changes in its Property Management and Maintenance programs and the overall pollutant reductions resulting from this program.

6. Public Education

The County/City/Agency shall continue to implement a public education and outreach program to reduce stormwater pollutants. Education and outreach efforts may be integrated with other aspects of the County/City/Agency's activities. These efforts are to be documented and summarized in each annual report, with details on resources (e.g., personnel and financial) expended and method of delivery for education and outreach. The County/City/Agency shall implement a public outreach and education campaign with specific performance goals and deadlines including, but not limited to:

a. Maintaining a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

b. Providing information to inform the general public about the benefits of:

i. Increasing water conservation;
ii. Residential and community stormwater management implementation and facility maintenance;
iii. Proper erosion and sediment control practices;
iv. Increasing proper disposal of household hazardous waste;
v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal);
vi. Residential car care and washing;
vii. Litter reduction;
viii. Reducing, reusing, and recycling solid waste; and
ix. Proper pet waste management.

E. Restoration for Total Maximum Daily Loads and Chesapeake Bay

1. TMDL Stormwater Implementation Plans

a. Within one year of permit issuance, the County/City/Agency shall propose a TMDL stormwater implementation plan for meeting each EPA approved local and Chesapeake Bay stormwater WLA. A single plan may be developed for

TMDLs targeting the same pollutant of concern, or a comprehensive plan may be developed to address all of the pollutants of concern. The TMDL stormwater implementation plan shall include estimated final benchmarks for implementing stormwater BMPs, programmatic initiatives, and alternative control practices consistent with the stormwater WLA within the permit term. The TMDL stormwater implementation plan shall report on the estimated continual maintenance costs of each stormwaterBMP, programmatic initiative and alternative control practice and how the efforts contribute to the overall MEP toward restoration. TMDL stormwater implementation plans approved by MDE during the previous permit cycle may be used to comply with this requirement;

b. Each implementation plan shall include a list of stormwater BMPs, programmatic initiatives, and alternative control practices that will be completed during this permit term. The list shall include the estimated cost of each practice/program and how the implementation of each will work toward meeting the local and Chesapeake Bay stormwater WLAs, impervious area restoration requirements in Part IV.E.2., and the additional Chesapeake Bay restoration requirement in Part IV.E.3. For tracking progress, the County/City/Agency shall report annually:

    i. The numerical stormwater BMP and alternative control practices implemented that year;
    ii. Narrative programmatic initiative milestones accomplished that year;
    iii. Numerical impervious acre restoration achieved that year and its progress toward the final benchmark;
    iv. Numerical pollutant load reduction benchmarks for TN and TP and progress toward Chesapeake Bay stormwater WLAs; and
    v. Numerical (or narrative where appropriate) pollutant load reductions for local stormwater WLAs.

c. Following submittal of TMDL stormwater implementation plan(s), XXXX County/City/Agency shall report annually on implementation progress,including any project substitutions.

d. For any local TMDL with a stormwater WLA that is approved by EPA subsequent to the issuance of this permit, the County/City/Agency shall submit a TMDL stormwater implementation plan within one year of that approval date to address changes from the previous local TMDLimplementation plan:

    i. TMDL stormwater implementation plans shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County/City/Agency water quality analysis; and
    ii. Each TMDL stormwater implementation plan shall include

estimated final benchmarks for implementing the stormwater BMPs, programmatic initiatives, and alternative stormwater controls proposed as part of the plan.

4. Adaptive Management

The County/City/Agency shall continue to implement, evaluate, and update all of its existing plans for each EPA approved stormwater WLA by:

a. Evaluating and tracking the implementation of stormwater BMPs, programmatic initiatives, and alternative control practices through monitoring or modeling to estimate the net change in pollutant load reductions or a water quality response;

b. Documenting progress toward meeting established benchmarks, milestones, and final dates for stormwater WLAs; and

c. Developing an ongoing and iterative process that continuously implements new and additional stormwater BMPs, programmatic initiatives, and alternative control practices when stormwater WLAs have not been met before the approved final dates.

5. Public Participation

The County/City/Agency shall provide outreach to the public regarding the development of its TMDL stormwater implementation plans. The County/City/Agency shall provide a comment period to the public regarding its TMDL stormwater implementation plans that will allow for suggestions on the draft version and comments on the final version.The County/City/Agency shall provide:

a. Notice in a local newspaper or the County/City/Agency's web site outlining how the public may obtain information on the development of TMDL stormwater implementation plans and opportunities for comment;

b. Procedures for providing electronic and/or paper copies of TMDL stormwater implementation plans to interested parties upon request;

c. A minimum 30 day comment period before finalizing TMDL stormwater implementation plans;

~~d. The County/City/Agency shall continue to provide for public comment on individual local stormwater management BMPs, programmatic initiatives, and alternative practices targeted at achieving the TMDL plan;~~

e. A summary in each implementation plan of how the County/City/Agency addressed or will address any material comment received from the public.

Commented [KB10]: Local papers do not exist in some jurisdictions

Commented [KB11]: 1.Inviting public comment on any and all BMPs etc. at any time would negatively impact restoration implementation by slowing the process down, increasing the cost of each project, and reducing permittee flexibility and adaptations.
2. Lists of BMPs, programmatic initiatives, and alternative practices are part of the TMDL plans, and TMDL plans are already exposed to public comment, then it is redundant to specify these items are open for public comment.

F. Assessment of Controls

XXXXX County/City/Agency shall conduct BMP effectiveness and watershed assessment monitoring for tracking progress toward improving local water quality and restoring Chesapeake Bay.

1. BMP Effectiveness Monitoring

By April 10, 2020, the County/City/Agency shall notify MDE which option it chooses for BMP effectiveness monitoring. The two options are:

a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by the Chesapeake Bay Trust (CBT) for determining monitoring needs and selecting appropriate monitoring studies. To implement the required monitoring, the County/City/Agency shall pay $100,000 into a pooled monitoring CBT fund by Sept. 1 of each year participating. Enrollment in the program shall be demonstrated through a memorandum of understanding (MOU) between the County/City/Agency and CBT. The County/City/Agency shall remain in the program for the duration of this permit term; or

b. The County/City/Agency shall continue monitoring the (*said*) outfall and (*said*) in-stream station in the (*said*) watershed, or select and submit for MDE's approval a new BMP effectiveness study for monitoring by April 10, 2020. Monitoring activities shall occur where the cumulative effects of watershed restoration activities, performed in compliance with this permit, can be assessed. The minimum criteria for chemical, biological, and physical monitoring are as follows:

i. Chemical Monitoring:

- Twelve (12) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If exceptional weather patterns (e.g., dry weather periods) or other circumstances (e.g., equipment failures) occur during the reporting year, the City/County/Agency shall provide documentation of such circumstance(s). A minimum of eight (8) storm events shall be monitored;
- Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods;
- At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136, and event mean concentrations (EMCs) shall be calculated;

Commented [KB12]: The MS4s have the following concerns or questions about the pooled monitoring option in this section:
* Confirm that EPA and MDE will recognize and authorize the pooled monitoring approach as satisfying permit monitoring conditions.
* Provide explanation on how participation costs are determined for participating jurisdictions.
* How are monitoring results to be validated and accepted (State vs. jurisdictions)?
* Provide clarity on volunteer participation vs. participation with State/Permit track. Our understanding is that volunteer participation in the pool will allow jurisdictions to have greater control or direction as to the "problem or question" being proposed through the grant RFP solicitations. Who has control and how will the questions/problems be developed and vetted under the pooled monitoring program?

Commented [KB13]: Need time for fiscal year change

- Baseflow sampling shall occur quarterly at the mid-point of each season, e.g., February 15 for the first quarter, June 15 for the second quarter.
- Stormwater flow and baseflow measurements shall be recorded at the outfall and in-stream stations for the following parameters:

Stormwater and Baseflow Representative Samples

(Parameters)
Total Suspended Solids (TSS)
Bacteria (*E.coli* or *Enterococcus* spp.)
Chloride
Discharge (flow)
Biological Oxygen Demand (BOD) or TOC
Orthophosphate
Total Nitrogen (TN)
Nitrate + Nitrite
Total ammonia (sewer signal)
Total Phosphorus (TP)

- Continuous measurements shall be recorded for the parameters listed below at the in-stream monitoring station or other practical location based on the approved study design;

Continuous Measurements (Parameters)
Temperature
pH
Discharge (flow)
Turbidity
Conductivity

- Data collected from stormwater, baseflow, and continuous monitoring shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models;
- An approved sampling plan under a prior MS4 permit for the County/City/Agency may continue until a new sampling plan is proposed under this permit.

ii. <u>Biological Monitoring</u>:

- Benthic macroinvertebrate samples shall be gathered each spring between the outfall and in-stream stations or other

practical locations based on an MDE approved study design; and

- The County/City/Agency shall use the Maryland Biological Stream Survey (MBSS) sampling protocols for biological and stream habitat assessment.

iii. Physical Monitoring:

- A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on the approved study design. This assessment shall include annual comparison of permanently monumented stream channel cross-sections and the stream profile; and

- A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

iv. Annual Data Submittal: The County/City/Agency shall describe in detail its monitoring activities for the previous year and include the following:

- EMCs submitted on MDE's long-term monitoring MS4 Geodatabase as specified in PART V below;
- Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations;
- Any available analysis of surrogate relationships with the above monitoring parameters; and
- Any requests and accompanying justifications for proposed modifications to the monitoring program.

2. [County/City/Agency] Watershed Assessment and Trend Monitoring

By April 10, 2020, the County/City/Agency shall notify MDE which option it chooses for watershed assessment monitoring. The two options are as follows:

a. The County/City/Agency shall collaborate with MDE in a Pooled Monitoring Advisory Committee administered by CBT for determining appropriate watershed assessment monitoring for stream biology and habitat, bacteria, and chlorides. The County/City/Agency can select the type of watershed assessment monitoring (stream biology and habitat, bacteria, and chlorides) for the pooled monitoring. . To implement the required monitoring, the County/City/Agency shall pay (between $101,000 and $166,000 for biological monitoring; $8,000 and $55,000 for bacteria monitoring,

Commented [KB14]: Montgomery County does not want to duplicate its biological trend monitoring program, but sees potential in joining into a pooled monitoring program for bacteria and chloride. This section should be more flexible for opting into the pooled monitoring.

and $8,100 and $15,200 for chloride monitoring annually into a pooled monitoring CBT fund by September 1 of each year participating. Enrollment in the program shall be demonstrated through an MOU between the County/City/Agency and CBT. Once the County/City/Agency has joined the program, the County/City/Agency shall remain in the program for the duration of this permit term; or

b. The County/City/Agency shall submit a comprehensive plan for watershed monitoring by April 10, 2021 related to stream biology and habitat, bacteria, and chlorides for MDE's approval. The plan shall include:

i. Biological and habitat assessment monitoring at randomly selected stream sites using MBSS protocols;

ii. Bacteria, i.e., *E.coli*, *Enterococcus* spp., or fecal coliform monitoring; and

iii. Chloride assessments at two locations.

G. Program Funding

1. Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted by XXXXX County/City/Agency as required in PART V below.

2. Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. Annual Reporting

1. Annual progress reports, required under 40 CFR §122.42(c), will facilitate the long-term assessment of XXXXX County/City/Agency's NPDES stormwater program. The County/City/Agency shall submit annual reports on or before the anniversary date of this permit and post these reports on the County/City/Agency's website. All information, data, and analyses shall be based on the State's fiscal year and include:

a. An executive summary on the status of implementing the County/City/Agency's MS4 programs that are established as permit conditions including:

i. Permit Administration;
ii. Legal Authority;
iii. Source Identification;
iv. Stormwater Management;
v. Erosion and Sediment Control;
vi. Illicit Discharge Detection and Elimination;
vii. Litter and Floatables;
viii. Property Management and Maintenance;
ix. Public Education;
x. Restoration for Total Maximum Daily Loads and Chesapeake Bay;
xi. Assessment of Controls; and
xii. Program Funding.

b. A narrative summary describing the results and analyses of data, including monitoring data that is accumulated throughout the reporting year;

c. Expenditures for the reporting period and the proposed budget for the upcoming year;

d. A summary describing the number and nature of enforcement actions, inspections, and public education programs;

e. The identification of water quality improvements and documentation of attainment and/or progress toward attainment of schedules, benchmarks, deadlines, and applicable stormwater WLAs developed under EPA approved TMDLs; and

f. The identification of any proposed changes to the County/City/Agency's program when stormwater WLAs are not being met.

2. All annual reporting specified in PARTs IV.C, D, E, F, and G, or required anywhere within this permit shall be made using the *Maryland Department of the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017)*. A corresponding User's Guide provides guidance for data requirements and entry into the MS4 Geodatabase.

3.

Because this permit uses an iterative approach to implementation, the County/City/Agency must evaluate the progression of its programs toward meeting the permit goals in each annual report. The County/City/Agency shall show through narrative and/or numerical documentation the progression towards meeting stormwater WLAs developed under EPA approved TMDLs. This evaluation will coincide with the BMP Effectiveness Monitoring reporting outlined in Part IV.

B. Program Review

Commented [KB15]: Outdated and must be updated for the requirements of this permit

Regarding PART IV.D.5.a --
MDE- please revise the GDB requirements for the *MunicipalFacilities* Feature Class to match the Gen 5 MS4 permit requirements. Make QTR_INSP, LAST_INSP_DATE, QUARTER, SWPPP, SWPPP_TRAINING, and ANNUAL_REVIEW fields optional. These data and narrative files are shared between the individual 12-SW permitted facility and MDEs industrial permit compliance staff. Reporting via the MS4 Geodatabase is duplicative.

Additional modifications to the GDB structure may be necessary to accommodate the data required in Parts IV. C, D, E, F, and G.

In order to assess the effectiveness of XXXXX County/City/Agency's NPDES stormwater program for reducing the discharge of pollutants to the MEP and working toward meeting water quality standards, MDE will review annual reports, conduct field inspections, and periodically make requests for additional data to determine permit compliance. Procedures for the review of local erosion and sediment control and stormwater management programs exist in Maryland State law and regulations.
Additional evaluations and field inspections shall be conducted for IDDE, public property management, assessment of controls, and impervious surface area and Chesapeake Bay restoration to determine compliance with permit conditions.

C. Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than 5 years unless administratively continued by MDE. Continuation or reissuance of this permit beyond this permit term will require XXXXX County/City/Agency to reapply for NPDES stormwater discharge permit coverage in its fourth-year annual report. Failure to reapply for coverage constitutes a violation of this permit.

As part of this application process, the County/City/Agency shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how each County/City/Agency watershed has been thoroughly evaluated, and the status of implementing water quality improvement projects and all schedules, benchmarks, and deadlines toward meeting stormwater WLAs. This application shall be used to gauge the effectiveness of the County/City/Agency's NPDES stormwater program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

1. The County/City/Agency's NPDES stormwater program goals;

2. Program summaries for the permit term regarding:

    a. Illicit discharge detection and elimination results;

    b. Impervious Surface and Chesapeake Bay Restoration status including County/City/Agency totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting stormwater WLAs developed under EPA approved TMDLs;

    c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved;

    d. Other relevant data and information for describing County/City/Agency programs;

3. Program operation and capital improvement costs for the permit term; and

4. Descriptions of any proposed permit condition changes based on analyses of

the successes and failures of the County/City/Agency's efforts to comply with the conditions of this permit.

PART VI. SPECIAL PROGRAMMATIC CONDITIONS

A. Maryland's baseline programs, including the 1991 Forest Conservation Act, 1997 Priority Funding Areas Act, 2007 Stormwater Management Act, 2009 Smart, Green & Growing Planning Legislation, 2010 Sustainable Communities Act, 2011 Best Available Technology Regulation, and the 2012 Sustainable Growth & Agricultural Preservation Act effectively mitigate the majority of the impacts from new development. Any additional loads will be offset through Maryland's alignment for growth policies and procedures as articulated through Chesapeake Bay milestone achievement. The overriding goal shall be no net growth in loads and XXXXX County/City/Agency shall reflect these policies, programs, and implementation as part of its net WLA accounting as stipulated in Part IV.E.4.b.ii of this permit.

PART VII. ENFORCEMENT AND PENALTIES

A. Discharge Prohibitions and Receiving Water Limitations

XXXXX County/City/Agency shall prohibit non-stormwater discharges through its MS4. NPDES permitted non-stormwater discharges are exempt from this prohibition. Discharges from the following will not be considered a source of pollutants when properly managed: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration to separate storm sewers; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation waters; springs; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; de-chlorinated swimming pool discharges (not including filter backwash); street wash water; and firefighting activities.

Consistent with §402(p)(3)(B)(iii) of the CWA, the County/City/Agency shall take all reasonable steps to minimize or prevent the contamination or other alteration of the physical, chemical, or biological properties of any waters of the State, including a change in temperature, taste, color, turbidity, or odor of the waters or the discharge or deposit of any organic matter, harmful organism, or liquid, gaseous, solid, radioactive, or other substance into any waters of the State, that will render the waters harmful to:

1. Public health, safety, or welfare;

2. Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial use;

3. Livestock, wild animals, cats, or birds; and

4. Fish or other aquatic life.

B. Duty to Mitigate

XXXXX County/City/Agency shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

C. Duty to Comply

XXXXX County/City/Agency shall be responsible for complying with all conditions of this permit. Other entities may be used to meet various permit obligations provided that both the County/City/Agency and the other entity agree contractually. Regardless of any arrangement entered into however, the County/City/Agency remains responsible for permit compliance. In no case may this responsibility or permit compliance liability be transferred to another entity.

Failure to comply with a permit provision constitutes a violation of the CWA and is grounds for enforcement action; permit termination, revocation, or modification; or denial of a permit renewal application. The County/City/Agency shall comply at all times with the provisions of the Environment Article, Title 4, Subtitles 1, 2, and 4; Title 7, Subtitle 2; and Title 9, Subtitle 3 of the Annotated Code of Maryland.

The County/City/Agency shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the County/City/Agency to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the County/City/Agency only when the operation is necessary to achieve compliance with the conditions of the permit.

D. Sanctions

1. Penalties Under the CWA - Civil and Criminal

Section 309(g)(2) of the CWA, 33 USC §1319(g)(2) provides that any person who violates any permit condition is subject to a civil penalty not to exceed $10,000 per day for each violation, not to exceed $125,000. Pursuant to the Civil Monetary Penalty Inflation Adjustment Rule, 40 CFR Part 19, any person who violates any NPDES permit condition or limitation is liable for an administrative penalty not to exceed $16,000 per day for each such violation, up to a total penalty of $177,500. Pursuant to Section 309(c) of the CWA, 33 USC §1319(c), any person who negligently violates any permit condition is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. Any person who knowingly violates any permit condition is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both.

2. Penalties Under the State's Environment Article - Civil and Criminal

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the County/City/Agency from civil or criminal responsibilities and/or penalties for a violation of Title 4, Title 7, and Title 9 of the Environment Article, Annotated Code of Maryland, or any federal, local, or other State law or regulation. Section 9-342 of the Environment Article provides that a person who violates any condition of this permit is liable to

a civil penalty of up to $10,000 per violation, to be collected in a civil action brought by MDE, and with each day a violation continues being a separate violation. Section 9-342 further authorizes MDE to impose upon any person who violates a permit condition, administrative civil penalties of up to $5,000 per violation, up to $50,000.

Section 9-343 of the Environment Article provides that any person who violates a permit condition is subject to a criminal penalty not exceeding
$25,000 or imprisonment not exceeding 1 year, or both for a first offense. For a second offense, Section 9-343 provides for a fine not exceeding $50,000 and up to 2 years imprisonment.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who knowingly makes any false statement, representation, or certification in any records or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

E. Permit Revocation and Modification

1. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by XXXXX County/City/Agency for a permit modification or a notification of planned changes or anticipated noncompliance does not stay any permit condition. A permit may be modified by MDE upon written request by the County/City/Agency and after notice and opportunity for a public hearing in accordance with and for the reasons set forth in COMAR 26.08.04.10.

A permit may be modified, suspended or revoked and reissued in whole or in part during this permit term by MDE after notice and opportunity for a hearing and in accordance with COMAR 26.08.04.10, for causes including, but not limited to the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. A change in any condition that requires either a temporary reduction or elimination of the authorized discharge;

d. A determination that the permitted discharge poses an immediate threat to human health or welfare or to the environment and can only be regulated to acceptable levels by permit termination or modification to

incorporate additional controls that are necessary to ensure human health and safety are not impacted by the permitted effluent;

f. As specified in 40 CFR §§122.62, 122.63, 122.64, and 124.5.

2. Duty to Provide Information

The County/City/Agency shall furnish to MDE, within a reasonable time, any information that MDE may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit. The County/City/Agency shall also furnish to MDE, upon request, copies of records required to be kept by this permit.

F. Inspection and Entry

XXXXX County/City/Agency shall allow an authorized representative of the State or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulatory activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and obtain copies at reasonable times of any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times, without prior notice, any construction site, facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or

5. parameters at any location.

G. Monitoring and Recordkeeping

Unless otherwise specified by this permit, all monitoring and records of monitoring shall be in accordance with 40 CFR §122.41(j).

H. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State or local law or regulations.

I. Severability

The provisions of this permit are severable. If any provision of this permit shall be held

invalid for any reason, the remaining provisions shall remain in full force and effect. If the application of any provision of this permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

J. Signature of Authorized Administrator and Jurisdiction

Each application, report, or other information required under this permit to be submitted to MDE shall be signed as required by COMAR 16.08.04.01-1.
Signatories shall be a principal executive officer, ranking elected official, or other duly authorized employee.

Lee Currey, Director **Date**
Water and Science Administration

From: "Karl Berger" <kberger@mwcog.org>
Sent: Fri, 17 Jan 2020 18:51:27 +0000
To: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen D. Wiggen" <WiggenK@charlescountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>
Cc: "Janis Markusic" <pwmark02@aacounty.org>; "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "Joiner, Jeremy" <JJoiner@FrederickCountyMD.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "Richmond, Mark S" <msrichmond@howardcountymd.gov>; "Lowe, Christine" <cslowe@howardcountymd.gov>; "Heyn, Chris" <cheyn@carrollcountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>
Subject: FW: Slides from yesterday's meeting
Attachments: MACO Meeting2.pptx

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

From: Jennifer M. Smith - MDE <jenniferm.smith@maryland.gov>
Sent: Friday, January 17, 2020 1:02 PM
To: Karl Berger <kberger@mwcog.org>
Cc: Raymond Bahr -MDE- <raymond.bahr@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: Slides from yesterday's meeting

Karl,

Please see attached a copy of the slides from our meeting yesterday. Thanks for distributing.

Jennifer

On Fri, Jan 17, 2020 at 9:57 AM Karl Berger <kberger@mwcog.org> wrote:

> Jennifer,
>
> Would you send me the slides MDE staff presented at yesterday's meeting, so that I can circulate to the group?

- Karl

--
Jennifer M. Smith, P.E.
Program Manager
Sediment, Stormwater and Dam Safety Program
Water and Science Administration
Maryland Department of Environment
1800 Washington Boulevard
Baltimore, MD 21230

410-537-3561

MS4 Phase I Large Tentative Determination Permit MACO Meeting

January 16, 2020

Agenda

1. Introduction
2. MS4 Stormwater Restoration Metrics
3. MS4 Guidance Snapshot
4. MEP BMP Portfolio Updates
5. MS4 Tentative Determination Schedule
6. MS4 Guidance in Detail
7. Questions

Ray

Introduction

- Purpose of Today's Meeting
- Input from Stakeholders on MS4 and Guidance
- Distributed MS4 Guidance final absent a fatal flaw
- EPA review, comments, direction, process
- Tentative Determination schedule is early Summer

MS4 Stormwater Restoration Metrics

1. Stormwater Restoration metrics
    a. Impervious acre restoration requirement
        i. Upland BMPs, e.g., ponds and practices from the manual
        ii. Alternative practices and equivalent impervious acres
        iii. Nutrient credits can be used for equivalent impervious acres
    b. Pollutant load reductions
2. Chesapeake Bay and Local TMDLs
    a) Show progress toward meeting TMDLs through BMP implementation
        i. Guidance on Bay TMDLs and delivery ratios
        ii. Reference to MDE's TMDL data center for guidance on local TMDLs

MS4 Guidance Snapshot

1. Revised pollutant loading rates, CBP Watershed Model, Version 6
2. Updated BMP efficiencies, CBP expert panels
    a. TN, TP, and TSS reduction efficiencies/rates
    b. Equivalent impervious acre factors for alternative practices
3. New BMPs in the tool box
    a. IDDE, floating treatment wetlands, land cover change, riparian forests, forest conservation, soil decompaction
4. Co-benefits
    a. Green stormwater infrastructure and watershed management, e.g., climate resiliency
5. Nutrient trading credits
6. Monitoring protocols for adding BMPs to the MS4 Guidance

MEP Portfolio Updates

- Recalculate impervious acre credits for upland bmps by adding estimated WM and GSI credits
- Add EIA credits for alternative practices
- Recalculate pollutant load reductions for TN, TSS and TP
- Add any additional BMPs (e.g. land conversion practices)
- Indicate TMDL implementation plan associated with each proposed BMP

MS4 Guidance in Detail

- What's new, comparison of the 2014 and 2019 versions -- Stew
- Pollutant loading rates and BMP efficiencies -- Jeff
- Alternative practices and equivalent impervious acres -- Jeff
- Incentivising stormwater co-benefits -- Jennifer
  - Green stormwater infrastructure credit
  - Watershed management credit (climate resiliency)
- Stream Restoration Credits -- Jeff
- Continuation of annual projects in new permit -- Ray
- Replacement of nutrient credits in new permit -- Ray

What is New in 2019 Guidance?

- Pollutant Loading Rates and BMP Efficiencies:
  - Based on the Phase 6 CB Model
  - Incorporates updated and refined BMP data
  - Includes new BMPs and refined efficiencies for existing BMPs
- 15 New BMPs:
  - 11 different street sweeping options (4 in 2014)
  - 8 types of land cover conversions (3 in 2014)
  - New BMPs - floating treatment wetlands (FTWs), urban soil restoration (pervious and impervious), IDDE
- Provides Impervious Acre Credit Incentives for Green Stormwater Infrastructure (GSI) and Watershed Management (WM)
- Includes Guidance on Nutrient Trading

Pollutant Unit Loads and BMP Efficiencies

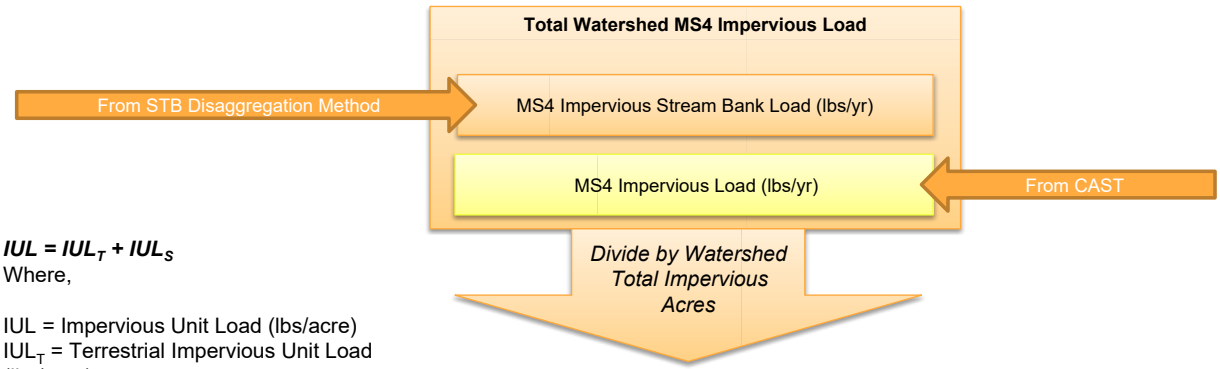
Load Source[1]	Statewide EOS Urban Unit Load (lbs/acre/yr)		
	TN	TP	TSS
Aggregate Impervious	20.09	2.55	8,474
Impervious Road	35.79	6.95	17,328
Mixed Open	8.15	1.59	1,414
Septic	16.66	0.00	0.00
Tree Canopy over Impervious	32.75	6.19	16,115
Turf	13.35	2.12	1,414
Tree Canopy over Turf	10.18	1.62	1,332
True Forest	2.28	0.32	719
Total Urban	12.89	1.46	3,306

Note
[1] For more information on Load Sources in the Phase 6 Model, see Appendix B.

- P6 Model Unit Loads
  - 2010 No Action (No BMP) Scenario
  - Edge-of-stream
  - Include streambank and bed loads for direct comparison to prior accounting document and P5
- P6 Model BMP Efficiency updates
  - Street sweeping and inlet cleaning
- P6 Model New BMPs
  - Tree Canopy and Conservation Landscaping

Using STB Disaggregation Output to Calculate Unit Loads

Impervious example



$IUL = IUL_T + IUL_S$

Where,

IUL = Impervious Unit Load (lbs/acre)
IUL_T = Terrestrial Impervious Unit Load (lbs/acre)
IUL_S = Stream Impervious Unit Load (lbs/acre)

Total Impervious (STB + Terrestrial) Unit Load

Alternative Practices and Equivalent Impervious Acres

- EIA_f = equivalent impervious acre factor used to determine equivalent impervious acres
- EIA_fs calculated using the new P6 Model unit loads
- Based on 1) difference between pollutant loads from aggregate impervious and true forest land covers, and 2) BMP specific load reductions (see appendix for more detail)
- Variable formula for alternative BMPs and land-cover change BMPs

Pollutant	Aggregate Impervious Unit Load (lbs/acre/yr)	True Forest Unit Load (lbs/acre/yr)	Delta (lbs/acre/yr)
TN	20.09	2.28	17.81
TP	2.55	0.32	2.23
TSS	8,474.18	718.57	7,756
Source: Phase 6 Model, Maryland aggregated statewide average unit loads without BMPs			

$$EIA_f = \frac{\left(\frac{TN\ Load\ Red.}{1-F_{TN}}\right)+\left(\frac{TP\ Load\ Red.}{1-F_{TP}}\right)+\left(\frac{TSS\ Load\ Red.}{1-F_{TSS}}\right)}{3} \quad EIA_f = \frac{\left(\frac{TN\ Load\ Red.}{ST1"\ delta_{TN}}\right)+\left(\frac{TP\ Load\ Red.}{ST1"delta_{TP}}\right)+\left(\frac{TSS\ Load\ Red.}{ST1"delta_{TSS}}\right)}{3}$$

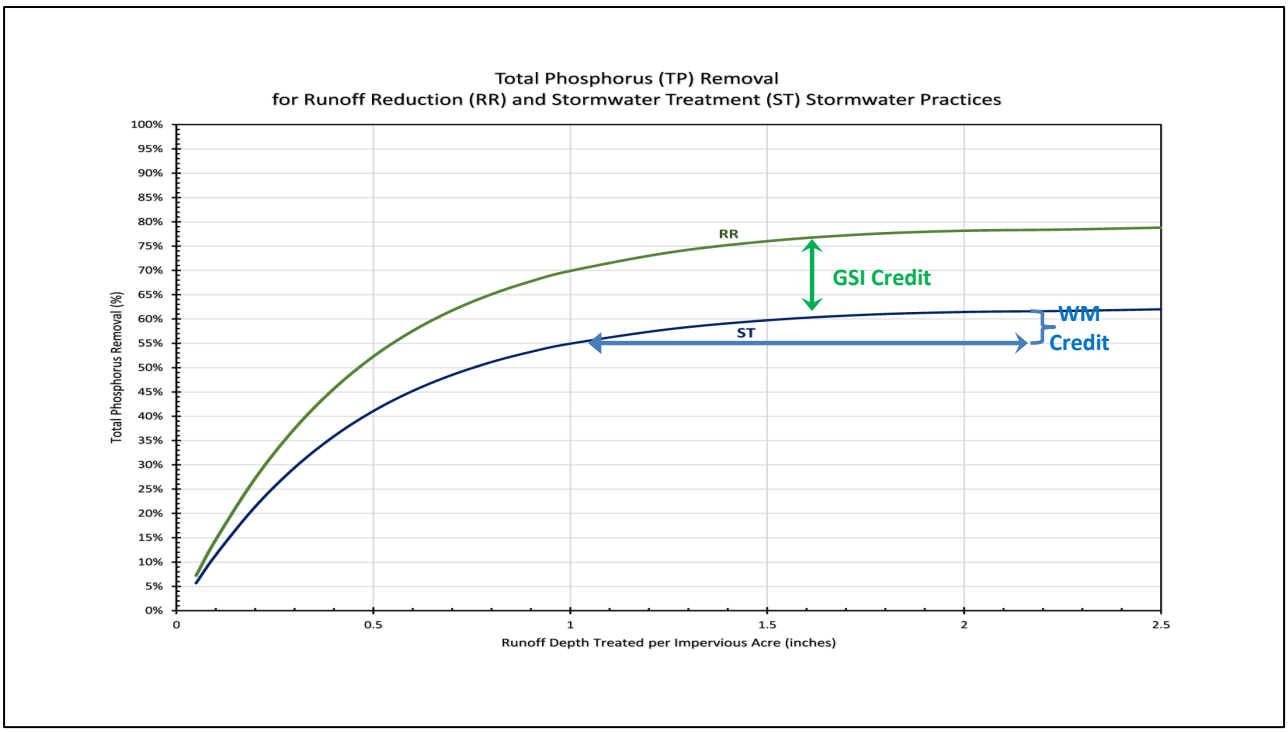
Alternative Practices and Equivalent Impervious Acres

BMP	Load Reductions (lbs/unit/yr)			EIA_f
	TN	TP	TSS	
Advanced Sweeping				**Per Mile Swept**
1 pass/12 weeks	0.00	0.07	347	0.025
1 pass/8 weeks	0.25	0.14	693	0.055
1 pass/4 weeks	0.36	0.21	1040	0.083
Spring 1 pass/1-2 weeks else monthly	0.36	0.28	1213	0.100
Fall 1 pass/1-2 weeks else monthly	0.72	0.35	1733	0.140
1 pass/2 weeks	0.72	0.35	1906	0.147
1 pass/week	1.07	0.56	2773	0.222
2 passes/week	1.43	0.70	3639	0.287
Mechanical Broom Sweeping				**Per Mile Swept**
1 pass/4 weeks	0.00	0.00	17	0.001
1 pass/week	0.00	0.00	87	0.004
2 passes/week	0.00	0.00	173	0.007
Storm Drain Cleaning				**Per Ton Removed**
Organic	4.44	0.48	400	0.17
Inorganic	3.78	0.84	1400	0.26
Floating Treatment Wetlands (% of pond wet surface area covered by FTW)				**Per Impervious Acre**
FTW1 (10%)	0.10	0.02	76	0.009
FTW2 (11-20%)	0.22	0.05	155	0.018
FTW3 (21-30%)	0.32	0.07	231	0.027
FTW4 (31-40%)	0.43	0.10	304	0.035
FTW5 (41-50%)	0.53	0.12	380	0.044
Land Cover Conversion				**Per Acre of Land Cover Changed**
Forest Planting	11.08	1.80	696	1.0
Riparian Forest Planting	14.30	2.53	2,349	1.41
Conservation Landscaping	5.21	0.53	0.00	0.37
Riparian Conservation Landscaping	6.72	0.75	0.00	0.50
Forest Conservation	10.61	1.14	2,587	0.48

BMP	Load Reductions (lbs/unit/yr)			EIA_f
	TN	TP	TSS	
Table 1 Continued				
Impervious Surface Reduction	6.74	0.43	7,060	0.82
Street Trees	3.04	0.76	1,213	0.39
Urban Tree Canopy Planting	3.18	0.51	82	0.28
Urban Soil Restoration of Compacted Pervious Surfaces (soil excavation depth in inches)				**Per Acre of Soil Treatment**
Level 1 (15 inches)	4.4	0.72	278	0.40
Level 2 (20 inches)	8.9	1.44	557	0.80
Urban Soil Restoration of Removed Impervious Surfaces (soil excavation depth in inches)				**Per Acre of Soil Treatment**
Level 1 (15 inches)	13.7	0.7	1,696	0.91
Level 2 (20 inches)	15.0	0.77	1,864	1.00
Septic[1]				**Per System**
Septic Pumping	0.00	0.00	0.00	0.02
Septic Denitrification	0.00	0.00	0.00	0.16
Septic to WWTP Connection	0.00	0.00	0.00	0.36
Shoreline Management[2]/Stream Restoration[3]				**Per Linear Foot**
Shoreline Management (Default Rate)	0.086	0.061	164	0.02
Stream Restoration (Planning Rate)	0.075	0.068	248	0.02
Elimination of Discovered Nutrient Discharges from Grey Infrastructure[4]				**Per Discharge**
Elimination of Eight Approved Discharge Types	Protocol	Protocol	0.00	Individually Calculated

Incentivizing Stormwater Management Co-Benefits

- Credit for Additional Water Quality Treatment
  - Essentially the water quality volume credit from the 2014 Guidance Document (but now you can get more credit if you go above a rainfall treatment (P_E) of 3.0 inches)
- Credit for Additional Storage (Watershed Management Credit)
  - Credit for additional quantity management (in the form of extended detention) up to a rainfall treatment (P_E) of 3.0 inches
- Green Stormwater Infrastructure Credit
  - Credit for enhancements to structural practices to provide green infrastructure features. This credit essentially equates the water quality performance of a structural practice with GSI features to an ESD practice.


Total Phosphorus (TP) Removal
for Runoff Reduction (RR) and Stormwater Treatment (ST) Stormwater Practices
Total Phosphorus Removal (%)
100%
95%
90%
85%
80%
75%
70%
65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
0
0.5
1
1.5
2
2.5
Runoff Depth Treated per Impervious Acre (inches)
RR
GSI Credit
ST
WM
Credit

Credit for Additional Water Quality Volume

- Additional water quality provided in an upland BMP for a rainfall depth between 1.0 inch and 3.0 inches.
- Increase P_E treatment limit from 2.6 inches to 3.0 inches (similar to 2014 guidance but increase pe treatment available for credit)
- For any additional WQ_T provided for a rainfall depth treated between 1-3 inches, and additional 25% impervious acre credit is provided (based on the CBP Adjustor curves)
- Get 1 for 1 credit for first inch and 0.25 for 1 credit for treatment between 1-3 inches.

$$WQ_T Credit = \left[\frac{(1\ inch + [(P_E - 1\ inch) \times 0.25])}{1\ inch}\right] \times Imp.Ac.$$

Credit for Additional Storage (WM Credit)

- Additional storage volume provided in an upland BMP in the form of extended detention for a rainfall depth between 1.0 inch and 3.0 inches.
- Extended detention must be for 24 hours (unless located in Use III watershed)
- Only applies to extended detention volume above the minimum WQ_T volume (i.e. must have a WQ_T volume of 1 inch before you can use this credit)
- Added to the WQ_T up to a P_E treated of 3.0 inches

$$WM\ Credit = \left[\frac{\left(P_E - P_{WQ_T}\right) \times 0.25}{1\ inch}\right] \times Imp.\ Ac.$$

Credit for Green Stormwater Infrastructure (GSI)

- Available to BMPs that provide water quality treatment and incorporate enhanced design features.
- All ESD practices that meet minimum design manual criteria automatically receive this credit.
- All Upland BMPs considered ST practices receive this credit if green infrastructure features are incorporated into the design.
- Credit is equal to an additional 35% impervious acre restoration credit. The GSI credit replaces the WQ_T credit

$$GSI\ Credit = 1.35 \times \left\{ \left\lfloor \frac{(1\ inch + [(P_E - 1\ inch) \times 0.25])}{1\ inch} \right\rfloor \times Imp.Ac. \right\}$$

Upland BMPs	Must Meet Required Manual Design Criteria	Must Meet Required Manual Design Criteria and Provide Enhanced Features
Chapter 5 Practices		
Green Roofs	X	
Permeable Pavements	X	
Reinforced Turf	X	
Disconnection of Rooftop Runoff	X	
Disconnection of Non-Rooftop Runoff	X	
Sheetflow to Conservation Areas	X	
Rainwater Harvesting	X	
Submerged Gravel Wetlands	X	
Landscape Infiltration	X	
Dry Wells	X	
Micro-Bioretention and Rain Gardens	X	
Bio-Swales, Grass Swales, Wet Swales, Dry Swales	X	
Chapter 3 Practices (Sections 3.1 and 3.2 of the Manual)		
Micropool Extended Detention Pond		X
Wet Pond		X
Wet Extended Detention Pond		X
Multiple Pond System		X
Pocket Pond		X
Shallow Wetland		X
Extended Detention Shallow Wetland		X
Pond/Wetland System		X
Pocket Wetland		X
Chapter 3 Practices (Sections 3.3 and 3.4 of the Manual Except Otherwise Noted[1])		
Infiltration Trench		X
Infiltration Basin		X
Surface Sand Filter		X
Organic Filter		X
Pocket Sand Filter		X
Bioretention		X
Note: [1] Infiltration trenches under pavement, underground sand filters, and perimeter sand filters are not eligible for GSI credit.		

Chapter 3.1 - 3.2 Stormwater Ponds and Wetlands
Required
1. Flow paths must be 1.5:1 (length relative to width). 2. Surface area of the wetland must be at least 1.5% of the total drainage area to the facility. 3. Any extended detention volume must not comprise more than 50% of the total wet pool volume, and the maximum extended detention water surface elevation must not extend more than three feet above the normal pool. 4. There must be at least 3 separate hydrologic zones (e.g., deep water pool, shallow water bench, shoreline fringe, riparian fringe; see Appendix A of the Manual). 5. These hydrologic zones must be planted throughout with at least 5 wetland species and include a variety of plant types (e.g., grasses, shrubs, trees). For more information on plant types, see *Vegetation in Stormwater Best Management Practices* (MDE, November 2019). 6. Vegetation must be established to cover a minimum of 50% of the pond surface, as measured at the permanent pool design water surface elevation. 7. The landscaping plan must include plants (i.e., aquatic, emergent, upland) along the aquatic bench, safety bench, and side slopes. 8. A vegetated buffer must extend 25 feet outward from the maximum water surface elevation with an additional 15 foot setback to structures (e.g., houses, sheds, roads).
Recommended
1. At least 25% of the total design volume (P_E) should be in deepwater zones with a minimum depth of 4 feet. 2. A minimum of 35% of the total surface area should have a depth of 6 inches or less. 3. At least 65% of the total surface area should be shallower than 18 inches. 4. The vegetated buffer and interior side slopes should be managed as a meadow or forest (mowing twice per year at a maximum).

Chapter 3.3 - 3.4 Stormwater Infiltration and Filtering Systems
Required
1. A minimum 85% vegetation cover must be established within 3 years including at least 5 species and a variety of plant types (grasses, shrubs, trees). For more information, see *Vegetation in Stormwater Best Management Practices* (MDE, November 2019). 2. The landscaping plan must not include invasive species or vines, and these must be removed as they are discovered during maintenance. 3. A vegetated buffer must extend 25 feet outward from the maximum design water surface elevation with an additional 15 foot setback to structures.
Recommended
1. Native plant species are strongly encouraged in the landscaping plan. 2. The vegetated buffer and interior side slopes should be managed as a meadow or forest (mowing twice per year at a maximum).

Combining Credits

- GSI credit replaces the WQ_T credit
- If WM and GSI credits both apply, calculate the GSI credit first. Calculate the WM credit separately. Add WM credit to GSI credit.
- GSI credit = 1.35 x WQ_T credit
- Total credit = GSI credit + WM credit

$$Total\ Credit = \left[1.35 \times \left\{\left[\frac{(1\ inch + [(P_E - 1\ inch) \times 0.25])}{1\ inch}\right] \times Imp.Ac.\right\}\right] + \left[\left[\frac{(P_E - P_{WQ_T}) \times 0.25}{1\ inch}\right] \times Imp.Ac.\right]$$

Continuation of Annual Practices in New Permits

1. Determine your final MS4 permit year's ***level of effort*** for annual BMPs, e.g., miles of street swept, septic system unit cleanouts
2. Translate that same ***level of effort*** into TN, TP, and TSS reductions and equivalent impervious acre using the 2019 MS4 Accounting Guidance
3. Continue to implement the annual BMPs from the prior permit term at the same ***level of effort*** by meeting the newly translated TN, TP, and TSS reductions and impervious acre equivalency calculated in step 2. above

Replacement of Nutrient Credits in New Permit

1. Determine nutrient credits acquired by the end of your prior MS4 permit term, e.g., lbs of TN, TP, and TSS, for meeting impervious acre restoration requirements
2. Continue acquiring annual nutrient credits, e.g., lbs of TN, TP, and TSS, until those nutrient credits are replaced by other BMPs from the 2019 MS4 Accounting Guidance
3. By the end of your new permit term, replace all nutrient credits acquired under your prior permit term, by implementing BMPs from the 2019 MS4 Accounting Guidance
4. Use the 2019 MS4 Accounting Guidance to determine the level of BMP implementation needed to reduce TN, TP, and TSS enough to replace the nutrient credits acquired under your previous permit

QUESTIONS ?

From: "Karl Berger" <kberger@mwcog.org>
Sent: Fri, 24 Jan 2020 15:51:05 +0000
To: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen D. Wiggen" <WiggenK@charlescountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>
Cc: "Janis Markusic" <pwmark02@aacounty.org>; "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "Joiner, Jeremy" <JJoiner@FrederickCountyMD.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "Richmond, Mark S" <msrichmond@howardcountymd.gov>; "Lowe, Christine" <cslowe@howardcountymd.gov>; "ProctorP@CharlesCountyMD.gov" <ProctorP@CharlesCountyMD.gov>; "Heyn, Chris" <cheyn@carrollcountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Mishra, Sudhanshu" <SPMishra@co.pg.md.us>
Subject: FW: FW: Phase I Large Contacts for cc

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

FYI,

Here is the email exchange with MDE over the date for portfolio revisions that Frank Dawson noted on today's call. Montgomery staff will continue to take the lead for the five large MS4s on addressing this deadline with MDE, taking account of the need for a timely response by MDE to the questions and comments re the Guidance that the full group will be submitting for this deadline to be met.

(Excuse my duplications)

From: Dawson, Frank <Frank.Dawson@montgomerycountymd.gov>
Sent: Friday, January 24, 2020 9:18 AM
To: Karl Berger <kberger@mwcog.org>
Subject: Fwd: FW: Phase I Large Contacts for cc

Fyi
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From: Lee Currey -MDE- <lee.currey@maryland.gov>
Sent: Thursday, January 23, 2020 7:56:05 PM
To: Dawson, Frank <Frank.Dawson@montgomerycountymd.gov>

Cc: Bennett, Katherine <Kate.Bennett@montgomerycountymd.gov>; Cameron, Mark <Mark.Cameron@baltimorecity.gov>; DeHan, Jeffrey M. <jmdehan@co.pg.md.us>; Erik Michelsen <pwmich20@aacounty.org>; Jennifer Smith -MDE- <jenniferm.smith@maryland.gov>; Kimberly.Grove@baltimorecity.gov <Kimberly.Grove@baltimorecity.gov>; Maldonado, Jerry G. <jgmaldonado@co.pg.md.us>; Raymond Bahr -MDE- <raymond.bahr@maryland.gov>; Robert Hirsch <rhirsch@baltimorecountymd.gov>; SPMishra@co.pg.md.us <SPMishra@co.pg.md.us>; Stevens, Amy <Amy.Stevens@montgomerycountymd.gov>; Stiles, James <James.Stiles@montgomerycountymd.gov>; Suzanne Dorsey -MDE- <suzanne.dorsey1@maryland.gov>
Subject: Re: FW: Phase I Large Contacts for cc

[EXTERNAL EMAIL]

Thanks Frank. I appreciate the follow up email and your outreach to the other jurisdictions. We will meet internally and then I will follow up with you next week.

On Thu, Jan 23, 2020 at 3:27 PM Dawson, Frank <Frank.Dawson@montgomerycountymd.gov> wrote:

> Lee, after our meeting last week concerning MDE's new Accounting Guidance and subsequent need to update Phase 1 permit portfolios, we canvased all the Phase 1 jurisdictions to better understand how much more time was needed to update the portfolios. Based on that survey, we are requesting a six-week extension until March 16, 2020. If you would like to discuss this further, please feel free to contact me. Thanks for listening to our concerns.
>
> Frank

Frank W. Dawson III

Division Chief

Watershed Restoration Division

Department of Environmental Protection

255 Rockville Pike

Rockville, Maryland 20850

Office: 240-777-7732

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D. Lee Currey, Director
Water and Science Administration
Maryland Department of the Environment (MDE)
Montgomery Park
1800 Washington Blvd., Ste. 4502
Baltimore, MD 21230-1718
Office: 410-537-3567
lee.currey@maryland.gov
http://secure-web.cisco.com/1GPd_uTIklrPpzRO_kMWwW4vb_AzrRlxuFrQHkpN_Rkzy7UUMAmjdpixbieP9xS_k2pfDnldcXKJzfYVBrfGhw41Cfu8v-ktuPQVYAXWVipVQsnn2qddI4Lmc3JytIB4iXDn2mk0FXip2-5rbqupD1VruMRDnPNp2xSRuHYgVI6Wr9ClMFW08vh_DWNQ5ZLaj3EZRXx7Yr7GiOgKVYc8DRIVbxj2DFzI8bL309GcNGkrtCMHmJH4NQLGKAlpW7O2CJv5zFl56eCoFHyfPQOOuL-JbNIa7kitu28a6SF4Ju7zNfWAKgL1b1LjdXElEZkerFTM_-UcTv3N94UrU8nNbSFCFaWWkDdg26UHODMv0ajxfpC2fSwpMXtKYelyYUEXVub40iIN2PI-Rx5f8fIBYXf5-pP74mvG49uFn8FJJhJw/http%3A%2F%2Fwww.mde.state.md.us
www.facebook.com/MDEnvironment
www.twitter.com/MDEnvironment

Click here to complete a three question customer experience survey.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Fri, 31 Jan 2020 18:06:46 +0000
To: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen D. Wiggen" <WiggenK@charlescountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>
Cc: "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>; "bennett.kate@gmail.com" <bennett.kate@gmail.com>
Subject: Comment email to MDE
Attachments: MS4 group comments on 2019 Accounting Guidance

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

MS4 managers,

Attached is a copy of the email I sent to MDE today relaying your comments on the Accounting Guidance.

- Karl

From: "Karl Berger" <kberger@mwcog.org>
Sent: Fri, 31 Jan 2020 18:03:17 +0000
To: "Lee Currey -MDE- (lee.currey@maryland.gov)" <lee.currey@maryland.gov>
Cc: "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>; "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Jeff White -MDE-" <jeff.white@maryland.gov>
Subject: MS4 group comments on 2019 Accounting Guidance
Attachments: 2019 Guidance Document Questions and Comments.final.Jan31.2020.docx

Lee,

Attached is a set of the MS4 Phase I group's comments on the Dec. 23, 2019, Accounting Guidance document that was circulated by MDE. In some cases, we directly recommend changes. In others, we ask for confirmation of how MDE will treat certain situations. Many of these still stem from concerns we expressed in our Oct. 29, 2019, letter from MACo. Until they are addressed, they represent fatal flaws in the document under the basis for our comments that you discussed at our Jan. 16, 2020, meeting.

The Phase I managers have done their best to meet the Jan. 31 date for submitting these comments that was discussed at our Jan. 16 meeting, but given the length and complexity of the document, these comments do not represent a fully comprehensive set of the questions and concerns that we have. As we continue to dig into the Guidance document and explore the ramifications for the project portfolios and other tracking and reporting requirements, we anticipate that we will have further comments.

Note that our comments are divided into overall questions/concerns (numbered 1 – 10) and a number of technical questions/concerns contained in an appendix.

We also have the following observations:

- Our ongoing dialogue has produced a new basis for restoration requirements in the new permits that the group supports, namely, MEP-driven restoration portfolios. However, the group is concerned about seemingly contradictory statements from MDE about stormwater permitting progress in future years. Considerable local effort has already gone into the development of the MEP restoration portfolios and further efforts will be needed to supply the revisions requested by MDE. Will MDE confirm in writing that you are committed to using the MEP restoration portfolios to set restoration requirements under the new permits? (This was another one of the requests we made in the Oct. 29, 2019, letter.) As noted in a separate email conversation, the ability of the five largest MS4s to meet a mid-March deadline for revising their portfolios depends upon how quickly MDE can answer our questions and address our comments.

- However, the level of detail in the Guidance and its importance in quantifying restoration metrics in the new permits is such that the flexibility to make changes and fix problems on a continual basis must be built into the permitting process. Otherwise, it will be difficult to meet MDE's timetable for issuing final permits.

- Some of these BMPs and options are brand new. We won't know if there are issues in the guidance for these BMPs until we actually implement these BMPs and use the guidance in the real world. What mechanism will be provided to address issues discovered in the guidance during the permit term?

Also, as usual, although the comments represent a group consensus, the MS4 permittees may comment separately on the Guidance.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

2019 Guidance Document Fatal Flaw Questions and Comments

Applicability – when do we use old values and when do we use new values

1. The group's understanding from the accounting principles and portfolio guidance MDE provided in April 2019 was that credit for projects designed to meet any unmet obligation from the existing permit's 20-percent impervious surface restoration requirement would be based on the 2014 Accounting Guidance and the old Chesapeake Bay Program watershed model (WSM Version 5.3.2) calculations. Restoration work following completion of the 20-percent requirement would be credited using the updated accounting principles and the new CBP WSM Version 6.

   However, MDE's October 2019 Accounting Principles and the 2019 Accounting Guidance do not mention any transition of accounting. MDE needs to provide clear guidance not only on when to use either the 2014 Guidance/5.3.2 WSM or the 2019 Guidance/6.0 WSM, but also on when individual BMPs are added to or removed from the MS4 toolbox. Without an orderly process for making these transitions, MDE could put MS4 jurisdictions in the position of having invested limited funds in BMPs that wind up receiving less credit than originally anticipated. (This comment combines the concerns of comment #s 3 and 4 in the 10/29/19 MACO letter to MDE, which have still not been addressed.)

Here are some examples of this issue:

   a. At the end of the Generation 4 Permit term (e.g. February 2019), a local jurisdiction claimed nutrient credits (via trading) to achieve full compliance with the 20% ISR requirement. The local jurisdiction continues implementing restoration BMPs for IA and/or EIA credits and will use those credits (during the administratively continued timeframe of the Gen4 permit and during the Gen5 permit cycle) to replace the nutrient credits claimed via trading at the end of the Gen4 permit term).

      Which crediting mechanism -- 2014 Guidance/5.3.2 WSM or the 2019 Guidance/6.0 WSM -- should the jurisdiction use to calculate the IA or EIA credits until the 20% ISR compliance is achieved?

      Which crediting mechanism should be used to calculate the pollutant load reductions achieved?

      If the crediting mechanism is the 2019 Guidance/6.0 WSM, then the way the credits are calculated appears to lead to situations in which the amount of structural practices needed to replace trades is greater than the amount that would have been required to meet the 20% ISR compliance under the Gen4 permit. Would MDE consider allowing jurisdictions to redeem trading credits either

through the 2019 Guidance/6.0 WSM or through a direct replacement of the amount of impervious area to be treated.

b. Please confirm that we have a correct understanding of how credit for an annual practice, used to meet part of a jurisdiction's 20% ISR requirement under its Gen4 permit, will be calculated.

The jurisdiction's street sweeping program was implemented under its Gen4 permit and was used to help meets its 20% ISR restoration goal and Bay TMDL pollutant reductions. The jurisdiction calculated credits for street sweeping based on the mass-loading approach (2014 Guidance/5.3.2 WSM). After its Gen5 permit is in effect, the jurisdiction will calculate and submit credit for its street sweeping program based on the 2019 Guidance/6.0 WSM. However, even though a different amount of ISR credit and pollutant reductions will be calculated for the street sweeping program based on the 2019 Guidance/6.0 WSM, as long as the jurisdiction maintains the same level of programmatic effort, it will remain in compliance and maintain the same levels of ISR restoration and pollutant reduction credit, as previously claimed under the Gen4 permit.

Grandfathering

2. For projects that are incomplete prior to issuance of the 2019 Guidance Document and/or the Gen5 permit (e.g. at 60-percent design or under construction), we recommend that crediting be based on the mechanism in place when the project was started, i.e. the 2014 Guidance/5.3.2 WSM.

    a. When is the cut-off date by which all restoration projects shall be credited using the 2019 Guidance/6.0 WSM?
    b. Are all projects completed prior to issuance of the Gen5 permit credited using the 2014 Guidance/5.3.2 WSM.?

3. Can jurisdictions use the loading rates from the nutrient trading guidance (which are lower than the loading rates in Section VII of the 2019 Guidance) in calculating EIA until the 20% restoration has been met?

Impervious Area Baseline

4. The 2019 Guidance does not address updating the impervious surface area baseline. Is it MDE's expectation that the baseline will be updated for the new permit?

5. When and how can we modify baseline IA conditions that may reflect changes in land ownership (federal and state) and other NPDES permit issuance (such as industrial)? Will treatment facilities installed prior to 2010 that may be documented by as-built documents that are still being received count for baseline IA revisions?

Incentivizing Stormwater Management Co-Benefits

6. There continues to be a lack of clarity concerning the new credits for green stormwater infrastructure and watershed management. We understand that the addition of these credits was intended to help account for co-benefits that might not otherwise be quantified, but they are completely new credits and additional clarification is needed for MS4s to be comfortable committing to higher restoration targets. (This was comment 6 in the 10/29/19 MACO letter to MDE, which has still not been addressed.)

Loading Rate Changes

7. Please explain why the loading rates in the 2019 guidance are so different from the 2010 No Action Loading Rates that were provided to the Accounting Update Workgroup in September 2018. (*See table below.*) Is this the result of disaggregating and adding the stream bed and bank load to each load source?

   We are concerned that using unit loads that are different from the Phase 6 unit loads to calculate IA credit will require MS4s to calculate, track and report two different sets of project benefits, one that complies with MDE guidance and one that is consistent with the Bay TMDL. It also appears that some of the BMP efficiencies may be different from Phase 6 as well, but this concern is difficult to verify because they are presented in pounds removed in Table 1 of the 2019 guidance whereas most of the practices were presented in terms of percent efficiency in the 2014 guidance. (This was comment 4 in the 10/29/19 MACO letter to MDE, which still not been addressed.)

Load Source	2019 Accounting Guidance, Table 4 Statewide EOS Urban Unit Load (lbs/acre/yr)			2018 Accounting Update Workgroup, Phase 6 2010 No Action Loading Rates (Individual EOS, lbs/acre/yr)		
	TN	TP	TSS	TN	TP	TSS
Aggregate Impervious	20.09	2.55	8,474	14.86	0.73	1,757
Non-road Impervious	N/A	N/A	N/A	13.56	0.68	1,747
Impervious Road	35.79	6.95	17,328	17.46	0.84	1,768
Mixed Open	8.15	1.59	1,414	2.04	0.27	898
Septic	16.66	0.00	-	11.14	0	0
Tree Canopy over Impervious	32.75	6.19	16,115	15.57	0.72	1,778
Turf	13.35	2.12	1,414	9.80	1.05	619
Tree Canopy over Turf	10.18	1.62	1,332	7.15	0.79	532
True Forest	2.28	0.32	719	1.43	0.05	32
Total Urban	12.89	1.46	3,306	N/A	N/A	N/A

Ignoring BMP Impacts on Pervious Area

8. Equation 4 in the 2019 Guidance Document indicates that pollutant load reductions calculated for upland BMPs are based solely on the impervious surface within a BMP drainage area:

Equation 4
*Load Reduction (lbs/yr) = [Urban Unit Load (lbs/acre/yr) * [Impervious Surface in BMP Drainage Area (acres)] * [BMP Efficiency/100] * [Phase 6 Modeling Segment Delivery Factor]*

This approach underestimates the load reductions provided by a BMP, as it ignores the pervious surfaces (e.g., turf) that may also be part of a drainage area with loads (i.e., unit loads presented in Table 4 of the 2019 Guidance Document) that are reduced by the BMP. In the table below, the example drainage area is ~25% impervious (i.e., pollutant load reductions for 75% of the drainage area are not being accounted for, based on Equation 4).

Pollutant	Credits (All P6 Land Use Types)	Credits (Impervious Only - per 2019 Guidance Equation 4)	Credit Unaccounted for under 2019 Guidance (All Land Uses – Impervious Only)
TN	377.42 lbs	163.9 lbs	213.5 lbs
TP	35.95 lbs	13.01 lbs	22.94 lbs
TSS	39,188.4 lbs	24,309.7 lbs	14,878.7 lbs

a. May jurisdictions submit pollutant load reductions that account for all of the land uses within a BMP drainage area?
b. There are concerns that relying solely on IA to calculate pollutant removals will underestimate project benefits and will require MS4s to calculate, track and report two different sets of project benefits, one that complies with MDE guidance and one that is consistent with the Bay TMDL? (This was detailed comment 20 in the 10/29/19 MACO letter to MDE, which has still not been addressed.)
c. Jurisdictions have impervious surface and land cover layers that are often of a higher resolution than those used as inputs for CBP WSM Phase 6. May a jurisdiction use its own land cover dataset if it is more accurate than the ones used in CBP WSM Phase 6?

Miscellaneous

9. If a jurisdiction exceeded the 20% goal in the Gen4 permit, can the exceedance be "credited" towards the Gen5 permit? If so, which accounting guidance method should be used for ISR?

10. For local TMDLs (nutrients and sediment), looking at the cumulative BMPs installed, should the same guidance be used for BMP type?

Technical Appendix

Re Stormwater Management Practices

1. SPSC/RSC: Please confirm in guidance that these count as both SWM facility credit AND outfall stabilization, as per page 14 of the USWG memo

   https://chesapeakestormwater.net/wp-content/uploads/dlm_uploads/2019/10/FINAL-APPROVED-OUTFALL-RESTORATION-MEMO-101519.pdf.

2. III.2. Nonstructural Practices. What does "% disconnected" mean? Is this meant to be the same as applying Chapter 5 to determine PE provided via disconnection (e.g. PE 0.5 = 50% disconnected)? Or is this something different from chapter 5?

3. Table 3 refers to the adjustor curves. Please confirm that the adjustor curves are the same as the revised CBP expert panel equations from 2016. Can you provide the formula used to extrapolate beyond 2.5"? The polynomial equations that replaced the curves in the expert panel are shown below.

TP	RR	$y = 0.0304x^5 - 0.2619x^4 + 0.9161x^3 - 1.6837x^2 + 1.7072x - 0.0091$
	ST	$y = 0.0239x^5 - 0.2058x^4 + 0.7198x^3 - 1.3229x^2 + 1.3414x - 0.0072$
TN	RR	$y = 0.0308x^5 - 0.2562x^4 + 0.8634x^3 - 1.5285x^2 + 1.501x - 0.013$
	ST	$y = 0.0152x^5 - 0.131x^4 + 0.4581x^3 - 0.8418x^2 + 0.8536x - 0.0046$
TSS	RR	$y = 0.0326x^5 - 0.2806x^4 + 0.9816x^3 - 1.8039x^2 + 1.8292x - 0.0098$
	ST	$y = 0.0304x^5 - 0.2619x^4 + 0.9161x^3 - 1.6837x^2 + 1.7072x - 0.0091$

Documentation can be found at the following link:

http://chesapeakestormwater.net/wp-content/uploads/dlm_uploads/2013/10/Revised-Perf-Standards-and-Retrofits_FAQ-Document_052515.pdf

4. "If an MS4 jurisdiction performs these calculations on its own, it must provide to the Department all supplemental information required to ensure that the pollutant load reductions are correct." Does this language refer only to nutrient trading program purposes? Or for all MS4 accounting purposes? And what is the supplemental information required?

5. Why did some of the BMPs change from ST to RR (submerged gravel wetland and wet swale) or RR to ST (infiltration trench and infiltration basin) between 2014 and 2019 guidance documents?

Re Alternative Practices

Stream Restoration

1. The 2019 Guidance does not mention the impervious area cap for stream restoration projects described in MDE's April 2019 memorandum. Is the cap no longer in effect? If, so, please confirm in writing. (This was comment 5 in the 10/29/19 MACO letter to MDE, which has still not been addressed.)

2. MDE must find a way to allow grandfathering of projects begun prior to the requirement that all projects must use the individual site-specific values prior to reporting nutrient, sediment and IA credit. If the pre-data has not been collected, the new protocols cannot be used. This is an example of the larger concern raised in Comment 1 above.

3. The guidance should establish a minimum length for outfall repairs that require the use of protocol #5. Smaller project credits would be calculated using the planning rate.

4. An example of stream restoration credits should be included in the appendix.

Shoreline Erosion

Please confirm that, if pollutant load reductions based on shoreline restoration protocols are available for a shoreline project, IA credit may be calculated based a site-specific EIA_f (i.e., in the same manner as we would calculate IA credit for a stream restoration project, based on protocol pollutant load reductions).

Storm Drain Cleaning

Load reductions and EIA_f are separated into organic and inorganic material removed. Will MDE require that jurisdictions parse removed materials (by mass) into organic and inorganic material? It would be preferable to either develop a separate set of values for load reductions and EIA when the loads are not separated or should allow jurisdictions to visually determine the predominant material type and apply the associated load reductions and EIA_f.

Trees

MDE's proposed guidance for street trees and urban tree canopy expansion contains fatal flaws, which if left uncorrected will encourage MS4 permittees to curtail or even eliminate street and urban tree canopy projects. The flaws are described below, followed by a recommendation to fix the flawed guidance.

Flaws:

- **Assumptions used by CBP's expert panel to arrive at 300 trees per acre underestimate urban tree canopy land cover change for many existing urban tree planting programs**
  MDE's guidance states urban trees will receive 1 acre of land cover conversion per 300 urban trees planted, and also requires inspections at least once every three years. The 1

acre per 300 tree figure is part of the CBP expert panel report on urban tree canopy. However, that figure is based on a series of assumptions that do not hold true for all tree planting programs: an assumed mortality rate of 5% per year (or 37% over 10 years), no replanting/replacement of dead trees, 1" DBH at planting, and an equal mix of "large" and "medium" deciduous trees. If a tree planting program replaces dead trees, plants more "large" than "medium" deciduous trees, or plants trees >1" DBH, the CBP expert panel will underestimate the urban tree canopy land cover added per tree planted. Additionally, the small restoration credit in the guidance does not reflect the important co-benefits provided by street trees, which include mitigation of urban heat island (climate change resiliency) and carbon sequestration. Any urban tree planting program that provides higher quality plantings that the CBP expert panel assumptions will be under-credited by the new MDE guidance, discouraging MS4 permittees from expending the additional funds and staff time necessary to support higher quality urban tree plantings.

- **The urban tree planting BMP guidance is a deviation from existing State policy on planting densities.**

  Maryland's Department of Natural Resources established standard planting densities in the 1991 State Forest Conservation Manual and subsequent revisions. On page A-19 of the current (1997) manual, Figure A:18 sets planting standards by size class and includes:

  - 700 seedlings/acre,
  - 350 whip/acres,
  - 200 1" caliper/acre, or
  - 100 2" caliper/acre.

  The above planting densities are well established, considered standard throughout Maryland, and incorporated into many planting programs. These planting densities are used to implement the Forest Conservation Act, and are therefore a critical component of Maryland's Chesapeake Bay WIP. If the mortality assumption is removed from the CBP expert panel's loading rate calculation, these densities are similar to expert panel's recommendations (190 1" DBH urban trees/acre or urban tree canopy). We recommend using existing State standards when determining the amount of trees required to convert one acre of land from turf to forest or urban tree canopy.

It is unreasonable to require inspections/maintenance of trees if using the expert panel report planting density, because the expert panel report assumes no inspections and no replacement of dead trees.

Inspections will identify which trees have survived and which were lost to mortality. If inspections are required, there is no need to apply a mortality rate assumption to set the acres of urban tree canopy land cover change per urban tree planted. If inspections are required, the BMP credit should be increased above 300 trees per acre of land cover change, reflecting zero mortality rate. If no inspections are required, a mortality assumption is reasonable to include in the rate of land cover change per tree planted. The guidance MDE proposes (requiring inspections) discourages permittees from engaging in tree giveaways or other tree planting programs where subsequent inspection cannot be guaranteed, as any credit gained will be lost if

inspections cannot be performed.

Need clear definition of what separates a "street tree" BMP from an "urban tree canopy expansion" BMP.
MDE's guidance describes "street trees" and "urban tree canopy expansion", and provides very different impervious surface and pollutant load crediting for these two BMPs. It is also not clear which CBP land cover category "urban tree canopy expansion" represents: is it tree canopy over pervious, tree canopy over impervious, or some blend of both? Because "street trees" receive no pollution load reductions, and load reductions for "urban tree canopy" appear to depend on "over Impervious" vs "over Turf", it is critical that MS4 permittees understand what MDE's definitions of these BMPs are.

Table 4 of the guidance document indicates that "Tree Canopy Over Impervious" will have a higher load than "Aggregate Impervious," indicating that planting trees could in effect increase loads in certain situations.

Table 4. Statewide Edge-of-Stream Urban Unit Load Summary

Load Source[1]	Statewide EOS Urban Unit Load (lbs/acre/yr)		
	TN	TP	TSS
Aggregate Impervious	20.09	2.55	8,474
Impervious Road	35.79	6.95	17,328
Mixed Open	8.15	1.59	1,414
Septic	16.66	0.00	0.00
Tree Canopy over Impervious	32.75	6.19	16,115
Turf	13.35	2.12	1,414
Tree Canopy over Turf	10.18	1.62	1,332
True Forest	2.28	0.32	719
Total Urban	12.89	1.46	3,306

Note
[1] For more information on Load Sources in the Phase 6 Model, see Appendix B.

Recommendations:
Many, if not all, existing urban tree planting programs are discouraged by MDE's new guidance. This issue was discussed by the guidance committee convened by MDE. In general, there was support for 100 trees per acre with inspections, because the permittees and environmental NGOs both like high quality tree planting programs. To resolve the fatal flaws identified above, we recommend the following:

- Provide permittees with two options for urban tree planting BMPs:
    - Urban tree canopy planting with maintenance. These are urban tree planting programs where inspection and maintenance is arranged for in advance, and carried out by professionals. 100 trees per acre of land cover conversion, inspections required and reported to MDE. This crediting is in line with existing planting density requirements set by DNR's Forest Conservation Manual.
    - Urban tree canopy planting with no maintenance (e.g. tree giveaways). These are urban tree planting programs where inspection and maintenance by professionals is not expected, and CBP's mortality rates may be reasonable to apply. 300 trees per acre of land cover conversion, no inspections required or reported to MDE.

- Provide clear definitions of "street tree" and "urban tree canopy expansion" BMPs, emphasizing what distinguishes these BMPs from each other. Clarify how "urban tree canopy expansion" relates to "tree canopy over turf" and "tree canopy over impervious" land covers, and consider providing two separate BMPs for urban trees that will primarily cover turf vs impervious.

IDDE

1. If IDDE credit records change in measured TSS concentrations in the water, can that measured reduction be included in the ISR calculation? The expert panel didn't provide TSS default measures, but they weren't considering ISR conversions and the arbitrary formula of dividing by 3 even though two pollutant reductions were being calculated.

2. Why does reported vs. discovered discharges matter? A documented discharge elimination is a documented discharge elimination. The pollution impacts are identical. And they take about the same level of effort to document and actually get fixed. Just because someone else reported it doesn't mean it is easy to locate the problem, as Baltimore County has demonstrated to MDE during 2019. The county has always used public input as part of their IDDE approach. The benefits of including citizen reports of illicit discharge are:
   - Allows larger areas of the county to be covered considering limited county staff
   - Gets county citizens involved in their community
   - County resources are used more efficiently
   - The number of IDDE problems addressed increases thus providing increased benefit to the bay.

   By excluding elimination of reported discharges from restoration crediting, MDE is discouraging permittees from seeking citizen reports of pollution problems, and discounting the benefits described above.

3. There should not be a cap on IDDE credit claimed. The cap proposed has three issues:
   - No cap is applied by the CBP expert panel. What science does MDE have to support the cap that the expert panel did not have?
   - The cap is based on assumptions about the pollution load from illicit discharges. Individual IDDE credits are based on before/after documentation of actual pollution loads from individual specific illicit discharges. Assumptions should not overrule real observational data.
   - The assumptions behind the cap are for average urban areas throughout the Chesapeake Bay watershed. No individual area will be the same as this average. The relationship between dry weather pollution loads and pervious land cover are not the same across urban areas, e.g. dense cities vs exurban suburbs. The age and quantity of public and private infrastructure and commercial/industrial areas has more to do with illicit discharge pollution loads than the acreage of pervious areas, and these factors vary widely across the Chesapeake Bay watershed (e.g. City of Baltimore vs Reston VA vs

Shrewsbury PA). Thus, the assumptions that form the basis for the cap are biased for/against different permittees.

Floating Treatment Wetlands

Table 8 "Load Reduced" columns do not equal Appendix C efficiencies multiplied by one acre of impervious surface. Appendix C efficiencies result in larger "load reduced" than shown in Table 8, therefore EIA_f should be larger.

table 8 vs table 4 + Appendix C discrepancy

BMP	% coverage	TN	TP	TSS	EIAf
FTW5	50%	(0.27)	(0.08)	(636.88)	(0.045)
FTW4	40%	(0.17)	(0.08)	(558.66)	(0.036)
FTW3	30%	(0.28)	(0.06)	(362.18)	(0.029)
FTW2	20%	(0.18)	(0.03)	(268.70)	(0.019)
FTW1	10%	(0.10)	(0.03)	(93.48)	(0.010)

Septic

1. Differential loading for CBCA, 1000' stream buffer, and upland is gone from the MS4 guidance. However, BRF funding remains prioritized for the CBCA. Is this BRF grant funding preference due to CBWM delivery factors, increased septic loading due to groundwater tables, or both? If the first, MS4 guidance squares, but if not, the MS4 guidance should really match.

2. For septic pumping, the five-year credit received in the last permit did not require an inspection program, but the new Guidance requires an inspection program. Jurisdictions generally do not have inspection programs for septics, except for those paid for by the BRF. Since these five-year practices would have to be continued at the same level of effort as the previous permit or replaced to meet permit requirements, does this mean that the county would have to implement an inspection program or lose credit?

3. If replacement is pursued, in what year of the permit would these practices need replacement? If credit is discontinued because a program no longer meets the Guidance requirement, how much pollutant load reduction would have to be replaced, since the septic practices receive no pollutant credits?

4. For septic pump-outs, is there any guidance for “what needs to be included for inspection”? Will jurisdictions need to submit something to be approved by MDE? Could the inspection

program be a check in GIS to verify the property is still served by septic Y or N, something similar to ESDs?

5. How are the EIA numbers calculated for each of the alternative practices, in particular for septic pumping.? Without seeing the numbers, one cannot check that the conversion has been done correctly. Appendix C only discusses loads.

Street Sweeping

Sweeping of streets and parking lots that lack curb and gutter but are served by storm drains should count. Storm drain systems in parking lots and roads without curb and gutter have been engineered and designed so the runoff of these areas is collected in the storm drain system and then piped to an outfall. It only makes sense that a street sweeping practice of the curb-less areas designed with storm drains is providing reductions in TN, TP, and TSS. Credit should be given to such practices because the ultimate goal is to reduce pollutants to the Bay. While they might provide a small amount of reduction, the amount should still be credited.

From: "Jennifer M. Smith - MDE" <jenniferm.smith@maryland.gov>
Sent: Mon, 3 Feb 2020 15:42:29 +0000
To: "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Erik Michelsen" <pwmich20@aacounty.org>; "Stevens, Amy" <Amy.Stevens@montgomerycountymd.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>
Subject: MEP Portfolio Update Letter from Lee Currey dated January 31, 2020

[THIS EMAIL IS FROM AN EXTERNAL SENDER]

Rob, Erik, Amy and Kim,

You have brought to my attention that there is a mistake in the letter from Lee Currey that was sent out to you on Friday, January 31, 2020 regarding the MEP project portfolio updates. MDE did not intend to include an attachment with that letter for further information on how to update the MEP project portfolios. However, we will review the questions and comments received by you on the *2019 Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* guidance and will follow up with responses that should assist in preparing the updated MEP project portfolios.

Please let me know if you have any questions.

Thanks,

Jennifer

--

CHANGING Maryland FOR THE BETTER

Jennifer M. Smith
Program Manager, Sediment, Stormwater, and Dam Safety Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
jenniferm.smith@maryland.gov
410-537-3561 (O)

Website | Facebook | Twitter

Click here to complete a three question customer experience survey.Jennifer M. Smith, P.E.

Click here to complete a three question customer experience survey.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Tue, 18 Feb 2020 14:34:46 +0000
To: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "jgmaldonado@co.pg.md.us" <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen D. Wiggen" <WiggenK@charlescountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>
Cc: "Janis Markusic" <pwmark02@aacounty.org>; "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "Joiner, Jeremy" <JJoiner@FrederickCountyMD.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "Richmond, Mark S" <msrichmond@howardcountymd.gov>; "Lowe, Christine" <cslowe@howardcountymd.gov>; "ProctorP@CharlesCountyMD.gov" <ProctorP@CharlesCountyMD.gov>; "Heyn, Chris" <cheyn@carrollcountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Mishra, Sudhanshu" <SPMishra@co.pg.md.us>
Subject: FW: MS4 group comments on 2019 Accounting Guidance
Attachments: MACo MS4 Comments 02_14_2020.pdf, 2019 Guidance Document Questions and Comments.final.Jan31.2020.pdf

From: Raymond Bahr -MDE- <raymond.bahr@maryland.gov>
Sent: Friday, February 14, 2020 3:53 PM
To: Karl Berger <kberger@mwcog.org>
Cc: Lee Currey -MDE- (lee.currey@maryland.gov) <lee.currey@maryland.gov>; Jennifer Smith -MDE- <jenniferm.smith@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>; Jeff White -MDE- <jeff.white@maryland.gov>
Subject: Re: MS4 group comments on 2019 Accounting Guidance

Hi Karl,

Thank you for coordinating the MS4 comments on the guidance document.

Please find attached the Department's answers for your information and use.

Have a great weekend!

Ray

On Fri, Jan 31, 2020 at 1:03 PM Karl Berger <kberger@mwcog.org> wrote:

Lee,

Attached is a set of the MS4 Phase I group's comments on the Dec. 23, 2019, Accounting Guidance document that was circulated by MDE. In some cases, we directly recommend changes. In others, we ask for confirmation of how MDE will treat certain situations. Many of these still stem from concerns we expressed in our Oct. 29, 2019, letter from MACo. Until they are addressed, they represent fatal flaws in the document under the basis for our comments that you discussed at our Jan. 16, 2020, meeting.

The Phase I managers have done their best to meet the Jan. 31 date for submitting these comments that was discussed at our Jan. 16 meeting, but given the length and complexity of the document, these comments do not represent a fully comprehensive set of the questions and concerns that we have. As we continue to dig into the Guidance document and explore the ramifications for the project portfolios and other tracking and reporting requirements, we anticipate that we will have further comments.

Note that our comments are divided into overall questions/concerns (numbered 1 – 10) and a number of technical questions/concerns contained in an appendix.

We also have the following observations:

- Our ongoing dialogue has produced a new basis for restoration requirements in the new permits that the group supports, namely, MEP-driven restoration portfolios. However, the group is concerned about seemingly contradictory statements from MDE about stormwater permitting progress in future years. Considerable local effort has already gone into the development of the MEP restoration portfolios and further efforts will be needed to supply the revisions requested by MDE. Will MDE confirm in writing that you are committed to using the MEP restoration portfolios to set restoration requirements under the new permits? (This was another one of the requests we made in the Oct. 29, 2019, letter.) As noted in a separate email conversation, the ability of the five largest MS4s to meet a mid-March deadline for revising their portfolios depends upon how quickly MDE can answer our questions and address our comments.

- However, the level of detail in the Guidance and its importance in quantifying restoration metrics in the new permits is such that the flexibility to make changes and fix problems on a continual basis must be built into the permitting process. Otherwise, it will be difficult to meet MDE's timetable for issuing final permits.

- Some of these BMPs and options are brand new. We won't know if there are issues in the guidance for these BMPs until we actually implement these BMPs and use the guidance in the real world. What mechanism will be provided to address issues discovered in the guidance during the permit term?

Also, as usual, although the comments represent a group consensus, the MS4 permittees may comment separately on the Guidance.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

Maryland Department of the Environment Response to Comments Submitted by the MS4 Community on the 2019 Accounting Guidance

February 14, 2020

Comment:

Applicability – when do we use old values and when do we use new values

1. The group's understanding from the accounting principles and portfolio guidance MDE provided in April 2019 was that credit for projects designed to meet any unmet obligation from the existing permit's 20-percent impervious surface restoration requirement would be based on the 2014 Accounting Guidance and the old Chesapeake Bay Program watershed model (WSM Version 5.3.2) calculations. Restoration work following completion of the 20-percent requirement would be credited using the updated accounting principles and the new CBP WSM Version 6.

   However, MDE's October 2019 Accounting Principles and the 2019 Accounting Guidance do not mention any transition of accounting. MDE needs to provide clear guidance not only on when to use either the 2014 Guidance/5.3.2 WSM or the 2019 Guidance/6.0 WSM, but also on when individual BMPs are added to or removed from the MS4 toolbox. Without an orderly process for making these transitions, MDE could put MS4 jurisdictions in the position of having invested limited funds in BMPs that wind up receiving less credit than originally anticipated.

Response:

All permittees with unmet restoration obligations from the previous permit term will be settled independently between the MS4 permittee and the Department. For permittees that completed the 20% restoration requirement, the Maryland Department of the Environment (Department) determined that the most scientific approach is in synching-up all new MS4 BMP implementation with the Phase 6 Chesapeake Bay Watershed Model as soon as possible. Thus, all nutrient credits, annual BMPs, or additional BMP implementation (i.e., > the 20% impervious acre restoration requirement) shall be credited in accordance with the 2019 Accounting Guidance. The following explains how to transition from the 2014 Accounting Guidance to the 2019 Accounting Guidance.

1) For an MS4 that acquired nutrient credits to meet its 20% impervious acre restoration requirement, the Department shall require the same number of nutrient credits, expressed in lbs of TN, TP, and TSS, to be continued in its new permit. The MS4 must:
   - Continue to acquire the same amount of nutrient credits that it acquired under its previous permit, until those credits are replaced by BMP implementation; and
   - Replace all nutrient credits acquired under its previous permit with an equal amount of nutrient reductions during its new permit term with BMPs in accordance with the 2019 Accounting Guidance.

Example:
County A acquired 100 lbs of TN, 20 lbs of TP, and 5 lbs of TSS through the trading program to meet the previous permit's 20% impervious surface restoration requirement. County A must continue to acquire 100 lbs of TN, 20 lbs of TP, and 5 lbs of TSS annually through the trading program until replaced with a BMP(s). The BMP(s) will be credited using the 2019 Accounting Guidance. The equivalent impervious acres (EIA) required to be treated with the new BMP(s) shall be determined using the 2019 Accounting Document.

$$\frac{\left[\left(\frac{100\ lbs\ TN}{17.81\ lbs/acre}\right)+\left(\frac{20\ lbs\ TP}{2.23\ lbs/acre}\right)+\left(\frac{10{,}000\ lbs\ TSS}{7{,}756\ lbs/acre}\right)\right]}{3}=5.3\ impervious\ acres$$

2) For an MS4 that used annual BMPs to meet a portion of its 20% impervious acre restoration requirement, the same level of BMP implementation must continue during its next permit term, or be replaced by another BMP. While the impervious acre equivalency or pollutant load reductions will likely change under the 2019 Accounting Guidance, it will be critical for the MS4 to document that the same level of BMP implementation is occurring so that it can be verified by the Department.

   Example:
   County A implements 1,000 lane miles of street sweeping as an annual BMP under its previous permit to meet its 20% impervious surface restoration requirement. County A must continue to implement 1,000 lane miles of street sweeping throughout the life of the next permit term. If replaced with a BMP(s), County A would use the EIA calculation for 1,000 lane miles of street sweeping from the 2019 Accounting Guidance.

3) For an MS4 that met its 20% impervious acre restoration requirement in accordance with the 2014 Accounting Guidance, all subsequent BMPs (i.e., beyond the 20% requirement) and impervious acre crediting shall be in accordance with the 2019 Accounting Guidance.

Comment:

Here are some examples of this issue:

a. At the end of the Generation 4 Permit term (e.g. February 2019), a local jurisdiction claimed nutrient credits (via trading) to achieve full compliance with the 20% ISR requirement. The local jurisdiction continues implementing restoration BMPs for IA and/or EIA credits and will use those credits (during the administratively continued timeframe of the Gen4 permit and during the Gen5 permit cycle) to replace the nutrient credits claimed via trading at the end of the Gen4 permit term).

Which crediting mechanism -- 2014 Guidance/5.3.2 WSM or the 2019 Guidance/6.0 WSM -- should the jurisdiction use to calculate the IA or EIA credits until the 20% ISR compliance is achieved?

Which crediting mechanism should be used to calculate the pollutant load reductions achieved?

If the crediting mechanism is the 2019 Guidance/6.0 WSM, then the way the credits are calculated appears to lead to situations in which the amount of structural practices needed to replace trades is greater than the amount that would have been required to meet the 20% ISR compliance under the Gen4 permit. Would MDE consider allowing jurisdictions to redeem trading credits either through the 2019 Guidance/6.0 WSM or through a direct replacement of the amount of impervious area to be treated.

Response: In all instances the 2019 Accounting Guidance must be used. The impervious acre credit for a structural practice is based on treating 1 inch of rainfall for water quality for both the 2014 and 2019 Accounting Guidance documents, so the impervious acre credit will be the same.

Comment:

b. Please confirm that we have a correct understanding of how credit for an annual practice, used to meet part of a jurisdiction's 20% ISR requirement under its Gen4 permit, will be calculated.

Response: Permittees must use the 2014 Accounting Guidance for calculating credit toward its fourth generation permit.

Comment:

The jurisdiction's street sweeping program was implemented under its Gen4 permit and was used to help meets its 20% ISR restoration goal and Bay TMDL pollutant reductions. The jurisdiction calculated credits for street sweeping based on the mass-loading approach (2014 Guidance/5.3.2 WSM). After its Gen5 permit is in effect, the jurisdiction will calculate and submit credit for its street sweeping program based on the 2019 Guidance/6.0 WSM. However, even though a different amount of ISR credit and pollutant reductions will be calculated for the street sweeping program based on the 2019 Guidance/6.0 WSM, as long as the jurisdiction maintains the same level of programmatic effort, it will remain in compliance and maintain the same levels of ISR restoration and pollutant reduction credit, as previously claimed under the Gen4 permit.

Response: For an MS4 that used annual BMPs to meet a portion of its 20% impervious acre restoration requirement, the same level of BMP implementation must continue during its next permit term, or be replaced by another BMP. While the impervious acre equivalency or pollutant

load reductions will likely change under the 2019 Accounting Guidance, it will be critical for the MS4 to document that the same level of BMP implementation is occurring so that it can be verified by the Department. Please see example calculation under scenario number 2) above.

Grandfathering

Comment:

2. For projects that are incomplete prior to issuance of the 2019 Guidance Document and/or the Gen5 permit (e.g. at 60-percent design or under construction), we recommend that crediting be based on the mechanism in place when the project was started, i.e. the 2014 Guidance/5.3.2 WSM.

    a. When is the cut-off date by which all restoration projects shall be credited using the 2019 Guidance/6.0 WSM?
    b. Are all projects completed prior to issuance of the Gen5 permit credited using the 2014 Guidance/5.3.2 WSM.?

3. Can jurisdictions use the loading rates from the nutrient trading guidance (which are lower than the loading rates in Section VII of the 2019 Guidance) in calculating EIA until the 20% restoration has been met?

Response: All projects must use the 2019 Accounting Guidance. For a more detailed explanation, please see the responses above.

Impervious Area Baseline

Comment:

4. The 2019 Guidance does not address updating the impervious surface area baseline. Is it MDE's expectation that the baseline will be updated for the new permit?

Response: The Department does not expect baselines to be updated under the new permit.

Comment:

5. When and how can we modify baseline IA conditions that may reflect changes in land ownership (federal and state) and other NPDES permit issuance (such as industrial)? Will treatment facilities installed prior to 2010 that may be documented by as-built documents that are still being received count for baseline IA revisions?

Response: The Department does not expect baselines to be updated under the new permit.

Incentivizing Stormwater Management Co-Benefits

Comment:

6. There continues to be a lack of clarity concerning the new credits for green stormwater infrastructure and watershed management. We understand that the addition of these credits was intended to help account for co-benefits that might not otherwise be quantified, but they are completely new credits and additional clarification is needed for MS4s to be comfortable committing to higher restoration targets.

Response: The Department can provide additional information on the green stormwater infrastructure (GSI) credit and the watershed management credit. In order to provide more detailed guidance, we ask the MS4 Phase I jurisdictions to provide specific questions for the Department's response.

Loading Rate Changes

Comment;

7. Please explain why the loading rates in the 2019 guidance are so different from the 2010 No Action Loading Rates that were provided to the Accounting Update Workgroup in September 2018. (*See table below*.) Is this the result of disaggregating and adding the stream bed and bank load to each load source?

   We are concerned that using unit loads that are different from the Phase 6 unit loads to calculate IA credit will require MS4s to calculate, track and report two different sets of project benefits, one that complies with MDE guidance and one that is consistent with the Bay TMDL. It also appears that some of the BMP efficiencies may be different from Phase 6 as well, but this concern is difficult to verify because they are presented in pounds removed in Table 1 of the 2019 guidance whereas most of the practices were presented in terms of percent efficiency in the 2014 guidance.

Load Source	2019 Accounting Guidance, Table 4 Statewide EOS Urban Unit Load (lbs/acre/yr)			2018 Accounting Update Workgroup, Phase 6 2010 No Action Loading Rates (Individual EOS, lbs/acre/yr)		
	TN	TP	TSS	TN	TP	TSS
Aggregate Impervious	20.09	2.55	8,474	14.86	0.73	1,757
Non-road Impervious	N/A	N/A	N/A	13.56	0.68	1,747
Impervious Road	35.79	6.95	17,328	17.46	0.84	1,768
Mixed Open	8.15	1.59	1,414	2.04	0.27	898
Septic	16.66	0.00	-	11.14	0	0
Tree Canopy over Impervious	32.75	6.19	16,115	15.57	0.72	1,778
Turf	13.35	2.12	1,414	9.80	1.05	619

Load Source	2019 Accounting Guidance, Table 4 Statewide EOS Urban Unit Load (lbs/acre/yr)			2018 Accounting Update Workgroup, Phase 6 2010 No Action Loading Rates (Individual EOS, lbs/acre/yr)		
	TN	TP	TSS	TN	TP	TSS
Tree Canopy over Turf	10.18	1.62	1,332	7.15	0.79	532
True Forest	2.28	0.32	719	1.43	0.05	32
Total Urban	12.89	1.46	3,306	N/A	N/A	N/A

Response: Yes, the loading rates in the 2019 Accounting Guidance now reflect the additional stream bed and bank (STB) load. Please note that the EIAs and unit loads discussed in fall of 2018 were Draft and have since been updated using refined calculations to provide consistency with the 2014 Accounting Guidance methods. The updated unit loads represent the same load sources as the Phase 5 Model (i.e., terrestrial and stream bed and bank load), and therefore, the Bay TMDL. It is correct that some BMP efficiencies have changed between the Phase 5 and 6 model. All BMP efficiencies can be found in Appendix C of the 2019 Accounting Guidance.

Ignoring BMP Impacts on Pervious Area

Comment:

8. Equation 4 in the 2019 Guidance Document indicates that pollutant load reductions calculated for upland BMPs are based solely on the impervious surface within a BMP drainage area:
   Equation 4
   *Load Reduction (lbs/yr) = [Urban Unit Load (lbs/acre/yr) * [Impervious Surface in BMP Drainage Area (acres)] * [BMP Efficiency/100] * [Phase 6 Modeling Segment Delivery Factor]*

   This approach underestimates the load reductions provided by a BMP, as it ignores the pervious surfaces (e.g., turf) that may also be part of a drainage area with loads (i.e., unit loads presented in Table 4 of the 2019 Guidance Document) that are reduced by the BMP. In the table below, the example drainage area is ~25% impervious (i.e., pollutant load reductions for 75% of the drainage area are not being accounted for, based on Equation 4).

Pollutant	Credits (All P6 Land Use Types)	Credits (Impervious Only - per 2019 Guidance Equation 4)	Credit Unaccounted for under 2019 Guidance (All Land Uses – Impervious Only)
TN	377.42 lbs	163.9 lbs	213.5 lbs
TP	35.95 lbs	13.01 lbs	22.94 lbs
TSS	39,188.4 lbs	24,309.7 lbs	14,878.7 lbs

a. May jurisdictions submit pollutant load reductions that account for all of the land uses within a BMP drainage area?
b. There are concerns that relying solely on IA to calculate pollutant removals will underestimate project benefits and will require MS4s to calculate, track and report two different sets of project benefits, one that complies with MDE guidance and one that is consistent with the Bay TMDL?
c. Jurisdictions have impervious surface and land cover layers that are often of a higher resolution than those used as inputs for CBP WSM Phase 6. May a jurisdiction use its own land cover dataset if it is more accurate than the ones used in CBP WSM Phase 6?

Response: For TMDL accounting purposes, jurisdictions should submit pollutant load reductions that account for impervious as well as urban pervious (turf grass) land uses within a BMP drainage area. The Department's Integrated Water Planning Program (IWPP) is working on guidance that goes into detail on how to account for BMP load reductions for TMDL accounting purposes using the Phase 6 Chesapeake Bay Watershed model. However, the unit loads and calculation procedures outlined within the MS4 Accounting Guidance should be consistent with future IWPP guidance. Jurisdictions may also use higher resolution data to estimate pollutant loads and load reductions for local and Chesapeake Bay TMDLs.

Miscellaneous

Comment:

9. If a jurisdiction exceeded the 20% goal in the Gen4 permit, can the exceedance be "credited" towards the Gen5 permit? If so, which accounting guidance method should be used for ISR?

Response: Yes, and the 2019 Accounting Guidance must be used.

Comment:

10. For local TMDLs (nutrients and sediment), looking at the cumulative BMPs installed, should the same guidance be used for BMP type?

Response: The Department asks for clarification on this question. The meaning of "looking at the cumulative BMPs installed" is unclear. While this guidance is generally consistent in load reduction calculation methodology, IWPP will be coming out with guidance and modeling tools in the near future for jurisdictions to use for planning and tracking progress towards nutrient and sediment TMDLs.

Comment:

11. Confirm opportunity and/or process for revising Guidance as MDE and permittees gain experience with the guidance.

Response: Yes, the Department will provide an opportunity for updating the Guidance as we implement it under the next generation permit. In the last permit term, the Department worked with MS4s in updating credits for stream restoration, outfall stabilization, and continuous monitoring and adaptive control practices, and how to determine BMP as-built and completion dates. The 2019 Accounting Guidance provides additional information on how to credit an enhanced outreach and oversight septic system program and an illicit discharge detection and elimination (IDDE) program. The Department supports the development of new and innovative BMPs and has included a process in the 2019 Accounting Guidance for their approval and crediting.

Comment:

12. We propose a credit for understory plantings that restore urban forests in decline. These understory plantings help ensure that urban forests, unable to regenerate naturally due to pressures from deer and invasives (e.g., emerald ash borer), are in fact able to regenerate and do not decline to an 'Open Urban' land use. One appropriate crediting mechanism is based on the difference between 'Forest' and 'Open Urban' loadings.

Response: The proposed urban forest understory management BMP would require further investigation before the Department allows it to receive restoration credit. There are a number of unknowns about the hydrologic benefits and nutrient/sediment reductions associated with urban forest under-story management. There are also unknowns in regards to the processes and fate of urban forests with an unmanaged understory. In order to receive restoration credit in the future, the BMP proposals would likely need to be tied in with monitoring data and/or a CBP expert panel report. Section VIII-2 of the 2019 Accounting Guidance provides detail on how an MS4 can propose new credits through monitoring. These possibilities can be further discussed with the Department during this permit term.

Technical Appendix

Re Stormwater Management Practices

Comment:

1. SPSC/RSC: Please confirm in guidance that these count as both SWM facility credit AND outfall stabilization, as per page 14 of the USWG memo https://chesapeakestormwater.net/wp-content/uploads/dlm_uploads/2019/10/FINAL-APPROVED-OUTFALL-RESTORATION-MEMO-101519.pdf.

Response: The equivalent impervious acre conversion factor (EIA_f) already considers both the upland and stream bank loads. There is no reason to disaggregate the reductions.

Comment:

2. III.2. Nonstructural Practices. What does "% disconnected" mean? Is this meant to be the same as applying Chapter 5 to determine PE provided via disconnection (e.g. PE 0.5 = 50% disconnected)? Or is this something different from chapter 5?

Response: The disconnection credits are based on the practices found in Chapter 5 of the Design Manual. The rainfall (or P_E) treated by this technique is determined by the ratio of the length of disconnection to the contributing length of the impervious surface. A P_E of 1 inch is treated when this ratio is 1:1 or 100%. Ratios of less than 1:1 are expressed as a % disconnect (e.g., 0.5:1 = 50%).

Comment:

3. Table 3 refers to the adjustor curves. Please confirm that the adjustor curves are the same as the revised CBP expert panel equations from 2016. Can you provide the formula used to extrapolate beyond 2.5"? The polynomial equations that replaced the curves in the expert panel are shown below.

TP	RR	$y = 0.0304x^5 - 0.2619x^4 + 0.9161x^3 - 1.6837x^2 + 1.7072x - 0.0091$
	ST	$y = 0.0239x^5 - 0.2058x^4 + 0.7198x^3 - 1.3229x^2 + 1.3414x - 0.0072$
TN	RR	$y = 0.0308x^5 - 0.2562x^4 + 0.8634x^3 - 1.5285x^2 + 1.501x - 0.013$
	ST	$y = 0.0152x^5 - 0.131x^4 + 0.4581x^3 - 0.8418x^2 + 0.8536x - 0.0046$
TSS	RR	$y = 0.0326x^5 - 0.2806x^4 + 0.9816x^3 - 1.8039x^2 + 1.8292x - 0.0098$
	ST	$y = 0.0304x^5 - 0.2619x^4 + 0.9161x^3 - 1.6837x^2 + 1.7072x - 0.0091$

Documentation can be found at the following link:
http://chesapeakestormwater.net/wp-content/uploads/dlm_uploads/2013/10/Revised-Perf-Standards-and-Retrofits_FAQ-Document_052515.pdf

Response: The Department used the Chesapeake Bay Program (CBP) expert panel's polynomial equations to develop Table 3 and plot the adjustor curves provided in Appendix A. Because there is limited monitoring information above 1 inch of rainfall, the CBP expert panel curves were limited to 2.5 inches. The Department extrapolated values from the equations to extend the curves to 3.0 inches.

Comment:

4. "If an MS4 jurisdiction performs these calculations on its own, it must provide to the Department all supplemental information required to ensure that the pollutant load reductions are correct." Does this language refer only to nutrient trading program purposes? Or for all MS4 accounting purposes? And what is the supplemental information required?

Response: If an MS4 does not use the calculator for MS4 accounting purposes, it will need to provide sufficient information to show that the calculations are correct. The documentation cannot be limited to the output. Example information includes drainage area, P_E, delivery factor, and formulas. Data would depend on the type of BMP.

Comment:

5. Why did some of the BMPs change from ST to RR (submerged gravel wetland and wet swale) or RR to ST (infiltration trench and infiltration basin) between 2014 and 2019 guidance documents?

Response: Submerged gravel wetlands and wet swales are environmental site design (ESD) practices and therefore, use the runoff reduction (RR) curve. Infiltration trenches and infiltration basins were switched to the stormwater treatment (ST) curve so that the Department could provide extra credit for incorporating vegetative features that are considered GSI. These practices cannot receive GSI credit if they are underground. See the footnote in Table 2.

Re Alternative Practices

Stream Restoration

Comment:

1. The 2019 Guidance does not mention the impervious area cap for stream restoration projects described in MDE's April 2019 memorandum. Is the cap no longer in effect? If, so, please confirm in writing.

Response: Yes, there is no longer a stream restoration cap.

Comment:

2. MDE must find a way to allow grandfathering of projects begun prior to the requirement that all projects must use the individual site-specific values prior to reporting nutrient, sediment and IA credit. If the pre-data has not been collected, the new protocols cannot be used. This is an example of the larger concern raised in Comment 1 above.

Response: CBP's current stream restoration expert panel report was published in 2014. This report indicates that stream restoration projects will be credited using the protocol calculations, which require pre-restoration data collection. The Department will allow MS4s to use the planning rate EIA_f for any project with an as-built date prior to January 1, 2020, in order to provide an EIA credit for a project that did not collect the necessary pre-construction data. For any projects built after January 1, 2020, the protocol calculations must be used, and any project that was built without collecting pre-construction data will not receive credit.

Comment:

3. The guidance should establish a minimum length for outfall repairs that require the use of protocol #5. Smaller project credits would be calculated using the planning rate.

Response: The Department will not establish a minimum length for outfall repairs nor allow the planning rate to be used. Pre-monitoring measurements, detailed plans, as-builts, and routine inspections are required to receive this credit. Permittees must follow approved Protocol 5 of the CBP stream restoration expert panel.

Comment:

4. An example of stream restoration credits should be included in the appendix.

Response: The Department will provide additional examples in Appendix F for calculating stream restoration EIAs.

Shoreline Erosion

Comment:

Please confirm that, if pollutant load reductions based on shoreline restoration protocols are available for a shoreline project, IA credit may be calculated based a site-specific EIA_f (i.e., in the same manner as we would calculate IA credit for a stream restoration project, based on protocol pollutant load reductions).

Response: Yes, jurisdictions should use the shoreline protocols to calculate an EIA for all but the non-conforming projects, as defined in the CBP shoreline management expert panel report: chesapeakestormwater.net/bmp-resources/shoreline-management/

Storm Drain Cleaning

Comment:

Load reductions and EIA_f are separated into organic and inorganic material removed. Will MDE require that jurisdictions parse removed materials (by mass) into organic and inorganic material? It would be preferable to either develop a separate set of values for load reductions and EIA when the loads are not separated or should allow jurisdictions to visually determine the predominant material type and apply the associated load reductions and EIA_f.

Response: The 2019 Accounting Guidance instructs MS4s to visually determine the predominant material type (organic or inorganic) and apply the associated EIA_f listed in Table 7. MS4s are not required to more precisely estimate the components unless they choose to.

Trees

Comment:

MDE's proposed guidance for street trees and urban tree canopy expansion contains fatal flaws, which if left uncorrected will encourage MS4 permittees to curtail or even eliminate street and urban tree canopy projects. The flaws are described below, followed by a recommendation to fix the flawed guidance.

Flaws:

- **Assumptions used by CBP's expert panel to arrive at 300 trees per acre underestimate urban tree canopy land cover change for many existing urban tree planting programs**
  MDE's guidance states urban trees will receive 1 acre of land cover conversion per 300 urban trees planted, and also requires inspections at least once every three years. The 1 acre per 300 tree figure is part of the CBP expert panel report on urban tree canopy. However, that figure is based on a series of assumptions that do not hold true for all tree planting programs: an assumed mortality rate of 5% per year (or 37% over 10 years), no

replanting/replacement of dead trees, 1" DBH at planting, and an equal mix of "large" and "medium" deciduous trees. If a tree planting program replaces dead trees, plants more "large" than "medium" deciduous trees, or plants trees >1" DBH, the CBP expert panel will underestimate the urban tree canopy land cover added per tree planted. Additionally, the small restoration credit in the guidance does not reflect the important co-benefits provided by street trees, which include mitigation of urban heat island (climate change resiliency) and carbon sequestration. Any urban tree planting program that provides higher quality plantings that the CBP expert panel assumptions will be under-credited by the new MDE guidance, discouraging MS4 permittees from expending the additional funds and staff time necessary to support higher quality urban tree plantings.

Response: The Department is updating the 2019 Guidance so that 1 acre of urban tree canopy is equivalent to 100 trees planted, if a jurisdiction has a tree maintenance program established. At least 50% of trees must be two inches in diameter or greater (4.5 feet above ground). The tree program must include triennial inspections to ensure a 100% survival rate of trees submitted for credit. The Department recognizes the many co-benefits of tree planting in all forms, but has determined that credits must be based on water quality co-benefits, because this is a Clean Water Act permit. The Department is considering these co-benefits for possible inclusion in future versions of the document.

Comment:

- **The urban tree planting BMP guidance is a deviation from existing State policy on planting densities.**
  Maryland's Department of Natural Resources established standard planting densities in the 1991 State Forest Conservation Manual and subsequent revisions. On page A-19 of the current (1997) manual, Figure A:18 sets planting standards by size class and includes:
  - 700 seedlings/acre,
  - 350 whip/acres,
  - 200 1" caliper/acre, or
  - 100 2" caliper/acre.

  The above planting densities are well established, considered standard throughout Maryland, and incorporated into many planting programs. These planting densities are used to implement the Forest Conservation Act, and are therefore a critical component of Maryland's Chesapeake Bay WIP. If the mortality assumption is removed from the CBP expert panel's loading rate calculation, these densities are similar to expert panel's recommendations (190 1" DBH urban trees/acre or urban tree canopy). We recommend using existing State standards when determining the amount of trees required to convert one acre of land from turf to forest or urban tree canopy.

Response: The Department is updating the 2019 Accounting Guidance so that 1 acre of tree canopy over turf grass or impervious surface ("urban tree canopy" and "street trees") is equivalent to 100 trees planted, if an MS4 has a tree maintenance program established. The tree program must include triennial inspections to ensure a 100% survival rate of trees submitted for credit.

Comment:

It is unreasonable to require inspections/maintenance of trees if using the expert panel report planting density, because the expert panel report assumes no inspections and no replacement of dead trees.
Inspections will identify which trees have survived and which were lost to mortality. If inspections are required, there is no need to apply a mortality rate assumption to set the acres of urban tree canopy land cover change per urban tree planted. If inspections are required, the BMP credit should be increased above 300 trees per acre of land cover change, reflecting zero mortality rate. If no inspections are required, a mortality assumption is reasonable to include in the rate of land cover change per tree planted. The guidance MDE proposes (requiring inspections) discourages permittees from engaging in tree giveaways or other tree planting programs where subsequent inspection cannot be guaranteed, as any credit gained will be lost if inspections cannot be performed.

Response: Please see the previous response regarding revisions to tree plantings in the 2019 Accounting Guidance.

Comment:

Need clear definition of what separates a "street tree" BMP from an "urban tree canopy expansion" BMP.
MDE's guidance describes "street trees" and "urban tree canopy expansion", and provides very different impervious surface and pollutant load crediting for these two BMPs. It is also not clear which CBP land cover category "urban tree canopy expansion" represents: is it tree canopy over pervious, tree canopy over impervious, or some blend of both? Because "street trees" receive no pollution load reductions, and load reductions for "urban tree canopy" appear to depend on "over Impervious" vs "over Turf", it is critical that MS4 permittees understand what MDE's definitions of these BMPs are.

Table 4 of the guidance document indicates that “Tree Canopy Over Impervious” will have a higher load than “Aggregate Impervious,” indicating that planting trees could in effect increase loads in certain situations.

Table 4. Statewide Edge-of-Stream Urban Unit Load Summary

Load Source[1]	Statewide EOS Urban Unit Load (lbs/acre/yr)		
	TN	TP	TSS
Aggregate Impervious	20.09	2.55	8,474
Impervious Road	35.79	6.95	17,328
Mixed Open	8.15	1.59	1,414
Septic	16.66	0.00	0.00
Tree Canopy over Impervious	32.75	6.19	16,115
Turf	13.35	2.12	1,414
Tree Canopy over Turf	10.18	1.62	1,332
True Forest	2.28	0.32	719
Total Urban	12.89	1.46	3,306

Note
[1] For more information on Load Sources in the Phase 6 Model, see Appendix B.

Response: Please see page 13 of the 2019 Accounting Guidance. "Urban Tree Canopy" is defined as a land-use conversion from turf grass to tree canopy over turf grass (i.e., planting trees on turf). "Street Trees" are defined as a land-use conversion from impervious surface to tree canopy over impervious surface. Pollutant load reductions in the numerator of the EIA_f formula for "Urban Tree Canopy" are set equivalent to the delta in unit loads between "Turf" and "Tree Canopy Over Turf". Pollutant load reductions in the numerator of the EIA_f formula for "Street Trees" are set equivalent to the delta in unit loads between "Impervious Road" and "Tree Canopy Over Impervious." This results in load reductions for TN, TP, and TSS. Please see Appendix C, Table 4, and Equation 16 for more details on these calculations.

Comment:

Recommendations:
Many, if not all, existing urban tree planting programs are discouraged by MDE's new guidance. This issue was discussed by the guidance committee convened by MDE. In general, there was support for 100 trees per acre with inspections, because the permittees and environmental NGOs both like high quality tree planting programs. To resolve the fatal flaws identified above, we recommend the following:

- Provide permittees with two options for urban tree planting BMPs:
    - Urban tree canopy planting with maintenance. These are urban tree planting programs where inspection and maintenance is arranged for in advance, and carried out by professionals. 100 trees per acre of land cover conversion, inspections required and reported to MDE. This crediting is in line with existing planting density requirements set by DNR's Forest Conservation Manual.
    - Urban tree canopy planting with no maintenance (e.g. tree giveaways). These are urban tree planting programs where inspection and maintenance by professionals is not expected, and CBP's mortality rates may be reasonable to apply. 300 trees per acre of land cover conversion, no inspections required or reported to MDE.
- Provide clear definitions of "street tree" and "urban tree canopy expansion" BMPs, emphasizing what distinguishes these BMPs from each other. Clarify how "urban tree canopy expansion" relates to "tree canopy over turf" and "tree canopy over impervious" land covers, and consider providing two separate BMPs for urban trees that will primarily cover turf vs impervious.

Response: See previous responses.

Illicit Discharge Detection and Elimination (IDDE)

Comment:

1. If IDDE credit records change in measured TSS concentrations in the water, can that measured reduction be included in the ISR calculation? The expert panel didn't provide TSS default measures, but they weren't considering ISR conversions and the arbitrary formula of dividing by 3 even though two pollutant reductions were being calculated.

Response: The CBP's 2014 Grey Infrastructure Expert Panel Report considered developing sediment reduction credits for total suspended solids (TSS), but decided against this. There was a lack of data and the data that were available showed generally low concentrations. The panel determined that sediment discharged from grey infrastructure probably did not represent a significant portion of the overall sediment load in most urban watersheds. However, if an MS4 takes direct measurements consistent with the 2014 Grey Infrastructure Expert Panel Report protocols, TSS reductions can be included in calculating the EIA.

The Department will not change the EIA formula for a single alternative practice. The formula is a weighted average and will be consistently applied across all practices to represent the effectiveness of each BMP in reducing TN, TP, and TSS. A weighted average also incentivizes practices with a greater number of co-benefits. If the MS4 does not directly measure TSS, the equation would still require division by 3.

Comment:

2. Why does reported vs. discovered discharges matter? A documented discharge elimination is a documented discharge elimination. The pollution impacts are identical. And they take about the same level of effort to document and actually get fixed. Just because someone else reported it doesn't mean it is easy to locate the problem, as Baltimore County has demonstrated to MDE during 2019. The county has always used public input as part of their IDDE approach. The benefits of including citizen reports of illicit discharge are:
   - Allows larger areas of the county to be covered considering limited county staff
   - Gets county citizens involved in their community
   - County resources are used more efficiently
   - The number of IDDE problems addressed increases thus providing increased benefit to the bay.

   By excluding elimination of reported discharges from restoration crediting, MDE is discouraging permittees from seeking citizen reports of pollution problems, and discounting the benefits described above.

Response: The 2014 Grey Infrastructure Expert Panel Report stated that "unexpected nutrient discharges from pipe breaks, spills, leaks and overflows that are reported to the local authority by the public or first responders and require immediate emergency repairs to stop the discharge" are not eligible to receive a credit. MS4s can take credit for eliminated discharges prompted by a citizen if the elimination of this discharge is the result of an investigation and not an emergency repair. The MS4 will need to provide an explanation of the nature of the eliminated discharge to demonstrate that it is an eligible credit.

Comment:

3. There should not be a cap on IDDE credit claimed. The cap proposed has three issues:
   - No cap is applied by the CBP expert panel. What science does MDE have to support the cap that the expert panel did not have?

- The cap is based on assumptions about the pollution load from illicit discharges. Individual IDDE credits are based on before/after documentation of actual pollution loads from individual specific illicit discharges. Assumptions should not overrule real observational data.
- The assumptions behind the cap are for average urban areas throughout the Chesapeake Bay watershed. No individual area will be the same as this average. The relationship between dry weather pollution loads and pervious land cover are not the same across urban areas, e.g. dense cities vs exurban suburbs. The age and quantity of public and private infrastructure and commercial/industrial areas has more to do with illicit discharge pollution loads than the acreage of pervious areas, and these factors vary widely across the Chesapeake Bay watershed (e.g. City of Baltimore vs Reston VA vs Shrewsbury PA). Thus, the assumptions that form the basis for the cap are biased for/against different permittees.

Response: As noted in the 2019 Accounting Guidance, the CBP's Watershed Technical Workgroup recommended a cap for nutrient reductions if the grey infrastructure loads are not explicitly simulated in the Phase 6 Watershed Model. These loads were not simulated, and therefore, the Department moved forward with establishing a maximum allowable EIA credit. This maximum credit is based on assumptions established by the 2014 Grey Infrastructure Expert Panel Report.

The protocols for individual IDDE credits allow for default concentration values and estimated flow volumes, which are assumptions. The expert panel report recognized future research needs due to "major scientific gaps" for understanding the magnitude and extent of illicit discharges, nutrient concentrations associated with specific discharge types, the effect of groundwater migration and denitrification, and more precise methods for estimating flow volume and duration. The panel agreed that the "recommended rates should be reevaluated by a new panel to be reconvened by 2018 when more research data, implementation experience and an improved CBWM model all become available." The CBP has not yet reconvened a panel and there is still scientific uncertainty regarding the recommended removal rates. Therefore, the Department is taking a conservative approach until more data become available. If MS4s would like to exceed the maximum allowable equivalent impervious acre credit, justification must be provided. The Department will review the submitted documentation and make a determination on a case by case basis. If a CBP expert panel is reconvened to evaluate new data and make revised recommendations with greater scientific certainty, the Department may consider removing the maximum allowable credit limit.

Floating Treatment Wetlands

Comment:

Table 8 "Load Reduced" columns do not equal Appendix C efficiencies multiplied by one acre of impervious surface. Appendix C efficiencies result in larger "load reduced" than shown in Table 8, therefore EIA_f should be larger.

table 8 vs table 4 + Appendix C discrepancy

BMP	% coverage	TN	TP	TSS	EIAf
FTW5	50%	(0.27)	(0.08)	(636.88)	(0.045)
FTW4	40%	(0.17)	(0.08)	(558.66)	(0.036)
FTW3	30%	(0.28)	(0.06)	(362.18)	(0.029)
FTW2	20%	(0.18)	(0.03)	(268.70)	(0.019)
FTW1	10%	(0.10)	(0.03)	(93.48)	(0.010)

Response: As defined in Appendix C, floating treatment wetland efficiencies are applied to the total urban unit load, and not the aggregate impervious unit load. The values in Table 8 are consistent with Appendix C.

Septic

Comment:

1. Differential loading for CBCA, 1000' stream buffer, and upland is gone from the MS4 guidance. However, BRF funding remains prioritized for the CBCA. Is this BRF grant funding preference due to CBWM delivery factors, increased septic loading due to groundwater tables, or both? If the first, MS4 guidance squares, but if not, the MS4 guidance should really match.

Response: The 2014 Accounting Guidance did not have different loading rates based on geographical area. The only thing that changed in the 2019 Accounting Guidance is the EIA_f based on the new Bay loading rates. While the Critical Area proximity is important for Bay health, septic system upgrades in proximity to local streams and impaired waters are as important.

Comment:

2. For septic pumping, the five-year credit received in the last permit did not require an inspection program, but the new Guidance requires an inspection program. Jurisdictions generally do not have inspection programs for septics, except for those paid for by the BRF. Since these five-year practices would have to be continued at the same level of effort as the previous permit or replaced to meet permit requirements, does this mean that the county would have to implement an inspection program or lose credit?

Response: Yes, the Department is receptive to giving enhanced outreach and oversight septic system programs the five year credit. The language in the 2019 Accounting Guidance formalizes criteria for this program to ensure that septic tanks are pumped out when their storage chambers reach capacity. MS4s may conduct these inspections themselves, use innovative applications for homeowner self-inspections, or utilize other mechanisms as long as they are documented for

verification by the MS4 and the Department. If an MS4 chooses to not implement an enhanced outreach and oversight program, it would still get the annual septic system pump-out credit.

Comment:

3. If replacement is pursued, in what year of the permit would these practices need replacement? If credit is discontinued because a program no longer meets the Guidance requirement, how much pollutant load reduction would have to be replaced, since the septic practices receive no pollutant credits?

Response: The enhanced outreach and oversight septic system program must be carried over into the next permit term or replaced within the first year by another BMP with the same impervious acre amount.

Comment:

4. For septic pump-outs, is there any guidance for "what needs to be included for inspection"? Will jurisdictions need to submit something to be approved by MDE? Could the inspection program be a check in GIS to verify the property is still served by septic Y or N, something similar to ESDs?

Response: GIS inspections of septic systems are not allowed. At a minimum, a septic system inspection program would need to verify that the septic system storage chamber has additional capacity for processing waste (i.e., bottom of scum layer is within 6 inches of the bottom of the outlet, or top of the sludge layer is within 12 inches of the outlet).

Comment:

5. How are the EIA numbers calculated for each of the alternative practices, in particular for septic pumping? Without seeing the numbers, one cannot check that the conversion has been done correctly. Appendix C only discusses loads.

Response: To calculate EIA_f for alternative practices, use *Equation 5 – EIA_f Calculation for Alternative BMPs* with the efficiencies found in *Appendix C – Best Management Practice Load Reduction Formulas and Pollutant Removal Efficiencies* and the unit loads found in *Table 4 – Statewide Edge-of-Stream Urban Unit Load Summary*.

Street Sweeping

Comment:

Sweeping of streets and parking lots that lack curb and gutter but are served by storm drains should count. Storm drain systems in parking lots and roads without curb and gutter have been engineered and designed so the runoff of these areas is collected in the storm drain system and then piped to an outfall. It only makes sense that a street sweeping practice of the curb-less areas designed with storm drains is providing reductions in TN, TP, and TSS. Credit should be given

to such practices because the ultimate goal is to reduce pollutants to the Bay. While they might provide a small amount of reduction, the amount should still be credited.

Response: The CBP's 2016 Street Sweeping Report indicates that sweeping streets without curb and gutters may create a net source of sediment if the adjacent pervious area is dislodged by the sweeper brush. Therefore, the Department has chosen not to allow this type of sweeping for credit.

Forest Conservation

Comment:

Conservation areas that are utilized as receiving areas for the "sheetflow to conservation area" upland stormwater BMP should not be excluded from this land cover change BMP. Pollution reductions via land cover change/change prevention are completely separate from pollution reductions via upland stormwater BMPs treating stormwater runoff. In the case of forest conservation, the conserved forest land area contributes less pollution than it would if it were developed. In the case of sheetflow to conservation area BMP, the pollution from upland developed areas is reduced when the stormwater runoff sheetflows into a conservation area and infiltrates into the soil. The conserved forest area continues to discharge less pollution than a developed area, regardless of its use in a sheetflow to conservation area upland stormwater BMP.

Response: Areas used to meet new development requirements may not be used to meet restoration requirements. However, areas in excess of that used to address new development may be considered for restoration.

Comment:

The guidance states "EIA credit for forest conservation is available for the permanent conservation of existing acres of forest." It also states "If an MS4 jurisdiction can establish that its forest conservation program results in less development on forest than the WIP forecast, then it has successfully prevented a future load increase." Are the "acres of forest conserved" in Table 13 and Appendix F the acres of forest within qualifying easements? Or the difference between the acres of forest and the WIP forecast for a particular year? If the former, it appears there is no need to "establish that its forest conservation program results in less development on forest than the WIP forecast". If the later, how should permittees relate the difference to the easement program ... is the easement program irrelevant, or is the conservation credit from the qualifying easement areas capped at the difference from the WIP forecast?

Response: The conservation credit for qualifying easement areas is capped at the difference from the WIP forecast. The MS4 should demonstrate that the actual forest loss is less than the projected forest loss (i.e., 2025 WIP3 Scenario) during the permit term to establish that it is eligible for conservation credit. The difference between the projected loss and the actual loss will represent a maximum conservation credit. The MS4 must then provide the relevant documentation of permit term forest conservation easements to attribute the difference in forest loss to conservation efforts.

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

February 14, 2020

Karl Berger, Principal Environmental Planner
Metropolitan Washington Council of Governments
777 North Capitol Street NE, Suite 300
Washington, DC 2000

Dear Mr. Berger:

Lee Currey, Director, Water and Science Administration, Maryland Department of the Environment (Department) would like to thank you in coordinating the review comments from Maryland's Phase I municipal separate storm sewer system (MS4) permittees regarding the *2019 Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* (Guidance). The Department has gone through these comments and accepted, edited, or clarified them as appropriate and believes that they have made the Guidance better.

Your comments emailed to us on January 31, 2020 are attached with the Department's responses. This information shall be used by the Phase I Large MS4s in developing updated best management practice (BMP) portfolios to the maximum extent practicable (MEP), and submitting them to the Department by March 15, 2020. If you have any questions regarding these materials, please do not hesitate to give me or my Deputy Program Manager, Raymond Bahr, a call at 410-537-3545, or raymond.bahr@maryland.gov. The Department appreciates your effort and the important work provided by the MS4s for improving Maryland's water resources.

Sincerely,

Jennifer M. Smith, Program Manager
Sediment, Stormwater, and Dam Safety Program

cc: Lee Currey, Director, Water and Science Administration
Raymond Bahr, Deputy Program Manager, Sediment, Stormwater, and Dam Safety Program

From: "Grove, Kimberly (DPW)"
Sent: Mon, 16 Mar 2020 15:59:05 +0000
To: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Raymond Bahr" <raymond.bahr@maryland.gov>
Cc: "Desantis, Paul (DPW)" <Paul.Desantis@baltimorecity.gov>
Subject: Revised Restoration Portfolio
Attachments: Baltimore City Restoration Projects Portfolio 2020-2027 3-15-20 FINAL.xlsx, Baltimore City Portfolio summary 3-15-2020 FINAL.pdf

Attached for your review is the City's revised Restoration Portfolio and supporting development summary. Please feel free to contact me if you have any questions.

Thanks,

Kimberly L. Grove, P.E.
Chief, Office of Compliance & Laboratories
Baltimore City Department of Public Works
(410) 396 - 0732 (office)
(443) 835-9272 (cell)

Restoration Projects To Be Planned, Designed, and/or Constructed from CY 2020 Through CY 2027
Baltimore City, Maryland

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

REST BMP ID	REST BMP TYPE[1]	BMP CLASS[1]	NUM BMP	IMP ACRES	TSS REDUCTION (lbs/year)	TN[6] REDUCTION (lbs/year)	IMPLEMENTATION COST	IMPLEMENTATION STATUS[2]	PROJECTED IMPLEMENTATION YEAR	TMDL PARAMETER OR WQ OBJECTIVE ADDRESSED
Remaining Unmet Restoration Obligations from Previous Permit										
Annual Operational Programs (Unmet Obligations from Previous Permit)[3,4]										
Street Sweeping		A								
		A								
		A								
		A								
		A								
		A								
Catch Basin Cleaning		A								
		A								
		A								
		A								
		A								
Septic Sytem Pumping		A								
		A								
		A								
		A								
		A								
		A								
Subtotal Operations[3]			0	0			$0			
Capital Projects (Unmet Obligations from Previous Permit Term)										
Subtotal Capital			0	0			$0			
Other (Unmet Obligations from Previous Permit Term)										
Subtotal Other			0	0			$0			
Total of Remaining Obligations from The Previous Permit			**0**	**0**			**$0**			
Obligations from Previous Permit That Must Be Continued										
Annual Operational Programs Required to be Maintained from Previous Permit[3,4]										
Street Sweeping	VSS	A	1	15,633	102,564,334	39,576	$5,218,386	Under Construction	2019	
	VSS	A	1	3,921	26,115,425	10,262	part of above	Under Construction	2019	
	VSS	A	1	1,745	11,482,462	3,975	part of above	Under Construction	2019	
		A								
		A								
Catch Basin Cleaning	SDV	A	1	10	22,640	251	$4,246,445	Under Construction	2019	
	SDV	A	1	132	713,160	1,926	part of above	Under Construction	2019	
		A								
		A								
		A								
Septic Sytem Pumping		A								
		A								
		A								
		A								
		A								
Subtotal Operations[3]			5		28,179,604	55,990	$9,464,831			
Capital Projects (Proposed to Replace Annual Obligations)										

Subtotal Capital			0	0	0	0	$0			
Other (Proposed to Replace Annual Obligations)										
Subtotal Other			0	0	0	0	$0			
Total of Obligations from Previous Permit That Must Be Continued			**5**	**0.0**	**28,179,604.2**	**55,990.0**	**$9,464,831**			
Proposed Restoration for the Next Permit										
Operational Programs[4]										
Street Sweeping		A								
		A								
		A								
		A								
		A								
Catch Basin Cleaning		A								
		A								
		A								
		A								
		A								
Septic Sytem Pumping		A								
		A								
		A								
		A								
		A								
Subtotal Operations[5]			0		0	0	$0			
Capital Projects										
	FBIO	S	40	13.8	11430	166	$955,100	Design	2022	
	IMPP	A	14	3.4	548	8	$1,281,500	Under Construction	2020	
	IMPP	A	11	1.8	743	7	$2,261,560	Design	2021	
	IMPP	A	8	3.1	2090	29	$3,392,340	Design	2022	
	MMBR	E	14	3.7	1437	39	$4,324,520	Design	2021	
	MMBR	E	16	5.1	4263	59	$6,334,400	Design	2022	
	SPSC	A	1	6	5068	139	$1,403,750	Design	2023	
	STRE	A	2	254	3149600	952	$13,059,300	Under Construction	2021	
	STRE	A	3	214	2656824	803	$14,799,048	Design	2022	
	STRE	A	5	313	3881200	1174	$21,527,239	Design	2023	
Subtotal Capital			114	817.9	9713203	3376	$69,338,757			
Other										
Subtotal Other			0	0	0	0	$0			
Total for Next Permit			**114**	**817.9**	**9,713,203.0**	**3,376.0**	**$69,338,757**			
Total for Remaining Obligations from The Previous Permit and Prosed Activities for the Next Permit			119	817.9	37,892,807.2	59,366.0	$78,803,588			

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

Notes:
1 Use BMP types and classes from the MDE Geodatabase.

GENERAL COMMENTS[7]
70,417 miles/ year @ 1 pass / week, only operational cost shown.
13,663 miles/ year @ 2 passes / week
21,020 miles/ year @ 1 pass / 4 weeks
57 tons / year organic, only operation costs shown
509 tons / year inorganic

Education
Education
Education
Education
Traffic calming and education
Traffic calming and education
Traffic calming and education
Utility protection. Flood reduction. Education.
Utility protection. Flood reduction. Education.
Utility protection. Flood reduction. Education.

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

BMP Classification	BMP Type Code	BMP Type
Alternative Surfaces (A)		
E	AGRE	Green Roof – Extensive
E	AGRI	Green Roof – Intensive
E	APRP	Permeable Pavements
E	ARTF	Reinforced Turf
Nonstructural Techniques (N)		
E	NDRR	Disconnection of Rooftop Runoff
E	NDNR	Disconnection of Non-Rooftop Runoff
E	NSCA	Sheetflow to Conservation Areas
Micro-Scale Practices (M)		
E	MRWH	Rainwater Harvesting
E	MSGW	Submerged Gravel Wetlands
E	MILS	Landscape Infiltration
E	MIBR	Infiltration Berms
E	MIDW	Dry Wells
E	MMBR	Micro-Bioretention
E	MRNG	Rain Gardens
E	MSWG	Grass Swale
E	MSWW	Wet Swale
E	MSWB	Bio-Swale
E	MENF	Enhanced Filters
Ponds (P)		
S	PWED	Extended Detention Structure, Wet
S	PWET	Retention Pond (Wet Pond)
S	PMPS	Multiple Pond System
S	PPKT	Pocket Pond
S	PMED	Micropool Extended Detention Pond
Wetlands (W)		
S	WSHW	Shallow Marsh
S	WEDW	ED – Wetland
S	WPWS	Wet Pond – Wetland
S	WPKT	Pocket Wetland
Infiltration (I)		
S	IBAS	Infiltration Basin
S	ITRN	Infiltration Trench
Filtering Systems (F)		

S	FBIO	Bioretention
S	FSND	Sand Filter
S	FUND	Underground Filter
S	FPER	Perimeter (Sand) Filter
S	FORG	Organic Filter (Peat Filter)
S	FBIO	Bioretention
Open Channels (O)		
S	ODSW	Dry Swale
S	OWSW	Wet Swale
Other Practices (X)		
S	XDPD	Detention Structure (Dry Pond)
S	XDED	Extended Detention Structure, Dry
S	XFLD	Flood Management Area
S	XOGS	Oil Grit Separator
S	XOTH	Other
Alternative BMPs		
A	MSS	Mechanical Street Sweeping
A	VSS	Regenerative/Vacuum Street Sweeping
A	IMPP	Impervious Surface Elimination (to pervious)
A	IMPF	Impervious Surface Elimination (to forest)
A	FPU	Planting Trees or Forestation on Pervious Urban
A	CBC	Catch Basin Cleaning
A	SDV	Storm Drain Vacuuming
A	STRE	Stream Restoration
A	OUT	Outfall Stabilization
A	SPSC	Regenerative Step Pool Storm Conveyance
A	SHST	Shoreline Management
A	SEPP	Septic Pumping
A	SEPD	Septic Denitrification
A	SEPC	Septic Connections to WWTP

Summary of Restoration Portfolio Development for Baltimore City

The City of Baltimore submitted to MDE a portfolio of *Restoration Projects to Be Planned, Designed, and/or Constructed from CY 2020 through CY 2027* (Restoration Portfolio) in August 2019. That submittal was based on accounting principles and guidance provided by MDE in a letter dated April 12, 2019. The Restoration Portfolio was part of a response to the *MDE Physical Capacity Questionnaire for MS4 Permittees as Part of a Maximum Extent Practicable (MEP) Analysis*. The Restoration Portfolio specifically excluded alternative BMPs from the estimation of "impervious acres" credit (also referred to as impervious surface restoration or ISR); only total suspended solids (TSS) and total nitrogen (TN) reductions could be attributed to alternative restoration projects, such as stream restoration and tree planting. The Restoration Portfolio also did not include the operational programs used in the City's current permit to meet the ISR credit.

In December 2019, the City submitted the following data in its FY 2019 MS4 Annual Report, based on the *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permit,* dated August 2014 (2014 Accounting Guidance):

Description	ISR Completed (ac)	TN Reduced (lb / year)	TSS Removed (lb / year)
Projects	**101**	**716**	**238,626**
Traditional	20	107	10,614
ESD	1	5	532
Stream Rest.	75	561	224,400
Other Alt.	5	43	3,080
Programs	**6,161**	**30,264**	**4,079,660**
Street Sweeping	5,475	24,639	3,790,658
Inlet Cleaning	394	2,408	289,002
IDDE	292	3,217	0
Partnerships	**659**	**4,088**	**114,232**
Redevelopment	488	1,312	44,449
Volunteer ESD	13	88	4,498
Afforestation	158	2,688	65,185
Total	**6,921**	**35,068**	**4,432,518**
Baseline	21,456	643,404	23,009,040
% Treated/ Reduce	**32%**	**5.5%**	**19%**

This data demonstrates that the City exceeded the 20% ISR requirement of the current permit.

On December 23, 2019 MDE issued a draft revised *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits (2019 Draft Accounting Guidance).* On January 16, MDE provided an overview of the 2019 Draft Accounting Guidance to MS4 managers. In response to the overview, the MS4 managers collaborated and submitted questions and comments to MDE on January 31, 2020. MDE's response to those comments were issued on February 14, 2020. The attached revised Restoration Portfolio was developed based on the 2019 Draft Accounting Guidance and MDE's response to comments. The City reserves the right to adjust these credits if MDE provides new revisions, updates, or clarifications to either of these documents.

Additionally, the City's Restoration Portfolio was revised as follows:

- The timeframe for the Restoration Portfolio was restructured to be FY 2020 to FY 2027 to reflect the reporting schedule for the City's MS4 program and ensure that the portfolio included projects completed since the end of FY 2019 (June 30, 2019).
- Annual operation programs for street sweeping and inlet cleaning were added to the revised Restoration Portfolio.
    - The estimated performance of street sweeping is an average total mileage recorded for the street operation for the last 5 fiscal years (FY 2015 to FY 2019), using a street sweeper path width of 52 inches. To be conservative, no increase in mileage is proposed; however, the City continues to take measures to improve the operation performance, such as the enforcement of parking requirements on street sweeping routes. The TN and TSS estimates are based on the total street sweeping operations, but Bay TMDL and local TMDL compliance calculations may only account for increases in street sweeping since 2010.
    - To be conservative, the estimated performance of inlet cleaning is based on the lowest recorded tonnage in the current permit cycle (FY 2018 MS4 Annual Report). The City does not have any data related to the organic content of material collected, but the majority inlets cleaned tend to be on streets with minimal street trees or plants, so a low organic content (10%) was assumed.
- ISR Credit for impervious area removal, stream restoration projects and regenerative storm conveyance systems have been added.
- The actual number of facilities for all capital projects, except stream restoration projects, are now listed. Previously, the number related to the WIP project references.
- Although MDE's *response to comments* allowed for exceeding ISR to be applied to the next permit, the City is electing to not include that exceedence in this revised Restoration Portfolio until MDE has reviewed the FY 2019 MS4 Annual Report and can provide clearer guidance of how that accounting should be shown in the portfolio report form.
- To be conservative, future IDDE, potential redevelopment and Tree Baltimore efforts (afforestation) were not included in the revised Restoration Portfolio. Historic data is limited, and thus unable to predict future IDDE and redevelopment trends. Tree Baltimore's community tree planting efforts will be using mitigation funds for a large portion of the future plantings.

From: "Karl Berger" <kberger@mwcog.org>
Sent: Tue, 31 Mar 2020 13:31:59 +0000
To: "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "'Frank Dawson'" <Frank.Dawson@montgomerycountymd.gov>; "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Maldonado, Jerry G." <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen D. Wiggen" <WiggenK@charlescountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>
Cc: "Janis Markusic" <pwmark02@aacounty.org>; "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "Joiner, Jeremy" <JJoiner@FrederickCountyMD.gov>; "kearby, scott" <sakearby@harfordcountymd.gov>; "Richmond, Mark S" <msrichmond@howardcountymd.gov>; "Lowe, Christine" <cslowe@howardcountymd.gov>; "ProctorP@CharlesCountyMD.gov" <ProctorP@CharlesCountyMD.gov>; "Heyn, Chris" <cheyn@carrollcountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>; "Knapp, Les" <lknapp@mdcounties.org>; "Mishra, Sudhanshu" <SPMishra@co.pg.md.us>
Subject: MDE letter from MACo
Attachments: Letter 2020-03-31 County MS4 Workgroup Meeting Request for MDE (MACo).pdf

MS4 managers,

Attached is the letter that Les was able to send on our behalf to MDE, requesting a (virtual) meeting, and based on the email text I sent to Lee Currey on March 11.

Separately, I have reached out to Jennifer and Ray suggesting that we could hold some sort of webinar-based meeting. (Toward that end, I find that Zoom is the best of the software packages for virtual meetings. Do any of you have the ability to host Zoom meetings, in this case, for as many as 25 participants?)

To my knowledge, the five largest MS4 jurisdictions have sent their revisions to their portfolios based on the new Accounting Guidance or will soon do so, although questions and issues remain unanswered or unresolved at this point.

Should MDE respond positively to our virtual meeting request or should some other development so warrant, I will call for a group planning call.

I hope everyone is doing well.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MARYLAND Association of COUNTIES

March 31, 2020

D. Lee Currey
Director, Water & Science Administration
Maryland Department of the Environment
Montgomery Park Business Center
1800 Washington Blvd.
Baltimore, MD 21230

Dear Lee,

I hope you, your family, and everyone at the Maryland Department of the Environment (MDE) are safe and doing well. The Maryland Association of Counties (MACo) and County Municipal Separate Stormwater Sewer System (MS4) Workgroup requests that MDE schedule a virtual meeting with the Workgroup as soon as possible. The purpose of the meeting would be to continue discussions about the schedule for the next generation Phase I permit and address outstanding issues and questions about the new accounting guidance.

As noted in previous correspondence, we appreciate MDE's efforts to establish a new basis for restoration requirements in these permits, a level of effort determined by a maximum-extent-practicable standard. We also appreciate MDE's prompt response to our comments and questions on your December 2019 Accounting Guidance document that the Workgroup submitted on Jan. 31, 2020.

Many, but not all, of our issues have been resolved. Given the extent of the changes in the new guidance, the fact that the guidance will largely determine enforceable metrics in the new permits, and our lack of experience in using the guidance to compute credits for actual practices, those members of the group faced with revising project portfolios originally submitted in June 2019 remain somewhat uneasy about doing so.

The first five permittees to go through the process of creating portfolios – Baltimore City and Anne Arundel, Baltimore, Montgomery and Prince George's Counties have worked diligently on their portfolio revisions. However, they and the other members of the group still have specific concerns about crediting issues and a general uncertainty about how the restoration metrics will mesh with state and Environmental Protection Agency goals for the Phase 3 Watershed Implementation Plan under the Chesapeake Bay Total

169 Conduit Street, Annapolis, MD 21401
410.269.0043 BALT/ANNAP ◆ 301.261.1140 WASH DC ◆ 410.268.1775 FAX
www.mdcounties.org

Maximum Daily Load. This uncertainty may cause permittees to provide caveats in their portfolio revisions.

Another group meeting will help reduce uncertainty, improve consistency and transparency, and help all parties move more expeditiously toward the issuance of final permits. Obviously, given the current circumstances of COVID-19, we expect such a meeting to be held virtually. The Workgroup can supply MDE with a list of our remaining questions and issues before such a meeting.

In addition, we ask that MDE staff hold a separate session, via webinar or some other interactive means, on the new credits for green stormwater infrastructure and watershed management. We also request that MDE conduct a workshop on the new Accounting Guidance document for consultants who provide us with assistance in project design, implementation, and crediting.

Please do not hesitate to contact me at 410.269.0043 or lknapp@mdcounties.org if you have questions or need further information.

Sincerely,

Leslie Knapp Jr.

Leslie Knapp Jr.
Legal and Policy Counsel
MACo

From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Fri, 10 Apr 2020 19:05:32 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Raymond Bahr" <raymond.bahr@maryland.gov>; "Jennifer Smith -MDE-" <jenniferm.smith@maryland.gov>; "Brian Cooper -MDE-" <brian.cooper@maryland.gov>; "Christina Lyerly -MDE-" <christina.lyerly@maryland.gov>; "Andrew Tagoe" <andrew.tagoe@maryland.gov>; "Michelle Crawford -MDE-" <michelle.crawford1@maryland.gov>; "Deborah Cappuccitti" <deborah.cappuccitti@maryland.gov>; "Nora Howard -MDE-" <nora.howard1@maryland.gov>
Subject: MEP Analysis

Kim,

Thank you for meeting with us Wednesday to discuss the City's MEP submittal. As discussed , the following are items that were identified as either missing or necessary to complete the Department's review:

1. Please revise the Restoration Project Portfolio using the provided format.
2. To the best of the City's ability, include proposed activities and BMPs for years 2024 to 2027. Also include any BMPs completed after the expiration date of the previous permit term.
3. The Department thanks the City for providing street sweeping and storm drain vacuuming data for 2019. The City should specify the level of street sweeping and storm drain vacuuming to be continued each year and include the required number of equivalent impervious acres, implementation costs, and TP, TN, and TSS reductions. This information shall be included in "Obligations from Previous Permit That Must Be Continued" section of the Portfolio. Also include the projected implementation cost for each year.
4. Does the City have data for TP, linear feet, lane miles, and tons of material removed? Please see the guidance document for more information. Additionally, please ensure that the planning rate for stream restoration has been correctly applied for proposed projects.
5. Does the City have the PE addressed and drainage area for proposed BMPs? Please include this information to the greatest extent possible.
6. Please confirm the final numbers for cost of restoration during the previous permit term, including the breakdown of costs for capital projects and annual BMPs. If the final numbers are different, please provide the updated amounts.
7. Under the "Other" section for "Proposed Restoration for the Next Permit", please add a line item for annual operations and maintenance in the Portfolio. This would only be for information on the cost and not any acreage. Also include annual capital improvement project information, if possible, on stormwater/flood control BMPs that are being repaired for safety but do not achieve any additional water quality credit, e.g., a dam repair or enhanced emergency spillway project. In the comment field note "watershed management".
8. Is the City addressing any other TMDLs (e.g., PCBs) that impact the resources and funds available for BMPs implemented for impervious area restoration?

Please understand that this information is needed to complete our work on the draft permit. For this reason, we are asking that you provide this information by Wednesday, April 22nd if possible. If there are any questions, please call me at 410-271-0800 or email me, or you may contact Brian Cooper at brian.cooper@maryland.gov. And again, thank you for your patience and cooperation. Stew C.
--

Maryland is currently operating under a state of emergency due to the coronavirus. Although most of us are working remotely from home, MDE continues to operate and remains open for business. We strive to provide great customer service and meet your needs; however, we ask that you have patience with us during this time. Stay healthy! Thank you.

Stewart Comstock, P.E.

Program Review Division Chief

Water and Science Administration

Maryland Department of the Environment

1800 Washington Boulevard

Baltimore, Maryland 21230

stewart.comstock@maryland.gov

(410) 537-3550 (O)

Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

From: "Grove, Kimberly (DPW)"
Sent: Tue, 21 Apr 2020 21:19:51 +0000
To: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>
Cc: "Christina Lyerly -MDE-" <christina.lyerly@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Subject: RE: MS4 MEP Discussion
Attachments: Street sweeping.xlsx

Street sweeping is still a bit wonky with the changes in calculating the EIA and nutrient reduction, comparing FY 18, FY 19, and new permit. I still need to discuss the appropriate approach for showing in the portfolio. Are you available tomorrow to discuss? I've attached the calculations as a reference.

Thanks,

Kimberly L. Grove, P.E.
Chief, Office of Compliance & Laboratories
Baltimore City Department of Public Works
(410) 396 - 0732 (office)
(443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Tuesday, April 21, 2020 3:45 PM
To: Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov>
Cc: Christina Lyerly -MDE- <christina.lyerly@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: MS4 MEP Discussion

Hi Kim,

We understand. Friday, the 24th works. Thanks for your hard work on the resubmission.

Brian

On Tue, Apr 21, 2020 at 12:32 PM Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov> wrote:

I need to push the re-submittal schedule back to Friday, April 24 to allow for suitable review within my organization, especially with the increased efforts. Please confirm approval in this change to the submittal schedule.

Thanks,

Kimberly L. Grove, P.E.
Chief, Office of Compliance & Laboratories
Baltimore City Department of Public Works
(410) 396 - 0732 (office)
(443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Monday, April 6, 2020 3:29 PM
To: Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov>
Cc: Christina Lyerly -MDE- <christina.lyerly@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: MS4 MEP Discussion

Hi Kim,

In preparation for Wednesday's discussion, we developed the attached checklist to help with our review. Feel free to give it a look and let us know if you have any questions.

Best,
Brian

On Fri, Apr 3, 2020 at 5:35 PM Brian Cooper -MDE- <brian.cooper@maryland.gov> wrote:

> Thanks, Kim. We have you on our calendars for next Wednesday from 10-11 AM. I'll send you a calendar invite with the conference call/video conferencing information.
>
> Have a great weekend!

Brian

On Fri, Apr 3, 2020 at 10:07 AM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> It will just be me on the call if it's focused on the MEP submittal. I'm available:
>
> Monday, April 6, 10 to noon or after 2 pm
> Tuesday, April 7, 10 am to noon
> Wednesday, April 8, 10 to 11 am
>
> Thanks,
>
> Kimberly L. Grove, P.E.
> Chief, Office of Compliance & Laboratories
> Baltimore City Department of Public Works
> (410) 396 - 0732 (office)
> (443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Thursday, April 2, 2020 2:10 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
Cc: Krause, Nathaniel <Nathaniel.Krause@baltimorecity.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>; Christina Lyerly -MDE- <christina.lyerly@maryland.gov>
Subject: MS4 MEP Discussion

Good afternoon Kim and Nathaniel,

I hope you both are doing well!

Thank you for your most recent MEP submission. We are finalizing our review and we have some clarifying questions that we would like to ask you. We'd like to do that early next week; probably need only 1 hour or less of your time. We can be available:

Monday, April 6 between 10A-4:30P
Tuesday, April 7 between 10A-1P
Wednesday, April 8 between 10A-12P and 3-4:30P

If these times do not work, please suggest other possible times for next week.

Best regards,
Brian

--

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

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Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

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1800 Washington Boulevard
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--

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Natural Resources Planner
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Click here to complete a three question customer experience survey.

FY 2019

Total
Non-routine
Routine, less frequent

Routine, min. 2x / week

Weekly Routes
Central District (2-4 x / week)

Width of Street Sweeper Path:

FY 2019 (New accounting)

Frequency
1 pass / week
2 pass / week
1 pass / 4 wk
Non-routine
Total
Baseline (CBP 6.0)
% Removed

FY 2020

Frequency
1 pass / week
2 pass / week
1 pass / 4 wk
Non-routine
Total
Difference in next permit

FY 2021

Frequency
1 pass / week
2 pass / week
1 pass / 4 wk
Non-routine
Total
Difference in next permit

FY 2022

Frequency
1 pass / week
2 pass / week
1 pass / 4 wk

Non-routine
Total
Difference in next permit

FY 2023 to 2027

Frequency
1 pass / week
2 pass / week
1 pass / 4 wk
Non-routine
Total
Difference in next permit

Summary of Next Permit

From previous MS4 Permits: only bi-weekly operations were included.

Fiscal Year
FY 2019
FY 2018

Note:

	Miles
	96,637
	1,421
	15,029
	80,187
	64,727
	15,460

96,637

Portion	Mile / yr
66.98%	64,727
16.00%	15,460
15.55%	15,027
1.47%	1,421

57,461

Portion	Mile / yr
66.98%	38,487
16.00%	9,193
15.55%	8,935
1.47%	845

64,747

Portion	Mile / yr
66.98%	43,367
16.00%	10,358
15.55%	10,068
1.47%	952

96,637

Portion	Mile / yr
66.98%	64,727
16.00%	15,460
15.55%	15,027

1.47%	1,421

101,469

Portion	Mile / yr
66.98%	67,963
16.00%	16,233
15.55%	15,778
1.47%	1,492

Year	Fiscal Year
1	FY 2021
2	FY 2022
3	FY 2023
4	FY 2024
5	FY 2025

Average (5 years)
Baseline (CBP 6.0)
% Removed

Metric	Amount
miles	80,187
tons	13,483

Previous MS4 Permit used rates from MS4 Accounting Guidance (2014)
FY 2018 method (tonnage) includes a 70% reduction of weight due to water.
FY 2019 loading rates:

TN
TP
TSS

1.47%
15.55%

66.98%
16.00%

52

EIA
Rate
0.222
0.287
0.083

BSW records for mileage as of Feb. 28. Street sweeping was suspended in March.

EIA
Rate
0.222
0.287
0.083

Average BSW records (FY 2017 - 2019), assuming no operations until end of October (reduce FY 19 by 33%)

EIA
Rate
0.222
0.287
0.083

Assumes same rate as FY 2019

EIA
Rate
0.222
0.287
0.083

Assumes 5% increase since FY 2023 due to street sign completion and parking enforcement

EIA
Rate
0.222
0.287
0.083

EIA
Rate
0.13
0.4

11.7
0.68
0.18

in

	TN		TP		TSS		
Total	Rate	Total	Rate	Total	Rate	Total (lbs)	(tons)
14,369	1.07	36,378	0.56	19,039	2773	94,276,510	47,138
4,437	1.43	11,612	0.7	5,684	3639	29,550,150	14,775
1,247	0.36	2,841	0.28	2,210	1040	8,208,688	4,104
20,054		50,832		26,933		132,035,349	66,018
21,456		1,153,789		210,303			206,866
93%		4%		13%			32%

	TN		TP		TSS		
Total	Rate	Total	Rate	Total	Rate	Total (lbs)	(tons)
8,544	1.07	21,631	0.56	11,321	2,773	56,057,437	28,029
2,638	1.43	6,905	0.7	3,380	3,639	17,570,715	8,785
742	0.36	1,690	0.28	1,314	1,040	4,880,941	2,440
11,924		30,225		16,015		78,509,093	39,255
(8,130)		(20,607)	-	(10,919)		(53,526,256)	(26,763)

	TN		TP		TSS		
Total	Rate	Total	Rate	Total	Rate	Total (lbs)	(tons)
9,627	1.07	24,373	0.56	12,756	2773	63,165,262	31,583
2,973	1.43	7,780	0.7	3,808	3639	19,798,601	9,899
836	0.36	1,904	0.28	1,481	1040	5,499,821	2,750
13,436		34,057		18,045		88,463,684	44,232
(6,618)		(16,774)	-	(8,888)		(43,571,665)	(21,786)

	TN		TP		TSS		
Total	Rate	Total	Rate	Total	Rate	Total (lbs)	(tons)
14,369	1.07	36,378	0.56	19,039	2773	94,276,510	47,138
4,437	1.43	11,612	0.7	5,684	3639	29,550,150	14,775
1,247	0.36	2,841	0.28	2,210	1040	8,208,688	4,104

20,054		50,832		26,933		132,035,349	66,018
-		-	-	-		-	-

	TN		TP		TSS		
Total	Rate	Total	Rate	Total	Rate	Total (lbs)	(tons)
15,088	1.07	38,197	0.56	19,991	2773	98,990,336	49,495
4,659	1.43	12,193	0.7	5,968	3639	31,027,658	15,514
1,310	0.36	2,984	0.28	2,321	1040	8,619,123	4,310
21,056		53,373		28,280		138,637,116	69,319
1,003		2,542	-	1,347		6,601,767	3,301

EIA	**TN**	**TP**	**TSS**	
(ac)	**(lb /yr)**	**(lb/ yr)**	**(lb / yr)**	**(ton / yr)**
13,436	34,057	18,045	88,463,684	44,232
20,054	50,832	26,933	132,035,349	66,018
21,056	53,373	28,280	138,637,116	69,319
21,056	53,373	28,280	138,637,116	69,319
21,056	53,373	28,280	138,637,116	69,319
19,332	49,002	25,964	127,282,076	63,641
21,456	816,930	115,896	181,839,116	90,920
90%	6%	22%	70%	

	TN		**TP**		**TSS**		
Total	**Rate**	**Total**	**Rate**	**Total**	**Rate**	**Total (lbs)**	**(tons)**
5,475	5%	24,639	6%	1,718	25%	3,790,658	1,895
3,775	3.5	33,033	1.4	13,213	420	3,964,002	1,982

lb / acre
lb / acre
ton / acre

From: "Grove, Kimberly (DPW)"
Sent: Mon, 27 Apr 2020 16:00:26 +0000
To: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>
Cc: "Christina Lyerly -MDE-" <christina.lyerly@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Subject: RE: MS4 MEP Discussion
Attachments: Baltimore City Portfolio summary 4-27-2020 FINAL.pdf, Restoration Project Portfolio Balt City Rev 4-24-2020.xlsx

Attached is the final revised submittal of the portfolio. Please feel free to contact me if you have any questions.

Thanks,

Kimberly L. Grove, P.E.
Chief, Office of Compliance & Laboratories
Baltimore City Department of Public Works
(410) 396 - 0732 (office)
(443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Tuesday, April 21, 2020 3:45 PM
To: Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov>
Cc: Christina Lyerly -MDE- <christina.lyerly@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: MS4 MEP Discussion

Hi Kim,

We understand. Friday, the 24th works. Thanks for your hard work on the resubmission.

Brian

On Tue, Apr 21, 2020 at 12:32 PM Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov> wrote:

I need to push the re-submittal schedule back to Friday, April 24 to allow for suitable review within my organization, especially with the increased efforts. Please confirm approval in this change to the submittal schedule.

Thanks,

Kimberly L. Grove, P.E.
Chief, Office of Compliance & Laboratories
Baltimore City Department of Public Works
(410) 396 - 0732 (office)
(443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Monday, April 6, 2020 3:29 PM
To: Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov>
Cc: Christina Lyerly -MDE- <christina.lyerly@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: MS4 MEP Discussion

Hi Kim,

In preparation for Wednesday's discussion, we developed the attached checklist to help with our review. Feel free to give it a look and let us know if you have any questions.

Best,
Brian

On Fri, Apr 3, 2020 at 5:35 PM Brian Cooper -MDE- <brian.cooper@maryland.gov> wrote:

> Thanks, Kim. We have you on our calendars for next Wednesday from 10-11 AM. I'll send you a calendar invite with the conference call/video conferencing information.
>
> Have a great weekend!

Brian

On Fri, Apr 3, 2020 at 10:07 AM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> It will just be me on the call if it's focused on the MEP submittal. I'm available:
>
> Monday, April 6, 10 to noon or after 2 pm
> Tuesday, April 7, 10 am to noon
> Wednesday, April 8, 10 to 11 am
>
> Thanks,
>
> Kimberly L. Grove, P.E.
> Chief, Office of Compliance & Laboratories
> Baltimore City Department of Public Works
> (410) 396 - 0732 (office)
> (443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Thursday, April 2, 2020 2:10 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
Cc: Krause, Nathaniel <Nathaniel.Krause@baltimorecity.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>; Christina Lyerly -MDE- <christina.lyerly@maryland.gov>
Subject: MS4 MEP Discussion

Good afternoon Kim and Nathaniel,

I hope you both are doing well!

Thank you for your most recent MEP submission. We are finalizing our review and we have some clarifying questions that we would like to ask you. We'd like to do that early next week; probably need only 1 hour or less of your time. We can be available:

Monday, April 6 between 10A-4:30P
Tuesday, April 7 between 10A-1P
Wednesday, April 8 between 10A-12P and 3-4:30P

If these times do not work, please suggest other possible times for next week.

Best regards,
Brian

--

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

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Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

--

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
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Brian E. Cooper
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Maryland Department of the Environment
1800 Washington Boulevard
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Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

Summary of Restoration Portfolio Development for Baltimore City

The City of Baltimore submitted to MDE a portfolio of *Restoration Projects to Be Planned, Designed, and/or Constructed from CY 2020 through CY 2027* (Restoration Portfolio) in August 2019. That submittal was based on accounting principles and guidance provided by MDE in a letter dated April 12, 2019. The Restoration Portfolio was part of a response to the *MDE Physical Capacity Questionnaire for MS4 Permittees as Part of a Maximum Extent Practicable (MEP) Analysis.* The Restoration Portfolio specifically excluded alternative BMPs from the estimation of "impervious acres" credit (also referred to as impervious surface restoration or ISR); only total suspended solids (TSS) and total nitrogen (TN) reductions could be attributed to alternative restoration projects, such as stream restoration and tree planting. The Restoration Portfolio also did not include the operational programs used in the City's current permit to meet the ISR credit.

In December 2019, the City submitted its FY 2019 MS4 Annual Report, based on the *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permit,* dated August 2014 (2014 Accounting Guidance). The report demonstrated that the City exceeded the 20% ISR requirement of the current permit by June 30, 2019.

On December 23, 2019 MDE issued a draft revised *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits (2019 Draft Accounting Guidance).* On January 16, MDE provided an overview of the 2019 Draft Accounting Guidance to MS4 managers. In response to the overview, the MS4 managers collaborated and submitted questions and comments to MDE on January 31, 2020. MDE's response to those comments were issued on February 14, 2020. On March 16, Baltimore City submitted a revised Restoration Portfolio, which was developed based on the 2019 Draft Accounting Guidance and MDE's response to comments. The City reserves the right to adjust these credits if MDE provides new revisions, updates, or clarifications to either of these documents.

Following a conversation with MDE on April 8, Baltimore City has revised the City's Restoration Portfolio as follows:

- The timeframe for the Restoration Portfolio was restructured to be 9 years (CY 2019 to CY 2027) ensure that the portfolio included capital projects completed since the end of FY 2018 (June 30, 2018). Currently, the next permit is anticipated to occur CY 2021 through CY 2025.
- Street sweeping will be continued from the previous permit:
    - The street sweeping operations, listed under "Obligations from Previous Permit That Must Be Continued", were based on the total mileage listed in the FY 2019 MS4 Annual Report, which accounted only for operations performed at least 2 times per month, using a street sweeper path width of 52 inches. The equivalent impervious area and pollution reductions were calculated using the mileage-based method from the 2014 Accounting Guidance. However, it should be noted that the 2014

Accounting Guidance provides significantly less calculated pollution reduction, especially for sediment, than the 2019 Guidance. Furthermore, the 2014 Accounting Guidance does not recognize operations occurring more frequently than 2 times per month. Cost estimations include a 2% annual escalation in operations costs. This approach will hinder the City's ability to comply with local TMDLs if using the 2019 Accounting Guidance for estimating pollutant loads.

  - The street sweeping operations, listed under "Proposed Restoration for the Next Permit", include the mileage currently performed in the City's quadrants at a monthly frequency. Starting in CY 2023, the City also estimates an improvement of 10% in efficiency, due to the enforcement of new parking signs currently being installed. No additional expenses are expected to address this accounting in the portfolio. The equivalent impervious area and pollution reductions were calculated using the 2019 Draft Accounting Guidance.
  - This operation is critical to the City's trash TMDL and to reducing potential flooding.

- Inlet cleaning will be continued from the previous permit:
  - The street sweeping operations, listed under "Obligations from Previous Permit That Must Be Continued", were based on the total tonnage listed in the FY 2018 MS4 Annual Report for both reactive and pro-active inlet cleaning. The number of inlets are listed as the number of BMPs. FY 2018 MS4 Annual Report data was used as a basis of continued operations because FY 2019 had record-setting rainfall; tonnage was considered an outlier in the data set. The equivalent impervious area and pollution reductions were calculated using the 2014 Accounting Guidance. Cost estimations include a 2% annual escalation in operations costs.
  - The inlet cleaning operations listed under "Proposed Restoration for the Next Permit", are based on the estimated performance of a planned increase in inlet cleaning operations to routinely, proactively clean an additional 1,060 inlets on a quarterly basis. The increase in operations is proposed to start in CY 2023. The equivalent impervious area and pollution reductions were calculated using the 2019 Draft Accounting Guidance, and assumes about 15% of the material will be organic. The cost estimation is specific personnel, vehicles, supplies and tipping fees related to the increased operations: 3 new crews starting in 2023 and another 3 crews starting in CY 2026. The City has appropriated funds in FY 2024 and 2025 for inlet modifications and in-line debris collection devices, which may enhance the effectiveness of the pro-active cleaning.
- The capital projects from the March 2020 Portfolio submittal have been revised to reflect the current costs, schedule (CY), and nutrient reduction based on the 2019 Draft Accounting Guidance. The March 2020 Portfolio submittal only included projects which were already in the design phase. This revised submittal has included stream restoration, ESD projects, district-level rainwater harvesting, and outfall stabilization projects which are currently in the planning phase and are scheduled to be completed by CY 2027. Green infrastructure and watershed management credits were applied as appropriate. The actual number of facilities for all capital projects show the number of locations. Implementation costs include both design and construction costs; operations and maintenance (O & M) costs are not included in the portfolio. O & M costs for the ESD projects are estimated to increase the City's operations budget by $600,000 / year by CY 2024.

- Future tree planting efforts, performed by Tree Baltimore, will be starting CY 2023. In the March Portfolio submittal, tree planting efforts were not listed because mitigation funds were going to be used large portion of the future plantings starting in CY 2020. The revised portfolio estimates about 500 tree planted /year as "Urban Tree Planting".
- Illicit discharge detection and elimination (IDDE) were listed by year under the category of "Other". IDDE credits last only for 10 years. The credits are cumulative of the IDDE efforts listed in the IDDE table of FY 2019 MS4 geodatabase. The IDDE efforts include sanitary sewer overflows (SSO) which were found only from the IDDE operations and would have otherwise not been found (i.e. the overflow did not appear at the ground surface). The reduction in equivalent impervious area and pollutant reductions in CY 2025 are a reflection of the 10-year schedule for this type of BMP.
- Restoration projects performed by private entities:
    - Potential redevelopment was listed under the category of "Other" and includes a conservative estimate of the approach used in development. No costs are listed, since implementation would be performed by private entities.
    - Volunteer efforts by community organizations and non-profit groups were listed based on historic efforts. The listed implementation costs only include 5 years of the City funded grant program (currently $200,000 / year); matching contributions from the private entity are not shown in the portfolio.
- The Revised Portfolio includes the City's efforts to develop a hydraulic and hydrologic model for the City's storm drain system. The estimated cost for this effort is $20M. This project is critical for future stormwater capital projects and programs related to asset management and flood reduction.

Although not listed in the Portfolio, the City plans to spend approximately $50M on storm drain rehabilitation projects by CY 2025. These projects address both failing infrastructure and flood management, such as:

- Lining the 10-foot storm tunnel associated with the sinkhole at Monument Street in 2012, which closed a City block for 6 months.
- H & H Model, plus gray and green infrastructure installation to address flooding at Frederick Avenue, where evacuations occurred in 2018.
- Re-alignment of storm drain system at Patapsco Avenue to relieve repeated flooding in Cherry Hill neighborhood.

The Portfolio also does not show the efforts to address the City's bacteria TMDLs, which will be completed under the Modified Consent Decree (MCD) for sanitary sewer overflows (Civil Action JFM-02-1524) by 2031. The cost of the capital projects associated with Phase I of the Modified Consent Decree is on the order of $2.6 billion, completed by CY 2021. Costs for Phase II of the MCD have not been determined yet. Costs associated with the capital projects for the MCD are reported to MDE as part of the quarterly MCD reports, which are posted on-line.

A summary of the restoration efforts from the previous permit and proposed for the next permit are summarized in the following table.

Summary of Restoration by End of Next Permit

Description	Reference	Area (ac)
Projects at end of Current Permit	FY 2019 MS4 Annual Report, WIP Progress tables for Projects	101
Restoration by Others at end of Current Permit	FY 2019 MS4 Annual Report, WIP Progress tables for Partnerships	659
Annual Operations (current)	Portfolio, average CY 2019 - 2025	5,701
Annual Operations (proposed)	Portfolio, total CY 2021 – 2025, divided by 5	2,259
Capital projects proposed	Portfolio for next permit as of CY 2025, including GSI and WQM credits	882
IDDE	Portfolio, as listed for CY 2025	150
Redevelopment + volunteer	Portfolio as of CY 2025	166
Total as of CY 2025		**9,918**
Baseline impervious	Baltimore City MS4 & TMDL Watershed Implementation Plan (2015)	21,455
Portion of baseline impervious area restored by CY 2025		**46%**

Restoration Projects To Be Planned, Designed, and/or Constructed From The End Of 4th Generation Permit Through CY 2027

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 INFRASTRUC-TURE (GSI) CREDIT (IA X 0.35)	WATERSHED MANAGE-MENT (WM) CREDIT	TOTAL IMP ACRES (W/ GSI AND WM CREDITS)	IMPLEMEN-TATION COST	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]																			
Street Sweeping*		A	ANNUAL											0					
		A												0					
		A												0					
		A																	
		A																	
Catch Basin Cleaning*		A												0					
		A												0					
		A												0					
		A												0					
		A												0					
Septic Sytem Pumping		A												0					
		A												0					
		A												0					
		A												0					
		A												0					
		A												0					
Subtotal Operations[3]				0				0	0	0	0			0	$0				
Capital Projects (Unmet Obligations from Previous Permit Term)																			
														0					
														0					
														0					
														0					
Subtotal Capital				0				0	0	0	0	0	0	0	$0				
Other (Unmet Obligations from Previous Permit Term)																			
														0					
														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[4,5]																			
Street Sweeping	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,218,386	Complete	2019	Bay/ local TN,TP, TSS, trash	2014 guidance,min. 2 x / mo
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,322,753	Under Construction	2020	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,429,208	Design	2021	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,537,792	Design	2022	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,648,548	Design	2023	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,761,519	Design	2024	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,876,750	Design	2025	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,994,285	Design	2026	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$6,114,170	Design	2027	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
Catch Basin Cleaning	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,246,485	Complete	2019	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as reference
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,331,414	Under Construction	2020	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,418,043	Design	2021	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,506,404	Design	2022	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,596,532	Design	2023	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,688,463	Design	2024	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,782,232	Design	2025	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,877,876	Design	2026	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,975,434	Design	2027	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
Septic Sytem Pumping		A												0					
		A												0					
		A												0					
		A												0					
		A												0					
Subtotal Operations[3]								1,773	3,957,062	26,026	5,701			5701	$92,326,294				
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**				**1,773.0**	**3,957,062.0**	0	0	**0.0**	**0.0**	**5,701.0**	**$92,326,294**				

Proposed Restoration for the Next Permit																				
Operational Programs[4]																				
Street Sweeping	VSS	A	ANNUAL	1			15,029	2,210	8,209,781	2,842	1,247			1,247	$0	Planning	2021	Trash, Bay/ local TN,TP, TSS	1 pass / 4 weeks. No add. Costs
	VSS	A	ANNUAL	1			15,029	2,210	8,209,781	2,842	1,247			1,247	$0	Planning	2022	Trash, Bay/ local TN,TP, TSS	1 pass / 4 weeks. No add. Costs
	VSS	A	ANNUAL	1			23,005	4,335	18,458,410	6,764	2,809			2,809	$0	Planning	2023	Trash, Bay/ local TN,TP, TSS	10% inc. for monthly and weekly routes. No add. Costs
	VSS	A	ANNUAL	1			23,005	4,335	18,458,410	6,764	2,809			2,809	$0	Planning	2024	Trash, Bay/ local TN,TP, TSS	Same as above
	VSS	A	ANNUAL	1			23,005	4,335	18,458,410	6,764	2,809			2,809	$0	Planning	2025	Trash, Bay/ local TN,TP, TSS	Same as above
	VSS	A	ANNUAL	1			23,005	4,335	18,458,410	6,764	2,809			2,809	$0	Planning	2026	Trash, Bay/ local TN,TP, TSS	Same as above
	VSS	A	ANNUAL	1			23,005	4,335	18,458,410	6,764	2,809			2,809	$0	Planning	2027	Trash, Bay/ local TN,TP, TSS	Same as above
Catch Basin Cleaning	CBC	A	ANNUAL	200			100	79	125,000	388	25			25	$436,271	Planning	2023	Trash, Bay/ local TN,TP, TSS	Additional pro-active cleaning, assume 15% organic (tons)
	SDV	A	ANNUAL	860			400	314	500,000	1,552	99			99	$1,130,580	Planning	2023	Trash, Bay/ local TN,TP, TSS	Same as above
	CBC	A	ANNUAL	200			100	79	125,000	388	25			25	$744,838	Planning	2024	Trash, Bay/ local TN,TP, TSS	Same as above, plus capital for debris collection devices
	SDV	A	ANNUAL	860			400	314	500,000	1,552	99			99	$229,736	Planning	2024	Trash, Bay/ local TN,TP, TSS	Same as above,
	CBC	A	ANNUAL	200			100	79	125,000	388	25			25	$1,862,930	Planning	2025	Trash, Bay/ local TN,TP, TSS	Same as above, plus capital for debris collection devices
	SDV	A	ANNUAL	860			400	314	500,000	1,552	99			99	$283,816	Planning	2025	Trash, Bay/ local TN,TP, TSS	Same as above
	CBC	A	ANNUAL	430			200	157	250,000	776	49			49	$779,008	Planning	2026	Trash, Bay/ local TN,TP, TSS	Same as above
	SDV	A	ANNUAL	1730			800	629	1,000,000	3,103	197			197	$1,644,678	Planning	2026	Trash, Bay/ local TN,TP, TSS	Same as above
	CBC	A	ANNUAL	430			200	157	250,000	776	49			49	$575,746	Planning	2027	Trash, Bay/ local TN,TP, TSS	Same as above
	SDV	A	ANNUAL	1730			800	629	1,000,000	3,103	197			197	$661,576	Planning	2027	Trash, Bay/ local TN,TP, TSS	Same as above
Septic Sytem Pumping		A																	
		A																	
		A																	
		A																	
		A																	
Subtotal Operations (up to 2025)[6]								3,721	14,733,958	6,359	2,259			2,259	$4,688,171				
Capital Projects																			
	MMBR	E	PERMANENT	6	6.88	0.6		6	13079	44	1.87	2.52		4.39	$691,069	Design	2022	Bay/ local TN,TP, TSS	Traffic calming and education
	MMBR	E	PERMANENT	14	9.57	1		10	22115	74	3.73	5.04		8.77	$243,863	Design	2022	Bay/ local TN,TP, TSS	Traffic calming and education
	MMBR	E	PERMANENT	10	4.9	1.2		6	11826	39	3.2	4.32	0.16	7.68	$1,124,962	Design	2023	Bay/ local TN,TP, TSS	Traffic calming and education
	MMBR	E	PERMANENT	7	3	1		3	6933	23	2.4	3.24		5.64	$825,000	Planning	2024	Bay/ local TN,TP, TSS	Traffic calming and education
	MMBR	E	PERMANENT	14	6	1		7	13865	46	5	6.75		11.75	$1,650,000	Planning	2025	Bay/ local TN,TP, TSS	Traffic calming and education
	FBIO	S	PERMANENT	20	20.93	1.4		25	52034	174	6.67	9		15.67	$2,774,700	Design	2022	Bay/ local TN,TP, TSS	Education
	FBIO	S	PERMANENT	16	10.06	1.2		12	24279	81	5.85	7.9		13.75	$2,014,252	Design	2023	Bay/ local TN,TP, TSS	Education
	IMPP	A	PERMANENT	14	4.11	NA		2	29015	28	3.37			3.37	$995,583	Complete	2020	Bay/ local TN,TP, TSS	Education, school
	IMPP	A	PERMANENT	11	4.89	NA		2	34523	33	4.01			4.01	$883,677	Design	2022	Bay/ local TN,TP, TSS	Education, school
	IMPP	A	PERMANENT	7	1.06	NA		0.5	7490	7	0.87			0.87	$425,690	Design	2023	Bay/ local TN,TP, TSS	Education, school
	FPU	A	PERMANENT	4	1.18	NA		1	1430	4	0.33			0.33	$32,122	Design	2022	Bay/ local TN,TP, TSS	Education, school
	FPU	A	PERMANENT	25	5	NA		3	6065	16	1.4			1.4	$220,000	Planning	2023	Bay/ local TN,TP, TSS	Est. 500 trees / yr, Tree Baltimore
	FPU	A	PERMANENT	25	5	NA		3	6065	16	1.4			1.4	$220,000	Planning	2024	Bay/ local TN,TP, TSS	Est. 500 trees / yr, Tree Baltimore
	FPU	A	PERMANENT	25	5	NA		3	6065	16	1.4			1.4	$220,000	Planning	2025	Bay/ local TN,TP, TSS	Est. 500 trees / yr, Tree Baltimore
	FPU	A	PERMANENT	25	5	NA		3	6065	16	1.4			1.4	$220,000	Planning	2026	Bay/ local TN,TP, TSS	Est. 500 trees / yr, Tree Baltimore
	MENF	E	PERMANENT	1	3.07	2.6		4	8018	27	2.02	2.73	0.8	5.55	$1,088,072	Design	2023	Bay/ local TN,TP, TSS	
	WPWS	S	PERMANENT	2	1.02	1.6		1	2033	5	0.78	1.05	0.12	1.95	$150,909	Design	2023	Bay/ local TN,TP, TSS	
	MRWH	E	PERMANENT	8	20	1		22	46218	154	20	27		47	$1,200,000	Planning	2024	Bay/ local TN,TP, TSS	Flood mgt, DW conservation
	MRWH	E	PERMANENT	8	20	1		22	46218	154	20	27		47	$1,200,000	Planning	2025	Bay/ local TN,TP, TSS	Flood mgt, DW conservation
	MRWH	E	PERMANENT	12	20	1		33	69327	231	30	40.5		70.5	$1,800,000	Planning	2026	Bay/ local TN,TP, TSS	Flood mgt, DW conservation
	MRWH	E	PERMANENT	12	20	1		33	69327	231	30	40.5		70.5	$1,800,000	Planning	2027	Bay/ local TN,TP, TSS	Flood mgt, DW conservation
	SPSC	A	PERMANENT	1	7.2	1		8	16638	55	6.08	8.21		14.29	$1,180,295	Design	2022	Bay/ local TN,TP, TSS	Treated as upland/ MMBR
	STRE	A	PERMANENT	1	NA	NA	12700	864	3149600	953	254			254	$11,440,864	Under Construction	2021	Bay/ local TN,TP, TSS	Utility protection, education
	STRE	A	PERMANENT	2	NA	NA	7653	520	1897944	574	153			153	$18,116,471	Design	2022	Bay/ local TN,TP, TSS	Utility protection, education
	STRE	A	PERMANENT	4	NA	NA	11967	814	2967816	898	239			239	$12,729,736	Design	2023	Bay/ local TN,TP, TSS	Utility protection, education
	STRE	A	PERMANENT	1	NA	NA	10560	718	2618880	792	211			211	$22,500,000	Planning	2026	Bay/ local TN,TP, TSS	Utility protection, education
	OUT	A	PERMANENT	50	NA	NA	2000	136	496000	150	20			20	$3,790,000	Planning	2024	Bay/ local TN,TP, TSS	
	OUT	A	PERMANENT	50	NA	NA	2000	136	496000	150	20			20	$3,790,000	Planning	2025	Bay/ local TN,TP, TSS	
	OUT	A	PERMANENT	50	NA	NA	2000	136	496000	150	20			20	$3,790,000	Planning	2026	Bay/ local TN,TP, TSS	
	OUT	A	PERMANENT	50	NA	NA	2000	136	496000	150	20			20	$3,790,000	Planning	2027	Bay/ local TN,TP, TSS	
														0					
Subtotal Capital (up to 2025)				475				2610.5	9361269	3721	776.38	104.76	1.08	882.22	$67,007,265				
Other																			
	IDDE	A	ANNUAL	1				500	0	3218	135			135	$1,816,333	Complete	2019	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015
	IDDE	A	ANNUAL	1				523	0	3343	141			141	$152,660	Under Construction	2020	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015
	IDDE	A	ANNUAL	1				569	0	3593	152			152	$1,889,713	Planning	2021	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015
	IDDE	A	ANNUAL	1				612	0	3833	163			163	$1,927,507	Planning	2022	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015
	IDDE	A	ANNUAL	1				651	0	4063	174			174	$1,966,057	Planning	2023	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015
	IDDE	A	ANNUAL	1				694	0	4283	184			184	$2,005,378	Planning	2024	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015
	IDDE	A	ANNUAL	1				569	0	3482	150			150	$2,045,486	Planning	2025	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015
	IDDE	A	ANNUAL	1				548	0	3259	143			143	$2,086,396	Planning	2026	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015
	IDDE	A	ANNUAL	1				400	0	2245	102			102	$2,128,124	Planning	2027	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015
	IMPP	A	PERMANENT	1	15	1		6	105900	101	6			6	$0	Planning	2025	Bay/ local TN,TP, TSS	Est. redevelopment 2019-2025
	MMBR	E	PERMANENT	1	75	1		82	173317	577	82			82	$0	Planning	2025	Bay/ local TN,TP, TSS	Est. redevelopment 2019-2025
	FSND	S	PERMANENT	1	40	1		41	72600	180	41			41	$0	Planning	2025	Bay/ local TN,TP, TSS	Est. redevelopment 2019-2025
	WPWS	S	PERMANENT	1	25	1		26	45375	113	26			26	$0	Planning	2025	Bay/ local TN,TP, TSS	Est. redevelopment 2019-2025
	IMPP	A	PERMANENT	1	1	1		0.4	7060	7	1			1	$250,000	Planning	2025	Bay/ local TN,TP, TSS, trash	Est. grant funded, volunteer NGO
	MMBR	E	PERMANENT	1	12	1		13	27731	92	10			10	$750,000	Planning	2025	Bay/ local TN,TP, TSS, trash	Est. grant funded, volunteer NGO
	OTH	A	PERMANENT	1											$20,000,000	Planning	2025	Bay/ local TN,TP, TSS, trash	H & H model of Storm drain system
Subtotal Other (up to 2025)				15				737	431983	4552	316	0	0	316	$32,803,134				
Total for Next Permit (up to 2025)				**490**				**7,068.7**	**24,527,210.4**	**14,632.2**	**3,351.0**	**104.8**	**1.1**	**3,456.8**	**$104,498,570**				
Total for Next Permit and Projected Years				**7,997**				**13,025**	**29,704,081**	**45,263.1**	**5,085**	**185.8**	**1.1**	**5,271.8**	**$139,594,755**				
Total for Remaining Obligations from The Previous Permit, Continued Obligations, and Proposed Activities for The Next Permit (up to 2025)				**1,619**				**8,842**	**28,484,272**	**40,658**	**9,052**	**104.8**	**1.1**	**9,157.8**	**$114,550,646**				
Total for Remaining Obligations from The Previous Permit, Continued Obligations, and Proposed Activities for The Next Permit (up to 2027)				**1,813**				**14,955**	**33,911,143**	**72,065**	**10,835**	**186**	**1**	**11,022**	**$129,853,232**				

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

BMP Classification	BMP Type Code	BMP Type
Alternative Surfaces (A)		
E	AGRE	Green Roof – Extensive
E	AGRI	Green Roof – Intensive
E	APRP	Permeable Pavements
E	ARTF	Reinforced Turf
Nonstructural Techniques (N)		
E	NDRR	Disconnection of Rooftop Runoff
E	NDNR	Disconnection of Non-Rooftop Runoff
E	NSCA	Sheetflow to Conservation Areas
Micro-Scale Practices (M)		
E	MRWH	Rainwater Harvesting
E	MSGW	Submerged Gravel Wetlands
E	MILS	Landscape Infiltration
E	MIBR	Infiltration Berms
E	MIDW	Dry Wells
E	MMBR	Micro-Bioretention
E	MRNG	Rain Gardens
E	MSWG	Grass Swale
E	MSWW	Wet Swale
E	MSWB	Bio-Swale
E	MENF	Enhanced Filters
Ponds (P)		
S	PWED	Extended Detention Structure, Wet
S	PWET	Retention Pond (Wet Pond)
S	PMPS	Multiple Pond System
S	PPKT	Pocket Pond
S	PMED	Micropool Extended Detention Pond
Wetlands (W)		
S	WSHW	Shallow Marsh
S	WEDW	ED – Wetland
S	WPWS	Wet Pond – Wetland
S	WPKT	Pocket Wetland
Infiltration (I)		
S	IBAS	Infiltration Basin
S	ITRN	Infiltration Trench
Filtering Systems (F)		

S	FBIO	Bioretention
S	FSND	Sand Filter
S	FUND	Underground Filter
S	FPER	Perimeter (Sand) Filter
S	FORG	Organic Filter (Peat Filter)
S	FBIO	Bioretention
Open Channels (O)		
S	ODSW	Dry Swale
S	OWSW	Wet Swale
Other Practices (X)		
S	XDPD	Detention Structure (Dry Pond)
S	XDED	Extended Detention Structure, Dry
S	XFLD	Flood Management Area
S	XOGS	Oil Grit Separator
S	XOTH	Other
Alternative BMPs		
A	MSS	Mechanical Street Sweeping
A	VSS	Regenerative/Vacuum Street Sweeping
A	IMPP	Impervious Surface Elimination (to pervious)
A	IMPF	Impervious Surface Elimination (to forest)
A	FPU	Planting Trees or Forestation on Pervious Urban
A	CBC	Catch Basin Cleaning
A	SDV	Storm Drain Vacuuming
A	STRE	Stream Restoration
A	OUT	Outfall Stabilization
A	SPSC	Regenerative Step Pool Storm Conveyance
A	SHST	Shoreline Management
A	SEPP	Septic Pumping
A	SEPD	Septic Denitrification
A	SEPC	Septic Connections to WWTP
A	FTW	Floating Treatment Wetland
A	FTC	Forest Conservation
A	CLS	Conservation Landscaping
A	RCL	Riparian Conservation Landscaping
A	IDDE	Illicit Discharge Detection & Elimination
A	OTH	Other

From: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Sent: Mon, 27 Apr 2020 16:05:12 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>; "Christina Lyerly -MDE-" <christina.lyerly@maryland.gov>
Subject: Re: MS4 MEP Discussion

Kim...

Thank you! We will contact you if there are any questions. Stew.

On Mon, Apr 27, 2020 at 12:00 PM Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov> wrote:

> Attached is the final revised submittal of the portfolio. Please feel free to contact me if you have any questions.
>
> Thanks,
>
> Kimberly L. Grove, P.E.
>
> Chief, Office of Compliance & Laboratories
>
> Baltimore City Department of Public Works
>
> (410) 396 - 0732 (office)
>
> (443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Tuesday, April 21, 2020 3:45 PM
To: Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov>
Cc: Christina Lyerly -MDE- <christina.lyerly@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: MS4 MEP Discussion

Hi Kim,

We understand. Friday, the 24th works. Thanks for your hard work on the resubmission.

Brian

On Tue, Apr 21, 2020 at 12:32 PM Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov> wrote:

> I need to push the re-submittal schedule back to Friday, April 24 to allow for suitable review within my organization, especially with the increased efforts. Please confirm approval in this change to the submittal schedule.
>
> Thanks,
>
> Kimberly L. Grove, P.E.
>
> Chief, Office of Compliance & Laboratories
>
> Baltimore City Department of Public Works

(410) 396 - 0732 (office)

(443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Monday, April 6, 2020 3:29 PM
To: Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov>
Cc: Christina Lyerly -MDE- <christina.lyerly@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: MS4 MEP Discussion

Hi Kim,

In preparation for Wednesday's discussion, we developed the attached checklist to help with our review. Feel free to give it a look and let us know if you have any questions.

Best,

Brian

On Fri, Apr 3, 2020 at 5:35 PM Brian Cooper -MDE- <brian.cooper@maryland.gov> wrote:

Thanks, Kim. We have you on our calendars for next Wednesday from 10-11 AM. I'll send you a calendar invite with the conference call/video conferencing information.

Have a great weekend!

Brian

On Fri, Apr 3, 2020 at 10:07 AM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> It will just be me on the call if it's focused on the MEP submittal. I'm available:
>
> Monday, April 6, 10 to noon or after 2 pm
>
> Tuesday, April 7, 10 am to noon
>
> Wednesday, April 8, 10 to 11 am
>
> Thanks,
>
> Kimberly L. Grove, P.E.
>
> Chief, Office of Compliance & Laboratories
>
> Baltimore City Department of Public Works
>
> (410) 396 - 0732 (office)
>
> (443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Thursday, April 2, 2020 2:10 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>
Cc: Krause, Nathaniel <Nathaniel.Krause@baltimorecity.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>; Christina Lyerly -MDE- <christina.lyerly@maryland.gov>
Subject: MS4 MEP Discussion

Good afternoon Kim and Nathaniel,

I hope you both are doing well!

Thank you for your most recent MEP submission. We are finalizing our review and we have some clarifying questions that we would like to ask you. We'd like to do that early next week; probably need only 1 hour or less of your time. We can be available:

Monday, April 6 between 10A-4:30P
Tuesday, April 7 between 10A-1P
Wednesday, April 8 between 10A-12P and 3-4:30P

If these times do not work, please suggest other possible times for next week.

Best regards,
Brian

--

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

--

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

--

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
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Click here to complete a three question customer experience survey.

--

Maryland is currently operating under a state of emergency due to the coronavirus. Although most of us are working remotely from home, MDE continues to operate and remains open for business. We strive to provide great customer service and meet your needs; however, we ask that you have patience with us during this time. Stay healthy! Thank you.

Stewart Comstock, P.E.

Program Review Division Chief

Water and Science Administration

Maryland Department of the Environment

1800 Washington Boulevard

Baltimore, Maryland 21230

stewart.comstock@maryland.gov

(410) 537-3550 (O)

Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

From: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>
Sent: Fri, 1 May 2020 20:39:13 +0000
To: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Cc: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Christina Lyerly -MDE-" <christina.lyerly@maryland.gov>
Subject: Re: MS4 MEP Discussion

Good afternoon Kim,

Thank you again for submitting the revised MEP portfolio. It shows a lot of hard work and is a good proposal for the next permit term. The following are items that were identified as either missing or necessary to complete the Department's review:

1. Thank you for including the additional information on annual BMPs. How were street sweeping EIAs calculated?

2. The City's summary shows 760 acres of restoration at the end of the current permit, and has included these acres as part of the total restoration achieved as of CY2025. Please clarify the amount of additional acres that have been achieved since the expiration of the current permit. Is it 236 acres as shown in the table below?

	ISR as of 2018	**ISR as of June 2019**	**Difference; i.e., projects completed in FY2019**
Projects	53	101	48
Partnerships	471	659	188
Total Projects/Partnerships	**524**	**760**	**236**
Programs	4006	6161	2155
Total 3 categories	**4530**	**6921**	**2391**

3. Please update the impervious acres for outfall stabilization so that the 0.02 conversion is used instead of 0.01.

4. The summary states that "O & M costs for the ESD projects are estimated to increase the City's operations budget by $600,000 / year by CY 2024." Under the "Other" section

for "Proposed Restoration for the Next Permit", please add line items for annual operations and maintenance in the Portfolio.

5. The Department thanks the City for providing the cost of the hydraulic and hydrologic model for the City's storm drain system. Additionally, thank you for indicating in the summary that "The Portfolio also does not show the efforts to address the City's bacteria TMDLs, which will be completed under the Modified Consent Decree (MCD) for sanitary sewer overflows." Although the portfolio does not show efforts for the bacteria TMDLs, does the City have cost data on PCB source tracking? If so, these data could be included as line items for the five years of the next permit.

This information is needed to complete our work on the draft permit. Are you ok with providing this information by Friday, May 15? As always, let us know if there are any questions. This has been a large effort on both of our parts and the Department would like to thank the City for its continued effort toward improving local water quality and restoring Chesapeake Bay.

Have a great weekend!
Brian

On Mon, Apr 27, 2020 at 12:05 PM Stewart Comstock -MDE- <stewart.comstock@maryland.gov> wrote:

Kim...

Thank you! We will contact you if there are any questions. Stew.

On Mon, Apr 27, 2020 at 12:00 PM Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov> wrote:

Attached is the final revised submittal of the portfolio. Please feel free to contact me if you have any questions.

Thanks,

Kimberly L. Grove, P.E.

Chief, Office of Compliance & Laboratories

Baltimore City Department of Public Works

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From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Tuesday, April 21, 2020 3:45 PM
To: Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov>
Cc: Christina Lyerly -MDE- <christina.lyerly@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: MS4 MEP Discussion

Hi Kim,

We understand. Friday, the 24th works. Thanks for your hard work on the resubmission.

Brian

On Tue, Apr 21, 2020 at 12:32 PM Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov> wrote:

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Baltimore City Department of Public Works

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Sent: Monday, April 6, 2020 3:29 PM
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Sent: Fri, 1 May 2020 20:49:35 +0000
To: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Cc: "Christina Lyerly -MDE-" <christina.lyerly@maryland.gov>
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Thanks for the review. Yes, we can address your comments by May 15.

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Sent: Thu, 7 May 2020 18:31:47 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Christina Lyerly -MDE-" <christina.lyerly@maryland.gov>
Subject: Baltimore City MEP Acres and Annual Practices

Hi Kim,

The Department has been discussing the proposed restoration in Baltimore City's portfolio. To be conservative, the Department recommends that the City's portfolio not include the additional 2,259 acres of new street sweeping, storm drain vacuuming, and catch basin cleaning. With the additional acres for outfall stabilization, the portfolio would show 1,474 acres of proposed restoration for the reissued permit. Is the City OK with this?

Thank you,
Brian
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CHANGING Maryland FOR THE BETTER

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Subject: RE: Baltimore City MEP Acres and Annual Practices

Would we still be able to account for the street sweeping and inlet cleaning in our Annual Reports?

Thanks,

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To: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>; "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>
Cc: "Christina Lyerly -MDE-" <christina.lyerly@maryland.gov>
Subject: RE: MS4 MEP Discussion
Attachments: Baltimore City Portfolio summary 5-15-2020.docx, Restoration Project Portfolio Balt City Rev 5-15-2020.xlsx

Attached is the third revision to the City's Restoration portfolio, addressing your comments below in addition to the removal of the proposed street sweeping and inlet cleaning, to be conservative.

Please feel free to contact me if you have any questions.

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Restoration Projects To Be Planned, Designed, and/or Constructed From The End Of 4th Generation Permit Through CY 2027

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 INFRASTRUC-TURE (GSI) CREDIT (IA X 0.35)	WATERSHED MANAGE-MENT (WM) CREDIT	TOTAL IMP ACRES (W/ GSI AND WM CREDITS)	IMPLEMEN-TATION COST	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]																			
Street Sweeping*		A	ANNUAL											0					
		A												0					
		A												0					
		A																	
		A																	
Catch Basin Cleaning*		A												0					
		A												0					
		A												0					
		A												0					
		A												0					
Septic Sytem Pumping		A												0					
		A												0					
		A												0					
		A												0					
		A												0					
		A												0					
Subtotal Operations[3]				0				0	0	0	0			0	$0				
Capital Projects (Unmet Obligations from Previous Permit Term)																			
														0					
														0					
														0					
														0					
Subtotal Capital				0				0	0	0	0	0	0	0	$0				
Other (Unmet Obligations from Previous Permit Term)																			
														0					
														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[2,4]																			
Street Sweeping	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,218,386	Complete	2019	Bay/ local TN,TP, TSS, trash	2014 guidance,min. 2 x / mo
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,322,753	Under Construction	2020	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,429,208	Design	2021	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,537,792	Design	2022	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,648,548	Design	2023	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,761,519	Design	2024	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,876,750	Design	2025	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$5,994,285	Design	2026	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
	VSS	A	ANNUAL	1			80,187	1,718	3,790,658	24,639	5,475			5,475	$6,114,170	Design	2027	Bay/ local TN,TP, TSS, trash	2014 guid.,min. 2 x / mo, 2% COLA
Catch Basin Cleaning	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,246,485	Complete	2019	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as reference
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,331,414	Under Construction	2020	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,418,043	Design	2021	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,506,404	Design	2022	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,596,532	Design	2023	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,688,463	Design	2024	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,782,232	Design	2025	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,877,876	Design	2026	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
	CBC	A	ANNUAL	1,128			556	55	166,404	1,387	226			226	$4,975,434	Design	2027	Bay/ local TN,TP, TSS, trash	2014 guidance, FY 2018 AR as ref.
Septic Sytem Pumping		A												0					
		A												0					
		A												0					
		A												0					
		A												0					
Subtotal Operations[3]								1,773	3,957,062	26,026	5,701			5701	$92,326,294				
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**				**1,773.0**	**3,957,062.0**	0	0	**0.0**	**0.0**	**5,701.0**	**$92,326,294**				

Proposed Restoration for the Next Permit																				
Operational Programs[4]																				
Street Sweeping		A												-						
		A												-						
		A												-						
		A												-						
		A												-						
Catch Basin Cleaning		A												-						
		A												-						
		A												-						
		A												-						
		A												-						
Septic Sytem Pumping		A																		
		A																		
		A																		
		A																		
		A																		
Subtotal Operations (up to 2025)[5]								0	0	0	0			0	$0					
Capital Projects																				
	MMBR	E	PERMANENT	6	6.88	0.6		6	13079	44	1.87	2.52		4.39	$691,069	Design	2022	Bay/ local TN,TP, TSS	Traffic calming and education	
	MMBR	E	PERMANENT	14	9.57	1		10	22115	74	3.73	5.04		8.77	$243,863	Design	2022	Bay/ local TN,TP, TSS	Traffic calming and education	
	MMBR	E	PERMANENT	10	4.9	1.2		6	11826	39	3.2	4.32	0.16	7.68	$1,124,962	Design	2023	Bay/ local TN,TP, TSS	Traffic calming and education	
	MMBR	E	PERMANENT	7	3	1		3	6933	23	2.4	3.24		5.64	$825,000	Planning	2024	Bay/ local TN,TP, TSS	Traffic calming and education	
	MMBR	E	PERMANENT	14	6	1		7	13865	46	5	6.75		11.75	$1,650,000	Planning	2025	Bay/ local TN,TP, TSS	Traffic calming and education	
	FBIO	S	PERMANENT	20	20.93	1.4		25	52034	174	6.67	9		15.67	$2,774,700	Design	2022	Bay/ local TN,TP, TSS	Education	
	FBIO	S	PERMANENT	16	10.06	1.2		12	24279	81	5.85	7.9		13.75	$2,014,252	Design	2023	Bay/ local TN,TP, TSS	Education	
	IMPP	A	PERMANENT	14	4.11	NA		2	29015	28	3.37			3.37	$995,583	Complete	2020	Bay/ local TN,TP, TSS	Education, school	
	IMPP	A	PERMANENT	11	4.89	NA		2	34523	33	4.01			4.01	$883,677	Design	2022	Bay/ local TN,TP, TSS	Education, school	
	IMPP	A	PERMANENT	7	1.06	NA		0.5	7490	7	0.87			0.87	$425,690	Design	2023	Bay/ local TN,TP, TSS	Education, school	
	FPU	A	PERMANENT	4	1.18	NA		1	1430	4	0.33			0.33	$32,122	Design	2022	Bay/ local TN,TP, TSS	Education, school	
	FPU	A	PERMANENT	25	5	NA		3	6065	16	1.4			1.4	$220,000	Planning	2023	Bay/ local TN,TP, TSS	Est. 500 trees / yr, Tree Baltimore	
	FPU	A	PERMANENT	25	5	NA		3	6065	16	1.4			1.4	$220,000	Planning	2024	Bay/ local TN,TP, TSS	Est. 500 trees / yr, Tree Baltimore	
	FPU	A	PERMANENT	25	5	NA		3	6065	16	1.4			1.4	$220,000	Planning	2025	Bay/ local TN,TP, TSS	Est. 500 trees / yr, Tree Baltimore	
	FPU	A	PERMANENT	25	5	NA		3	6065	16	1.4			1.4	$220,000	Planning	2026	Bay/ local TN,TP, TSS	Est. 500 trees / yr, Tree Baltimore	
	MENF	E	PERMANENT	1	3.07	2.6		4	8018	27	2.02	2.73	0.8	5.55	$1,088,072	Design	2023	Bay/ local TN,TP, TSS		
	WPWS	S	PERMANENT	2	1.02	1.6		1	2033	5	0.78	1.05	0.12	1.95	$150,909	Design	2023	Bay/ local TN,TP, TSS		
	MRWH	E	PERMANENT	8	20	1		22	46218	154	20	27		47	$1,200,000	Planning	2024	Bay/ local TN,TP, TSS	Flood mgt, DW conservation	
	MRWH	E	PERMANENT	8	20	1		22	46218	154	20	27		47	$1,200,000	Planning	2025	Bay/ local TN,TP, TSS	Flood mgt, DW conservation	
	MRWH	E	PERMANENT	12	20	1		33	69327	231	30	40.5		70.5	$1,800,000	Planning	2026	Bay/ local TN,TP, TSS	Flood mgt, DW conservation	
	MRWH	E	PERMANENT	12	20	1		33	69327	231	30	40.5		70.5	$1,800,000	Planning	2027	Bay/ local TN,TP, TSS	Flood mgt, DW conservation	
	SPSC	A	PERMANENT	1	7.2	1		8	16638	55	6.08	8.21		14.29	$1,180,295	Design	2022	Bay/ local TN,TP, TSS	Treated as upland/ MMBR	
	STRE	A	PERMANENT	1	NA	NA	12700	864	3149600	953	254			254	$11,440,864	Under Construction	2021	Bay/ local TN,TP, TSS	Utility protection, education	
	STRE	A	PERMANENT	2	NA	NA	7653	520	1897944	574	153			153	$18,116,471	Design	2022	Bay/ local TN,TP, TSS	Utility protection, education	
	STRE	A	PERMANENT	4	NA	NA	11967	814	2967816	898	239			239	$12,729,736	Design	2023	Bay/ local TN,TP, TSS	Utility protection, education	
	STRE	A	PERMANENT	1	NA	NA	10560	718	2618880	792	211			211	$22,500,000	Planning	2026	Bay/ local TN,TP, TSS	Utility protection, education	
	OUT	A	PERMANENT	50	NA	NA	2000	136	496000	150	40			40	$3,790,000	Planning	2024	Bay/ local TN,TP, TSS		
	OUT	A	PERMANENT	50	NA	NA	2000	136	496000	150	40			40	$3,790,000	Planning	2025	Bay/ local TN,TP, TSS		
	OUT	A	PERMANENT	50	NA	NA	2000	136	496000	150	40			40	$3,790,000	Planning	2026	Bay/ local TN,TP, TSS		
	OUT	A	PERMANENT	50	NA	NA	2000	136	496000	150	40			40	$3,790,000	Planning	2027	Bay/ local TN,TP, TSS		
														0						
Subtotal Capital (up to 2025)				475				2610.5	9361269	3721	816.38	104.76	1.08	922.22	$67,007,265					
Other																				
	IDDE	A	ANNUAL	1				500	0	3218	135			135	$1,816,333	Complete	2019	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015	
	IDDE	A	ANNUAL	1				523	0	3343	141			141	$152,660	Under Construction	2020	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015	
	IDDE	A	ANNUAL	1				569	0	3593	152			152	$1,889,713	Planning	2021	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015	
	IDDE	A	ANNUAL	1				612	0	3833	163			163	$1,927,507	Planning	2022	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015	
	IDDE	A	ANNUAL	1				651	0	4063	174			174	$1,966,057	Planning	2023	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015	
	IDDE	A	ANNUAL	1				694	0	4283	184			184	$2,005,378	Planning	2024	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015	
	IDDE	A	ANNUAL	1				569	0	3482	150			150	$2,045,486	Planning	2025	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015	
	IDDE	A	ANNUAL	1				548	0	3259	143			143	$2,086,396	Planning	2026	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015	
	IDDE	A	ANNUAL	1				400	0	2245	102			102	$2,128,124	Planning	2027	Bay/ local TN,TP, TSS, and bacteria	Cumulative since 2015	
	IMPP	A	PERMANENT	1	15	1		6	105900	101	6			6	$0	Planning	2025	Bay/ local TN,TP, TSS	Est. redevelopment 2019-2025	
	MMBR	E	PERMANENT	1	75	1		82	173317	577	82			82	$0	Planning	2025	Bay/ local TN,TP, TSS	Est. redevelopment 2019-2025	
	FSND	S	PERMANENT	1	40	1		41	72600	180	41			41	$0	Planning	2025	Bay/ local TN,TP, TSS	Est. redevelopment 2019-2025	
	WPWS	S	PERMANENT	1	25	1		26	45375	113	26			26	$0	Planning	2025	Bay/ local TN,TP, TSS	Est. redevelopment 2019-2025	
	IMPP	A	PERMANENT	1	1	1		0.4	7060	7	1			1	$250,000	Planning	2025	Bay/ local TN,TP, TSS, trash	Est. grant funded, volunteer NGO	
	MMBR	E	PERMANENT	1	12	1		13	27731	92	10			10	$750,000	Planning	2025	Bay/ local TN,TP, TSS, trash	Est. grant funded, volunteer NGO	
	OTH	A	PERMANENT	1											$20,000,000	Planning	2025	Bay/ local TN,TP, TSS, trash	H & H model of Storm drain system	
	OTH	A	ANNUAL	1											$150,000	Under Construction	2020	Bay/ local TN,TP, TSS, trash	O & M of BMPs, including stream rest	
	OTH	A	ANNUAL	1											$150,000	Planning	2021	Bay/ local TN,TP, TSS, trash	O & M of BMPs, including stream rest	
	OTH	A	ANNUAL	1											$200,000	Planning	2022	Bay/ local TN,TP, TSS, trash	O & M of BMPs, including stream rest	
	OTH	A	ANNUAL	1											$500,000	Planning	2023	Bay/ local TN,TP, TSS, trash	O & M of BMPs, including stream rest	
	OTH	A	ANNUAL	1											$600,000	Planning	2024	Bay/ local TN,TP, TSS, trash	O & M of BMPs, including stream rest	
	OTH	A	ANNUAL	1											$650,000	Planning	2025	Bay/ local TN,TP, TSS, trash	O & M of BMPs, including stream rest	
	OTH	A	ANNUAL	1											$700,000	Planning	2026	Bay/ local TN,TP, TSS, trash	O & M of BMPs, including stream rest	
	OTH	A	ANNUAL	1											$750,000	Planning	2027	Bay/ local TN,TP, TSS, trash	O & M of BMPs, including stream rest	
	OTH	A	PERMANENT	1											$400,000	Under Construction	2021	PCB TMDL	USGS/ UMBC Study	
Subtotal Other (up to 2025)				15				737	431983	4552	316	0	0	316	$32,803,134					
Total for Next Permit (up to 2025)				**490**				**3,347.9**	**9,793,252.0**	**8,273.0**	**1,132.4**	**104.8**	**1.1**	**1,238.2**	**$99,810,399**					
Total for Next Permit and Projected Years				**490**				**8,904**	**13,548,851**	**37,680.0**	**2,679**	**185.8**	**1.1**	**2,865.6**	**$137,924,919**					
Total for Remaining Obligations from The Previous Permit, Continued Obligations, and Proposed Activities for The Next Permit (up to 2025)				**1,619**				**5,121**	**13,750,314**	**34,299**	**6,833**	**104.8**	**1.1**	**6,939.2**	**$109,862,475**					
Total for Remaining Obligations from The Previous Permit, Continued Obligations, and Proposed Activities for The Next Permit (up to 2027)				**1,296**				**10,677**	**17,505,913**	**63,706**	**8,380**	**186**	**1**	**8,567**	**$128,183,396**					

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

BMP Classification	BMP Type Code	BMP Type
Alternative Surfaces (A)		
E	AGRE	Green Roof – Extensive
E	AGRI	Green Roof – Intensive
E	APRP	Permeable Pavements
E	ARTF	Reinforced Turf
Nonstructural Techniques (N)		
E	NDRR	Disconnection of Rooftop Runoff
E	NDNR	Disconnection of Non-Rooftop Runoff
E	NSCA	Sheetflow to Conservation Areas
Micro-Scale Practices (M)		
E	MRWH	Rainwater Harvesting
E	MSGW	Submerged Gravel Wetlands
E	MILS	Landscape Infiltration
E	MIBR	Infiltration Berms
E	MIDW	Dry Wells
E	MMBR	Micro-Bioretention
E	MRNG	Rain Gardens
E	MSWG	Grass Swale
E	MSWW	Wet Swale
E	MSWB	Bio-Swale
E	MENF	Enhanced Filters
Ponds (P)		
S	PWED	Extended Detention Structure, Wet
S	PWET	Retention Pond (Wet Pond)
S	PMPS	Multiple Pond System
S	PPKT	Pocket Pond
S	PMED	Micropool Extended Detention Pond
Wetlands (W)		
S	WSHW	Shallow Marsh
S	WEDW	ED – Wetland
S	WPWS	Wet Pond – Wetland
S	WPKT	Pocket Wetland
Infiltration (I)		
S	IBAS	Infiltration Basin
S	ITRN	Infiltration Trench
Filtering Systems (F)		

S	FBIO	Bioretention
S	FSND	Sand Filter
S	FUND	Underground Filter
S	FPER	Perimeter (Sand) Filter
S	FORG	Organic Filter (Peat Filter)
S	FBIO	Bioretention
Open Channels (O)		
S	ODSW	Dry Swale
S	OWSW	Wet Swale
Other Practices (X)		
S	XDPD	Detention Structure (Dry Pond)
S	XDED	Extended Detention Structure, Dry
S	XFLD	Flood Management Area
S	XOGS	Oil Grit Separator
S	XOTH	Other
Alternative BMPs		
A	MSS	Mechanical Street Sweeping
A	VSS	Regenerative/Vacuum Street Sweeping
A	IMPP	Impervious Surface Elimination (to pervious)
A	IMPF	Impervious Surface Elimination (to forest)
A	FPU	Planting Trees or Forestation on Pervious Urban
A	CBC	Catch Basin Cleaning
A	SDV	Storm Drain Vacuuming
A	STRE	Stream Restoration
A	OUT	Outfall Stabilization
A	SPSC	Regenerative Step Pool Storm Conveyance
A	SHST	Shoreline Management
A	SEPP	Septic Pumping
A	SEPD	Septic Denitrification
A	SEPC	Septic Connections to WWTP
A	FTW	Floating Treatment Wetland
A	FTC	Forest Conservation
A	CLS	Conservation Landscaping
A	RCL	Riparian Conservation Landscaping
A	IDDE	Illicit Discharge Detection & Elimination
A	OTH	Other

Summary of Restoration Portfolio Development for Baltimore City

The City of Baltimore submitted to MDE a portfolio of *Restoration Projects to Be Planned, Designed, and/or Constructed from CY 2020 through CY 2027* (Restoration Portfolio) in August 2019. That submittal was based on accounting principles and guidance provided by MDE in a letter dated April 12, 2019. The Restoration Portfolio was part of a response to the *MDE Physical Capacity Questionnaire for MS4 Permittees as Part of a Maximum Extent Practicable (MEP) Analysis*. The Restoration Portfolio specifically excluded alternative BMPs from the estimation of "impervious acres" credit (also referred to as impervious surface restoration or ISR); only total suspended solids (TSS) and total nitrogen (TN) reductions could be attributed to alternative restoration projects, such as stream restoration and tree planting. The Restoration Portfolio also did not include the operational programs used in the City's current permit to meet the ISR credit.

In December 2019, the City submitted its FY 2019 MS4 Annual Report, based on the *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permit,* dated August 2014 (2014 Accounting Guidance). The report demonstrated that the City exceeded the 20% ISR requirement of the current permit by June 30, 2019.

On December 23, 2019 MDE issued a draft revised *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits (2019 Draft Accounting Guidance).* On January 16, MDE provided an overview of the 2019 Draft Accounting Guidance to MS4 managers. In response to the overview, the MS4 managers collaborated and submitted questions and comments to MDE on January 31, 2020. MDE's response to those comments were issued on February 14, 2020. On March 16, Baltimore City submitted a revised Restoration Portfolio, which was developed based on the 2019 Draft Accounting Guidance and MDE's response to comments. The City reserves the right to adjust these credits if MDE provides new revisions, updates, or clarifications to either of these documents.

Following a conversation with MDE on April 8, Baltimore City submitted a second revision to the City's Restoration Portfolio on April 27. MDE's review of the submittal on May 1, 2020. Base don that review, Baltimore City has prepared a third revision to the City's Restoration Portfolio as follows:

- Street sweeping will be continued from the previous permit. The street sweeping operations, listed under "Obligations from Previous Permit That Must Be Continued", were based on the total mileage listed in the FY 2019 MS4 Annual Report, which accounted only for operations performed at least 2 times per month, using a street sweeper path width of 52 inches. The equivalent impervious area and pollution reductions were calculated using the mileage-based method from the 2014 Accounting Guidance. Specifically, the equivalent impervious area was calculated using the rate of 0.13 EIA / area swept. The area swept is the width of the sweeper multiplied by the total miles swept during the year. Cost estimations include a 2%

annual escalation in operations costs. This operation is critical to the City's trash TMDL and to reducing potential flooding. To be conservative, no increase in mileage is proposed; however, the City continues to take measures to improve the operation performance, such as the enforcement of parking requirements on street sweeping routes.

- Inlet cleaning will be continued from the previous permit. The street sweeping operations, listed under "Obligations from Previous Permit That Must Be Continued", were based on the total tonnage listed in the FY 2018 MS4 Annual Report for both reactive and pro-active inlet cleaning. The number of inlets are listed as the number of BMPs. FY 2018 MS4 Annual Report data was used as a basis of continued operations because FY 2019 had record-setting rainfall; tonnage was considered an outlier in the data set. The equivalent impervious area and pollution reductions were calculated using the 2014 Accounting Guidance. Cost estimations include a 2% annual escalation in operations costs. To be conservative, no increase in tonnage is proposed; however, the City is evaluating potential expansions of the pro-active inlet cleaning operations.
- The capital projects reflect the current costs, schedule (CY), and nutrient reduction based on the 2019 Draft Accounting Guidance. The EIA conversion rate for outfall stabilization was changed from 0.01 to 0.02 acre / LF, per recommendations from MDE. Implementation costs include both design and construction costs; annual operations and maintenance (O & M) costs are listed in the Portfolio under Other.
- Tree plantings, IDDE, and restoration projects performed by private entities remained the same as the April Portfolio submittal.
- The City's current study related to PCBs in the Back River watershed has been added to the revised Portfolio under Other. This Study was initiated in 2018, in coordination with USGS and UMBC.

Although not listed in the Portfolio, the City plans to spend approximately $50M on storm drain rehabilitation projects by CY 2025. These projects address both failing infrastructure and flood management, such as:

- Lining the 10-foot storm tunnel associated with the sinkhole at Monument Street in 2012, which closed a City block for 6 months.
- H & H Model, plus gray and green infrastructure installation to address flooding at Frederick Avenue, where evacuations occurred in 2018.
- Re-alignment of storm drain system at Patapsco Avenue to relieve repeated flooding in Cherry Hill neighborhood.

The Portfolio also does not show the efforts to address the City's bacteria TMDLs, which will be completed under the Modified Consent Decree (MCD) for sanitary sewer overflows (Civil Action JFM-02-1524) by 2031. The cost of the capital projects associated with Phase I of the Modified Consent Decree is on the order of $2.6 billion, completed by CY 2021. Costs for Phase II of the MCD have not been determined yet. Costs associated with the capital projects for the MCD are reported to MDE as part of the quarterly MCD reports, which are posted on-line.

A summary of the restoration efforts from the previous permit and proposed for the next permit are summarized in the following table.

Summary of Restoration by End of Next Permit

Description	Reference	Area (ac)
Baseline impervious	Baltimore City MS4 & TMDL Watershed Implementation Plan (2015)	21,455
Projects at End of Current Permit	FY 2018 MS4 Annual Report, WIP Progress tables for Projects, Table R1: 53 acres	101
	FY 2019 MS4 Annual Report, WIP Progress tables for Projects, Table N-1: 101 acres, 48 acres since 2018	
Restoration by Others at End of Current Permit	FY 2018 MS4 Annual Report, WIP Progress table for Partnerships, Table R-3: 471 acres	659
	FY 2019 MS4 Annual Report, WIP Progress tables for Partnerships, Table N-3: 659 acres, 188 acres since 2018	
Annual Operations (current)	Portfolio, average CY 2019 – 2025. Street Sweeping based on FY 2019. Inlet cleaning based on FY 2018.	5,701
Subtotal of Impervious Area Completed at End of the Current Permit		*6,461*
Portion of baseline impervious area restored at End of the Current Permit		*30.1%*
Proposed Capital Projects	Portfolio for next permit as of CY 2025, including GSI and WQM credits	922
IDDE	Portfolio, as listed for CY 2025	150
Estimated Partnerships (Redevelopment + Volunteer)	Portfolio as of CY 2025	166
Additional Impervious Area Completed in the Next Permit (by CY 2025)		*1,238*
Cumulative Total of Impervious Area Completed by CY 2025		**7,699**
Portion of baseline impervious area restored by CY 2025		**35.9%**

From: "Brian Cooper -MDE-" <brian.cooper@maryland.gov>
Sent: Mon, 18 May 2020 18:36:15 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Stewart Comstock -MDE-" <stewart.comstock@maryland.gov>; "Christina Lyerly -MDE-" <christina.lyerly@maryland.gov>
Subject: Re: MS4 MEP Discussion

Thank you, Kim. We will give this a look and let you know if we have any questions.

Best,
Brian

On Fri, May 15, 2020 at 3:32 PM Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov> wrote:

> Attached is the third revision to the City's Restoration portfolio, addressing your comments below in addition to the removal of the proposed street sweeping and inlet cleaning, to be conservative.
>
> Please feel free to contact me if you have any questions.
>
> Thanks,
>
> Kimberly L. Grove, P.E.
> Chief, Office of Compliance & Laboratories
> Baltimore City Department of Public Works
> (410) 396 - 0732 (office)
> (443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Friday, May 1, 2020 4:39 PM
To: Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Cc: Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov>; Christina Lyerly -MDE- <christina.lyerly@maryland.gov>
Subject: Re: MS4 MEP Discussion

Good afternoon Kim,

Thank you again for submitting the revised MEP portfolio. It shows a lot of hard work and is a good proposal for the next permit term. The following are items that were identified as either missing or necessary to complete the Department's review:

1. Thank you for including the additional information on annual BMPs. How were street sweeping EIAs calculated?

2. The City's summary shows 760 acres of restoration at the end of the current permit, and has included these acres as part of the total restoration achieved as of CY2025. Please clarify the amount of additional acres that have been achieved since the expiration of the current permit. Is it 236 acres as shown in the table below?

	ISR as of 2018	**ISR as of June 2019**	**Difference; i.e., projects completed in FY2019**
Projects	53	101	48
Partnerships	471	659	188
Total Projects/Partnerships	**524**	**760**	**236**

Programs	4006	6161	2155
Total 3 categories	**4530**	**6921**	**2391**

3. Please update the impervious acres for outfall stabilization so that the 0.02 conversion is used instead of 0.01.

4. The summary states that "O & M costs for the ESD projects are estimated to increase the City's operations budget by $600,000 / year by CY 2024." Under the "Other" section for "Proposed Restoration for the Next Permit", please add line items for annual operations and maintenance in the Portfolio.

5. The Department thanks the City for providing the cost of the hydraulic and hydrologic model for the City's storm drain system. Additionally, thank you for indicating in the summary that "The Portfolio also does not show the efforts to address the City's bacteria TMDLs, which will be completed under the Modified Consent Decree (MCD) for sanitary sewer overflows." Although the portfolio does not show efforts for the bacteria TMDLs, does the City have cost data on PCB source tracking? If so, these data could be included as line items for the five years of the next permit.

This information is needed to complete our work on the draft permit. Are you ok with providing this information by Friday, May 15? As always, let us know if there are any questions. This has been a large effort on both of our parts and the Department would like to thank the City for its continued effort toward improving local water quality and restoring Chesapeake Bay.

Have a great weekend!

Brian

On Mon, Apr 27, 2020 at 12:05 PM Stewart Comstock -MDE- <stewart.comstock@maryland.gov> wrote:

Kim...

Thank you! We will contact you if there are any questions. Stew.

On Mon, Apr 27, 2020 at 12:00 PM Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov> wrote:

> Attached is the final revised submittal of the portfolio. Please feel free to contact me if you have any questions.
>
> Thanks,
>
> Kimberly L. Grove, P.E.
>
> Chief, Office of Compliance & Laboratories
>
> Baltimore City Department of Public Works
>
> (410) 396 - 0732 (office)
>
> (443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Tuesday, April 21, 2020 3:45 PM
To: Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov>
Cc: Christina Lyerly -MDE- <christina.lyerly@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: MS4 MEP Discussion

Hi Kim,

We understand. Friday, the 24th works. Thanks for your hard work on the resubmission.

Brian

On Tue, Apr 21, 2020 at 12:32 PM Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov> wrote:

> I need to push the re-submittal schedule back to Friday, April 24 to allow for suitable review within my organization, especially with the increased efforts. Please confirm approval in this change to the submittal schedule.
>
> Thanks,
>
> Kimberly L. Grove, P.E.
>
> Chief, Office of Compliance & Laboratories
>
> Baltimore City Department of Public Works
>
> (410) 396 - 0732 (office)
>
> (443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Monday, April 6, 2020 3:29 PM
To: Grove, Kimberly (DPW) <Kimberly.Grove@baltimorecity.gov>
Cc: Christina Lyerly -MDE- <christina.lyerly@maryland.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>
Subject: Re: MS4 MEP Discussion

Hi Kim,

In preparation for Wednesday's discussion, we developed the attached checklist to help with our review. Feel free to give it a look and let us know if you have any questions.

Best,

Brian

On Fri, Apr 3, 2020 at 5:35 PM Brian Cooper -MDE- <brian.cooper@maryland.gov> wrote:

> Thanks, Kim. We have you on our calendars for next Wednesday from 10-11 AM. I'll send you a calendar invite with the conference call/video conferencing information.
>
> Have a great weekend!

Brian

On Fri, Apr 3, 2020 at 10:07 AM Grove, Kimberly <Kimberly.Grove@baltimorecity.gov> wrote:

> It will just be me on the call if it's focused on the MEP submittal. I'm available:
>
> Monday, April 6, 10 to noon or after 2 pm
>
> Tuesday, April 7, 10 am to noon
>
> Wednesday, April 8, 10 to 11 am
>
> Thanks,
>
> Kimberly L. Grove, P.E.
>
> Chief, Office of Compliance & Laboratories
>
> Baltimore City Department of Public Works
>
> (410) 396 - 0732 (office)
>
> (443) 835-9272 (cell)

From: Brian Cooper -MDE- [mailto:brian.cooper@maryland.gov]
Sent: Thursday, April 2, 2020 2:10 PM
To: Grove, Kimberly <Kimberly.Grove@baltimorecity.gov>

Cc: Krause, Nathaniel <Nathaniel.Krause@baltimorecity.gov>; Stewart Comstock -MDE- <stewart.comstock@maryland.gov>; Christina Lyerly -MDE- <christina.lyerly@maryland.gov>
Subject: MS4 MEP Discussion

Good afternoon Kim and Nathaniel,

I hope you both are doing well!

Thank you for your most recent MEP submission. We are finalizing our review and we have some clarifying questions that we would like to ask you. We'd like to do that early next week; probably need only 1 hour or less of your time. We can be available:

Monday, April 6 between 10A-4:30P
Tuesday, April 7 between 10A-1P
Wednesday, April 8 between 10A-12P and 3-4:30P

If these times do not work, please suggest other possible times for next week.

Best regards,
Brian

--

CHANGING Maryland FOR THE BETTER

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

--

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

--

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

--

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

--

Maryland is currently operating under a state of emergency due to the coronavirus. Although most of us are working remotely from home, MDE continues to operate and remains open for business. We strive to provide great customer service and meet your needs; however, we ask that you have patience with us during this time. Stay healthy! Thank you.

Stewart Comstock, P.E.

Program Review Division Chief

Water and Science Administration

Maryland Department of the Environment

1800 Washington Boulevard

Baltimore, Maryland 21230

stewart.comstock@maryland.gov

(410) 537-3550 (O)

Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

--

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

--

Brian E. Cooper
Natural Resources Planner
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
brian.cooper@maryland.gov
410-537-3653 (O)
Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

From: "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>
Sent: Mon, 13 Jul 2020 22:13:09 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Lee Currey -MDE-" <lee.currey@maryland.gov>; "jenniferm.smith@maryland.gov" <jenniferm.smith@maryland.gov>; "Karl Berger" <kberger@mwcog.org>
Subject: Baltimore City's draft MS4 Permit
Attachments: BC MS4 Draft Permit Letter 7_13_2020.pdf, BC_FactSheet 7_13_2020.pdf, 2020 MS4 Accounting Guidance Document-EPA-June_2020 (1).pdf

Hi Kim,

Please find attached a letter from WSA's Director Lee Currey to DPW's Acting Director Matthew Garbark regarding Baltimore City's draft MS4 permit, accompanying fact sheet, and the *2020 Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* (2020 Guidance). Can you please make sure that Mr. Garbark receives these materials until a hard copy may be sent in the mail.

These documents are a result of extensive collaboration between the Department and City staff and we want to thank you for your cooperation in this important program.

Please let me know if you have any questions.

Hope that all is well,

Ray

Raymond P Bahr
Deputy Program Manager
Sediment, Stormwater, and Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1708
(410) 537-3545

Maryland
Department of
the Environment

Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated

Guidance for National Pollutant Discharge Elimination System Stormwater Permits

June 3, 2020 Draft

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I. Introduction

The goals of Maryland's National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4) permits are to control stormwater pollution, improve water quality, and work toward meeting water quality standards. The permits require MS4 jurisdictions to implement restoration activities in order to meet stormwater wasteload allocations (SW-WLAs) included in Environmental Protection Agency (EPA) approved total maximum daily loads (TMDLs). The *2020 Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* (Guidance) reflects updated permit crediting to address impervious acre restoration and nutrient load reductions consistent with Maryland's Phase III Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL and 2025 nutrient load targets.

The Guidance also incorporates the Phase 6 Chesapeake Bay Watershed Model (Phase 6 Model), new and updated best management practices (BMPs) approved by the Chesapeake Bay Program (CBP) expert panels, and stormwater management co-benefits. This Guidance was developed with the contributions of environmental non-governmental organizations, MS4 jurisdictions, State agencies, and EPA. The 2020 MS4 restoration credits and accounting principles supersede the 2014 guidance for reissued permits.

II. Restoration Credits and Accounting Principles

MS4 jurisdictions must use an impervious acre credit to account for MS4 restoration achieved through stormwater BMP implementation. The impervious acre credit is the MS4 permit's surrogate parameter for level of implementation required to show progress in total nitrogen (TN), total phosphorus (TP), and total suspended sediment (TSS) load reductions toward meeting Chesapeake Bay and local TMDLs. MS4 jurisdictions must also report load reductions achieved through BMP implementation. The procedures for calculating impervious acre credits and associated pollutant load reductions, and general accounting principles are summarized below and described in more detail in the body of this Guidance.

The impervious acre credit is used for accounting for upland BMPs that provide impervious acre water quality treatment. These BMPs are described in Chapters 3 and 5 of the *2000 Maryland Stormwater Design Manual* (Manual). The impervious acre credit is determined from three BMP variables: drainage area, impervious acres, and the rainfall depth treated. Impervious acres in the drainage area are considered treated 100% for water quality when the runoff from one inch of rainfall over the drainage area is captured and treated. More information on the impervious acre credit can be found in Section III. Impervious Acre Credits of Upland Best Management Practices.

Equivalent impervious acres (EIAs) are used to determine the impervious acre restoration credit for alternative BMPs that are not found in the Manual but are additional options for MS4 jurisdictions to reduce stormwater pollutants. Alternative BMPs include street sweeping, storm drain cleaning, floating treatment wetlands, land cover conversion, urban soil restoration, septic practices, shoreline management, stream restoration, and elimination of discovered nutrient discharges from grey infrastructure. A method has been developed using the CBP land cover unit loads and the reduction in pollutant loads from alternative BMPs for determining an EIA conversion factor (EIA_f). The EIA_f for all alternative BMPs for MS4 restoration crediting are

presented in Table 1. More detailed information on the EIA credits is found in Section V: Alternative Best Management Practices

MS4 jurisdictions are required to document progress toward meeting local and Chesapeake Bay TMDLs by reporting TN, TP, and TSS load reductions when implementing stormwater BMPs. All BMPs found in the Manual, i.e., Chapter 3 structural practices and Chapter 5 environmental site design (ESD) practices, plus alternative BMPs are acceptable for restoration and may be used to calculate load reduction credits. The TN, TP, and TSS removal efficiencies for these BMPs must be calculated in accordance with the CBP expert panel reports, using the Phase 6 Model and delivery factors based on the BMP's proximity to the Chesapeake Bay. Additional information can be found in Section IV: Pollutant Load Reductions for Upland Best Management Practices.

Table 1. EIA_f and Load Reductions for Alternative BMPs

BMP	Load Reductions (lbs/unit/yr)			EIA_f
	TN	TP	TSS	
Advanced Sweeping				**Per Mile Swept**
1 pass/12 weeks	0.00	0.07	401	0.027
1 pass/8 weeks	0.26	0.14	802	0.059
1 pass/4 weeks	0.36	0.21	1,203	0.087
Spring 1 pass/1-2 weeks else monthly	0.36	0.28	1,404	0.106
Fall 1 pass/1-2 weeks else monthly	0.73	0.34	2,005	0.148
1 pass/2 weeks	0.73	0.34	2,206	0.156
1 pass/week	1.09	0.55	3,209	0.235
2 passes/week	1.46	0.69	4,211	0.304
Mechanical Broom Sweeping				**Per Mile Swept**
1 pass/4 weeks	0.00	0.00	20	0.001
1 pass/week	0.00	0.00	100	0.004
2 passes/week	0.00	0.00	201	0.008
Storm Drain Cleaning				**Per Ton Removed**
Organic	4.44	0.48	400	0.17
Inorganic	3.78	0.84	1,400	0.25
Floating Treatment Wetlands (% of pond wet surface area covered by FTW)				**Per Impervious Acre**
FTW1 (10%)	0.10	0.02	74	0.008
FTW2 (11-20%)	0.22	0.05	151	0.017
FTW3 (21-30%)	0.32	0.07	225	0.026
FTW4 (31-40%)	0.43	0.09	295	0.034
FTW5 (41-50%)	0.53	0.11	369	0.042
Land Cover Conversion				**Per Acre of Land Cover Changed**
Forest Planting	11.12	1.78	2,805	1.10
Riparian Forest Planting	14.34	2.50	4,411	1.50
Conservation Landscaping	5.24	0.53	0.00	0.37
Riparian Conservation Landscaping	6.75	0.74	0.00	0.50

BMP	Load Reductions (lbs/unit/yr)			EIA_f
	TN	TP	TSS	
Table 1 Continued				
Forest Conservation	10.57	1.10	2,465	0.46
Impervious Surface Reduction	6.96	0.45	5,241	0.71
Street Trees	3.10	0.76	1,404	0.40
Urban Tree Canopy Planting	3.20	0.50	206	0.28
Urban Soil Restoration of Compacted Pervious Surfaces (soil excavation depth in inches)				**Per Acre of Soil Treatment**
Level 1 (15 inches)	4.4	0.72	278	0.40
Level 2 (20 inches)	8.9	1.44	557	0.80
Urban Soil Restoration of Removed Impervious Surfaces (soil excavation depth in inches)				**Per Acre of Soil Treatment**
Level 1 (15 inches)	13.7	0.7	1,696	0.91
Level 2 (20 inches)	15.0	0.77	1,864	1.00
Septic[1]				**Per System**
Septic Pumping	0.00	0.00	0.00	0.02
Septic Denitrification	0.00	0.00	0.00	0.16
Septic to WWTP Connection	0.00	0.00	0.00	0.23
Shoreline Management[2]/Stream Restoration and Outfall Stabilization[3]				**Per Linear Foot**
Shoreline Management (Default Rate)	0.173	0.122	328	0.04
Stream Restoration (Planning Rate)	0.075	0.068	248	0.02
Outfall Stabilization (Planning Rate)	0.075	0.068	248	0.02
Elimination of Discovered Nutrient Discharges from Grey Infrastructure[4]				**Per Discharge**
Elimination of Eight Approved Discharge Types	Protocol	Protocol	0.00	Individually Calculated

Notes:
[1] Actual load reductions must be reported through the local health department. Septic system credits only apply to the impervious acre restoration requirement. (WWTP = wastewater treatment plant).
[2] Default load reduction values can be used in cases when the shoreline management practice parameters are unavailable for the protocols recommended by the panel, such as in some planning efforts, historic projects, and/or nonconforming projects.
[3] Load reduction values and EIA_f are used for planning purposes only and must always be replaced with individual site-specific values prior to reporting for nutrient and sediment reduction credit and EIA restoration credit.
[4] TN and TP load reductions for individual discharges are calculated based on the protocols approved in the CBP's 2014 Grey Infrastructure Report. The EIA_f is determined using Equation 5: EIA_f Calculation for Alternative BMPs.

The BMPs approved by the CBP for TN, TP, and TSS reductions have been documented to provide reductions for other pollutants associated with local TMDLs. The 2015 report *Potential Benefits of Nutrient and Sediment Practices to Reduce Toxic Contaminants in the Chesapeake Bay Watershed* published by Chesapeake Stormwater Network substantiates that stormwater BMPs are also effective for reducing toxic pollutants. More information on the latest guidance for showing progress toward meeting local TMDLs are found on the Department's website: mde.maryland.gov/programs/Water/TMDL/DataCenter/Pages/TMDLStormwaterImplementation.aspx.

III. Impervious Acre Credits of Upland Best Management Practices

Upland BMPs are stormwater BMPs that meet the water quality criteria and design standards in the Manual. Upland BMPs include structural practices, nonstructural practices, and alternative surfaces. Impervious acre credits may be achieved when upland BMPs are implemented as part of a restoration, retrofit, or redevelopment project that provides water quality treatment for previously unmanaged impervious surfaces. BMPs must function properly to ensure that the expected water quality improvements are achieved. Upland BMPs must be regularly maintained and inspected a minimum of every three years. BMP data must be submitted within the MS4 Geodatabase.

1. Structural Practices

The impervious acre credit for structural practices is based on the impervious acres in a BMP's drainage area, the depth of rainfall treated, and the water quality volume (WQ_v) standards found in the Manual. For restoration and impervious acre crediting, the rainfall depth treated may be less than the 1 inch required for the WQ_v. For the purposes of this Guidance, the rainfall depth treated in restoration practices is referred to as the water quality treatment volume or "WQ_T". Treatment of 1 inch of rainfall across the drainage area of the BMP will provide full credit for the impervious acres in the BMP's drainage area. This WQ_T is considered the minimum treatment level for 1 impervious acre credit of restoration. Opportunities for restoration that treat less than 1 inch of rainfall (i.e., $WQ_T < 1$ inch) can be pursued where they make sense to an MS4 jurisdiction for local water quality, flooding, or co-benefits. Where the WQ_T is less than 1 inch, the impervious acre credit will be pro-rated on the fraction of the rainfall depth treated (see Equation 1).

Equation 1. Impervious Acre Credits for Structural Practices

$$Impervious\ Acres\ in\ Drainage\ Area \times \left(\frac{Rainfall\ Depth\ Treated}{1\ inch}\right) = Impervious\ Acre\ Credit$$

Examples:

A structural BMP with a drainage area of 10 impervious acres receives the following credit based on the rainfall depth treated:

$$10\ Impervious\ Acres \times \left(\frac{1.0\ inch\ Rainfall\ Depth\ Treated}{1\ inch}\right) = 10\ Impervious\ Acres\ Credit$$

$$10\ Impervious\ Acres \times \left(\frac{0.75\ inch\ Rainfall\ Depth\ Treated}{1\ inch}\right) = 7.5\ Impervious\ Acres\ Credit$$

$$10\ Impervious\ Acres \times \left(\frac{0.5\ inch\ Rainfall\ Depth\ Treated}{1\ inch}\right) = 5\ Impervious\ Acres\ Credit$$

2. Nonstructural Practices

Nonstructural practices acceptable for MS4 restoration must meet the design criteria found in Chapter 5 of the Manual. These practices include disconnection of rooftop runoff,

disconnection of non-rooftop runoff, and sheetflow to conservation areas. Nonstructural practices combine relatively simple features, grading, and landscaping to divert runoff into vegetated areas and away from conventional storm drain systems. Runoff flows over these areas, filters through the vegetation, and soaks into the ground.

Impervious acre credits for nonstructural practices are directly proportional to the amount of impervious acres in a watershed that are disconnected from the storm drain system (see Equation 2).

Equation 2. Impervious Acre Credits for Nonstructural Practices

$$Impervious\ Acres\ in\ Drainage\ Area \times Percent\ Disconnect = Impervious\ Acre\ Credit$$

Example

A drainage area of 10 impervious acres will receive the following credit based on the percentage of impervious acres that are disconnected:

$$10\ Impervious\ Acres \times 100\%\ Disconnect = 10\ Impervious\ Acres\ Credit$$

$$10\ Impervious\ Acres \times 75\%\ Disconnect = 7.5\ Impervious\ Acres\ Credit$$

$$10\ Impervious\ Acres \times 50\%\ Disconnect = 5\ Impervious\ Acres\ Credit$$

3. Alternative Surfaces in Chapter 5 of the Manual

Alternative surfaces accepted for MS4 restoration must meet the design criteria found in Chapter 5 of the Manual. These practices include green roofs, permeable pavements, and reinforced turf. Replacing one acre of impervious surface with an approved alternative surface provides a credit of one acre of impervious area restoration.

4. Redevelopment

Impervious acres that drain to upland BMPs where the State regulatory requirements for redevelopment are met or exceeded are eligible for restoration credit. Since 2010, State regulations require water quality (WQ) treatment for 1 inch of rainfall for fifty percent of the untreated existing impervious acres within the project's limit of disturbance (LOD). Additional credit may be granted for any untreated existing impervious acres that are treated to meet or exceed the fifty percent requirement (see Equation 3).

Equation 3. Impervious Acre Credits for Redevelopment

$$Existing\ Untreated\ Impervious\ Acres \times \% \ of\ the\ Existing\ Untreated\ Impervious\ Acres\ Treated\ for\ WQ\ through\ Redevelopment = Impervious\ Acres\ Restoration\ Credit$$

Examples

Below are examples of the credits that a redevelopment project would achieve for treating different percentages of an existing 10 acres of untreated impervious surface within the LOD.

$$10\ Existing\ Untreated\ Impervious\ Acres \times 50\%\ of\ the\ Existing\ Untreated\ Impervious\ Acres\ Treated\ for\ WQ\ through\ Redevelopment = 5\ Impervious\ Acres\ Restoration\ Credit$$

$$10\ Existing\ Untreated\ Impervious\ Acres \times 75\%\ of\ the\ Existing\ Untreated\ Impervious\ Acres\ Treated\ for\ WQ\ through\ Redevelopment = 7.5\ Impervious\ Acres\ Restoration\ Credit$$

$$10\ Existing\ Untreated\ Impervious\ Acres \times 100\%\ of\ the\ Existing\ Untreated\ Impervious\ Acres\ Treated\ for\ WQ\ through\ Redevelopment = 10\ Impervious\ Acres\ Restoration\ Credit$$

IV. Pollutant Load Reductions for Upland Best Management Practices

Pollutant load reductions for upland BMPs are based on the pollutant removal efficiencies recommended by the CBP. In order for MS4 jurisdictions to address permit conditions and receive proper credit toward Chesapeake Bay TMDLs, restoration activities and reporting need to be consistent with CBP recommendations. BMP pollutant removal performance is determined using the CBP approved publication, *Recommendations of the Expert Panel to Define Removal Rates for New State Stormwater Performance Standards* (Schueler and Lane, 2012 and 2015). This report offers a series of pollutant removal adjustor curves (see Appendix A) for BMPs that are classified as runoff reduction (RR) and stormwater treatment (ST) to determine nutrient and sediment load reductions. Table 2 provides a list of upland BMPs, identifying each as RR or ST.

Table 2. Stormwater BMPs for Upland Applications

Runoff Reduction (RR) Practices		Stormwater Treatment (ST) Practices	
Manual Reference	**Practice**	**Manual Reference**	**Practice**
Infiltration		**Ponds**	
M-3	Landscape Infiltration	P-1	Micro-Pool Extended Detention (ED)
M-4	Infiltration Berm	P-2	Wet Pond
M-5	Dry Well	P-3	Wet ED Pond
Filtering Systems[1]		P-4	Multiple Pond
F-6	Bioretention	P-5	Pocket Pond
M-2	Submerged Gravel Wetland	**Wetlands[2]**	
M-6	Micro-Bioretention	W-1	Shallow Wetland
M-7	Rain Garden	W-2	ED Shallow Wetland
M-9	Enhanced Filter	W-3	Pond/Wetland System
Open Channel Systems		W-4	Pocket Wetland
O-1	Dry Swale	**Infiltration[2]**	
M-8	Grass Swale	I-1	Infiltration Trench
M-8	Bio-Swale	I-2	Infiltration Basin
M-8	Wet Swale	**Filtering Systems**	
Alternative Surfaces		F-1	Surface Sand Filter
A-1	Green Roof	F-2	Underground Filter
A-2	Permeable Pavement	F-3	Perimeter Filter
A-3	Reinforced Turf	F-4	Organic Filter
Other Systems		F-5	Pocket Filter
M-1	Rainwater Harvesting		

Notes:
[1] A dry channel regenerative step pool stormwater conveyance system (SPSC) is considered an upland stormwater retrofit by the CBP Stream Restoration Expert Panel. This practice may use the BMP code SPSC and use the same pollutant load reductions as a filtering practice. The impervious area draining to these practices may be considered treated in accordance with the design rainfall depth treated (P_E) for crediting purposes.
[2] Stormwater wetlands, infiltration trenches, and infiltration basins are ST practices unless designed according to Section VI.

For commonly used rainfall depths, Table 3 provides pollutant removal efficiencies for RR and ST practices based on the CBP approved adjustor curves. The adjustor curves can also be used to determine pollutant removal efficiencies associated with redevelopment.

Table 3. TN, TP, and TSS Removal Efficiencies for Upland BMPs

Rainfall Depth Treated (inches)	TN Removal Efficiency (%)		TP Removal Efficiency (%)		TSS Removal Efficiency (%)	
	RR	ST	RR	ST	RR	ST
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	23.3	13.6	27.2	21.4	29.1	27.2
0.40	39.2	22.8	45.7	35.9	48.9	45.7
0.60	49.3	28.8	57.5	45.2	61.7	57.5
0.80	55.7	32.5	65.1	51.1	69.7	65.1
1.00	59.7	35.0	69.9	54.9	74.9	69.9
1.20	62.5	36.5	73.0	57.4	78.3	73.0
1.40	64.4	37.6	75.2	59.1	80.7	75.2
1.60	65.6	38.4	76.7	60.3	82.3	76.7
1.80	66.4	38.8	77.6	61.0	83.3	77.6
2.00	66.8	39.1	78.2	61.4	83.9	78.2
2.20	67.1	39.2	78.4	61.7	84.2	78.4
2.40	67.5	39.3	78.6	61.9	84.6	78.6
2.60[1]	67.9	39.4	78.8	62.1	85.0	78.8
2.80[1]	68.3	39.5	79.0	62.3	85.4	79.0
3.00[1]	68.6	39.6	79.2	62.5	85.8	79.2

Note:
[1] Values exceed the adjustor curves and are extrapolated from the CBP formulas.

The next step in this process is to apply the pollutant removal efficiencies to the appropriate urban land cover unit loads to calculate the load reductions. For this step, use No Action Scenario urban unit loads presented in Table 4 that best represent the BMPs drainage area land covers.

The final step in determining pollutant load reductions for the Chesapeake Bay TMDLs is to use the specific Phase 6 Model segment delivery factors presented in Appendix L. These factors indicate how much of an edge-of-stream (EOS) load reduction is realized at the edge-of-tide (EOT). The delivery factors for a given project can be also found via the "EOT Factor Map" on the Department's water quality trading website under the Tools and Resources tab at: mde.maryland.gov/programs/Water/WQT/Pages/WQT_Tools_Resources.aspx.

Table 4. Statewide Edge-of-Stream Urban Unit Load Summary

Load Source[1]	Statewide EOS Urban Unit Load (lbs/acre/yr)		
	TN	TP	TSS
Aggregate Impervious	20.39	2.55	8,793
Impervious Road	36.43	6.89	20,055
Mixed Open	8.19	1.58	3,552
Septic	16.83	0.00	0.00
Tree Canopy over Impervious	33.33	6.13	18,651
Turf	13.43	2.10	3,552
Tree Canopy over Turf	10.23	1.60	3,346
True Forest	2.31	0.32	747
Total Urban	12.88	1.42	3,212

Note:
[1] For more information on Load Sources in the Phase 6 Model, see Appendix B.

The general formula for calculating these load reductions is presented below. An example calculation can be found in Appendix B.

Equation 4. TN, TP, and TSS Load Reductions

$$Load\ Reduction\ (lbs/yr) = Urban\ Unit\ Load\ (lbs/acre/yr) \times Impervious\ Surface\ in\ BMP\ Drainage\ Area\ (acres) \times \left[\frac{BMP\ Efficiency}{100}\right] \times Phase\ 6\ Modeling\ Segment\ Delivery\ Factor$$

The Department has developed BMP specific calculators for its nutrient trading program that can be used by MS4 jurisdictions to perform these load reduction calculations automatically. These calculators are located on the water quality trading webpage under the Tools and Resources tab. Users input geographic information for their project and other project specific data, such as BMP type, drainage area, land cover acres, and water quality treatment. The calculators will automatically generate the load reduction credit. If an MS4 jurisdiction performs these calculations on its own, it must provide to the Department supplemental information sufficient to demonstrate that the pollutant load reductions were calculated correctly.

V. Alternative Best Management Practices

The Department has developed the EIA_f (i.e., equivalent impervious acre conversion factor) for translating the pollutant load reductions from an alternative BMP into an EIA (i.e., equivalent impervious acre) credit. This is based on the difference in pollutant loads between aggregate impervious and true forest land covers. For the purpose of this Guidance, aggregate impervious includes the Phase 6 Model impervious road and impervious non-road land covers and true forest is the statewide average forest cover. The Phase 6 Model estimates that the annual TN load in runoff from an aggregate impervious acre is 20.39 lbs while the annual TN load from an acre of true forest is 2.31 lbs. The difference, or delta, between the two land covers is 18.08 lbs of TN per year. The deltas for TN, TP, and TSS loads are shown in Table 5. These deltas are used to set a level of implementation that alternative practices must meet to be equivalent to the quality of runoff from forest conditions.

Table 5. True Forest and Aggregate Impervious Pollutant Unit Load Deltas

Pollutant	Aggregate Impervious Unit Load (lbs/acre/yr)	True Forest Unit Load (lbs/acre/yr)	Delta (lbs/acre/yr)
TN	20.39	2.31	18.08
TP	2.55	0.32	2.23
TSS	8,793	747	8,046
Source: Phase 6 Model, Maryland aggregated statewide average unit loads without BMPs.			

The pollutant load reduction for each alternative BMP is calculated from the land cover unit load and the approved BMP efficiency determined in the CBP expert panel reports. Alternative BMPs have different urban land cover unit loads. Some alternative BMPs, like street sweeping, are almost exclusively implemented on impervious surface areas (e.g., roads and parking lots). In these instances, the pollutant load associated with "impervious road" found in Table 4 is used to set the initial load rate and determine the pollutant load reduction. The efficiencies and land cover types to be used with each alternative BMP to calculate the TN, TP, and TSS load reductions are tabulated in Appendix C.

Alternative BMPs also use different units of implementation to calculate pollutant load reductions. For example, some BMPs, like street sweeping, use a street lane mile unit per year while others, like land cover conversion, use a per acre unit per year. Pollutant reductions are reported based on the specific unit of implementation.

The delta between aggregate impervious and true forest land cover loads for TN, TP, and TSS is divided into each alternative BMP's annual pollutant load reduction for each pollutant and then averaged to determine a single weighted equivalent impervious acre conversion factor (see Equation 5). Further details on how the EIA_f is calculated can be found in Appendix D.

Equation 5. EIA_f Calculation for Alternative BMPs

$$EIA_f = \frac{\left(\frac{TN\ Load\ Red.}{I-F_{TN}}\right)+\left(\frac{TP\ Load\ Red.}{I-F_{TP}}\right)+\left(\frac{TSS\ Load\ Red.}{I-F_{TSS}}\right)}{3}$$

Where:

EIA_f = Equivalent impervious acre conversion factor
TN Load Red. = BMP load reduction for TN (lbs/unit/yr)
TP Load Red. = BMP load reduction for TP (lbs/unit/yr)
TSS Load Red. = BMP load reduction for TSS (lbs/unit/yr)
$I - F_{TN}$ = Aggregate impervious unit load minus true forest unit load for TN (lbs/acre/yr)
$I - F_{TP}$ = Aggregate impervious unit load minus true forest unit load for TP (lbs/acre/yr)
$I - F_{TSS}$ = Aggregate impervious unit load minus true forest unit load for TSS (lbs/acre/yr)

Additional information on EIA_f and pollutant load reduction credits for specific alternative practices is found below. Alternative BMPs must follow inspection frequencies as specified by the CBP expert panels, with the exception of land cover conversion BMPs, which require inspections at least every three years. BMP data must be submitted within the MS4 Geodatabase.

1. <u>Street Sweeping and Storm Drain Cleaning</u>

Street sweeping and storm drain cleaning are annual practices that must be tracked and reported each year to receive credit. The CBP recommended updates to acceptable street sweeping methods and the removal rates for nutrients and sediments, as described in the 2016 report *Recommendations of the Expert Panel to Define Removal Rates for Street and Storm Drain Cleaning Practices* (2016 Street Sweeping Report). The expert panel developed these estimates using the Source Loading and Management Model for Windows (WinSLAMM). The mass loading method is no longer an acceptable method to calculate pollution reduction. The previous estimated rates were dependent on a strict twice-monthly frequency, whereas the updated load reduction credits allow greater flexibility because MS4 jurisdictions may choose from a range of sweeping schedules listed in Table 6.

MS4 jurisdictions may generate credits by sweeping municipal and commercial parking lots when using advanced street sweeping technology (i.e., vacuum assisted sweepers and regenerative air sweepers). Mechanical sweeping of parking lots may not be used for credit because of the low amount of pollutants estimated to be collected. Credit will not be given for sweeping roads or parking lots without curbs and gutters.

MS4 jurisdictions must enter information into the MS4 Geodatabase on schedule, locations, and sweeper technology. Additionally, MS4 jurisdictions must retain documentation as proof of sweeping activities to receive credit. Documentation may include a sweeping summary table, copies of receipts or contracts if sweeping is conducted by a contractor, or sweeper equipment maintenance records. This information must be made available to the Department upon request. The EIA credit for street sweeping is based on the annual number of miles swept averaged over the span of the 5 year permit term. Table 6 provides the nutrient and sediment load reductions and EIA_f values for different street sweeping options.

Table 6. Load Reductions and EIA_f for Street Sweeping

BMP	Load Reduced (lbs/lane mile/yr)			EIA_f per Lane Mile Swept
	TN	TP	TSS	
Advanced Sweeping				
1 pass/12 weeks	0.00	0.07	401	0.027
1 pass/8 weeks	0.26	0.14	802	0.059
1 pass/4 weeks	0.36	0.21	1,203	0.087
Spring 1 pass/1-2 weeks else monthly	0.36	0.28	1,404	0.106
Fall 1 pass/1-2 weeks else monthly	0.73	0.34	2,005	0.148
1 pass/2 weeks	0.73	0.34	2,206	0.156
1 pass/week	1.09	0.55	3,209	0.235
2 passes/week	1.46	0.69	4,211	0.304
Mechanical Broom				
1 pass/4 weeks	0.00	0.00	20	0.001
1 pass/week	0.00	0.00	100	0.004
2 passes/week	0.00	0.00	201	0.008

The CBP recommended a conservative approach for calculating credits attributed to storm drain cleaning. A credit is available when the mass of nutrient-rich catch basin sediments is measured and physically removed from the storm drain system. The EIA credit for storm drain cleaning is based on the annual aggregate load collected and averaged over the span of the 5 year permit term. Table 7 provides the nutrient and sediment load reductions and EIA_f values for storm drain cleaning options. Jurisdictions can visually determine the predominant material type and apply the associated EIA_f.

Table 7. Load Reductions and EIA_f for Storm Drain Cleaning

Material Removed	Load Reduced (lbs/ton/yr)			EIA_f per Ton Material Removed
	TN	TP	TSS	
Organic	4.44	0.48	400	0.17
Inorganic	3.78	0.84	1,400	0.25

There are three qualifying conditions to generate credit from storm drain cleaning:

1. To maximize nutrient load reductions, efforts should target catch basins that trap the greatest organic matter loads, streets with the greatest overhead tree canopy, and/or outfalls with high sediment or debris loads.

2. The nutrient loads must be tracked and verified using a field protocol to measure the mass or volume of solids collected within the storm drain system. The local MS4 jurisdiction must demonstrate that it has instituted a standard operating procedure to keep track of the mass of the sediments and/or organic matter that is removed.

3. Material must be properly disposed of so it cannot migrate back into the storm drain system.

The storm drain cleaning credit does not apply to sediment removal operations that occur during ditch maintenance along open section roads. It does apply to operations that occur in open, concrete-lined conveyance channels.

2. Floating Treatment Wetlands

Floating treatment wetlands (FTWs) are installed in existing stormwater management ponds to provide additional nutrient and sediment removal. FTWs are buoyant rafts of wetland vegetation that are planted in growing media and whose roots extend below the water's surface. The CBP determined nutrient removal rates based on the percent of pond wet surface area that the FTW covers. Coverage must be at least 10% but not more than 50% of the pond's wet surface area measured at the design permanent pool elevation. Pollutant load reductions and EIA credits are reported separately from credits that the stormwater pond provides. Table 8 provides the nutrient and sediment load reductions and EIA_f values for FTWs.

Table 8. Load Reductions and EIA_f for Floating Treatment Wetlands

BMP	% of Pond Wet Surface Area Covered by FTW	Load Reduced (lbs/acre/yr)			EIA_f per Impervious Acre
		TN	TP	TSS	
FTW1	10%	0.10	0.02	74	0.008
FTW2	11-20%	0.22	0.05	151	0.017
FTW3	21-30%	0.32	0.07	225	0.026
FTW4	31-40%	0.43	0.09	295	0.034
FTW5	41-50%	0.53	0.11	369	0.042

Equation 6 can be used to calculate the impervious acre credit. An example calculation is provided in Appendix F.

Equation 6. EIA_f for Floating Treatment Wetlands

$$Total\ Impervious\ Acres\ in\ Stormwater\ Pond\ Drainage\ Area \times EIA_f\ from\ Table\ 8 = Equivalent\ Impervious\ Acre\ Credit$$

3. Land Cover Conversion BMPs

Land cover conversion BMPs are those that involve the conversion of one land cover to another. Nutrient and sediment reductions for land cover conversion BMPs are calculated based on the load reduction that results from the change in unit loads from the original land cover to another land cover. Land cover conversion BMPs fall into three categories: Non-riparian land cover conversion BMPs, riparian land cover conversion BMPs, and forest conservation.

The difference in unit loads between land cover types are driven primarily by a change in hydrology. To reflect this improved hydrology, crediting land cover conversion BMPs is aligned with other upland stormwater treatment practices. The EIA_f for a land cover conversion BMP is calculated using the load reductions from the conversion of land cover

divided by a "delta" equal to the treatment of 1 inch of rainfall on 1 acre of impervious land cover using stormwater treatment (ST) BMPs (Refer to Appendix D for more information).

a) Non-Riparian Land Cover Conversion BMPs

Pollutant load reductions resulting from land cover conversion that occurs completely outside of the riparian zone (i.e., not within 100 feet of a waterbody) are calculated as the difference between the unit loads of the original and converted land covers. The land cover types used in calculating pollutant load reductions for each BMP can be found in Appendix C. Table 9 provides the pollutant load reductions and EIA_f for non-riparian land cover conversion BMPs. The following BMPs are eligible for credit.

1. *Forest Planting.* The conversion of pervious turf to a forested land cover. Urban forest planting includes any contiguous tree planting greater than one acre with an unmanaged understory (unfertilized, unmowed) on pervious, except those used to establish riparian forest buffers, which receive enhanced credit. Forest planting credit is available for planting occurring on one contiguous acre or greater. Planting should have a survival rate of 100 trees planted on one acre. At least 50% of trees should have a two inch diameter or greater (4.5 feet above ground), or a 1 inch caliper at time of planting (high likelihood of 2 inch diameter once 4.5 feet in height).

2. *Conservation Landscaping.* Land cover conversion from pervious turf to an unmanaged (unfertilized, unmowed) meadow condition. Conservation landscaping refers to areas of managed turf that are converted into perennial meadows using species that are native to the Chesapeake Bay region.

3. *Impervious Surface Reduction.* A reduction in impervious surfaces to promote infiltration and percolation of stormwater runoff.

4. *Street Trees*. Any tree planting that occurs over an impervious surface (e.g., trees planted in sidewalk boxes on a roadside curb). One tree planted is the equivalent of 0.01 acre, or 100 trees is equivalent to one acre of implementation. Credit for street trees requires a survival rate of 100%. This BMP does not require trees to be planted in a contiguous area.

5. *Urban Tree Canopy*. The conversion of pervious turf to tree canopy over turf. The urban tree canopy BMP is applicable where the resulting understory remains managed (regularly mowed and/or fertilized). One tree planted is the equivalent of 0.01 acre, or 100 trees is equivalent to one acre of implementation. Credit for urban tree planting assumes a survival rate of 100%. This BMP does not require trees to be planted in a contiguous area.

Table 9. Load Reductions and EIA_f for Non-Riparian Land Cover Conversion BMPs

Non-Riparian Land Cover Conversion BMP	Load Reduced (lbs/acre/yr)			EIA_f per Acre of Land Cover Converted
	TN	TP	TSS	
Forest Planting	11.12	1.78	2,805	1.10
Conservation Landscaping	5.24	0.53	0.00	0.37
Impervious Surface Reduction	6.96	0.45	5,241	0.71
Street Trees	3.10	0.76	1,404	0.40
Urban Tree Canopy Planting	3.20	0.50	206	0.28

b) Riparian Land Cover Conversion BMPs

Riparian land cover conversion BMPs are forest planting and conservation landscaping practices that occur within 100 feet of a perennial stream.

1. *Riparian Forest Buffers*. Linear wooded areas that help filter nutrients, sediments, and other pollutants from runoff as well as remove nutrients from groundwater. The recommended buffer width is 100 feet, with a 35 foot minimum width required (Chesapeake Assessment Scenario Tool, i.e., CAST, 2019).

2. *Riparian Conservation Landscaping*. Grassland buffers that help filter nutrients, sediments, and other pollutants from runoff as well as remove nutrients from groundwater. These are buffers converted from managed turf land cover to an unmanaged meadow use.

These practices are eligible for enhanced land cover conversion credit. The riparian land cover conversion BMP EIA_f credit is based on a baseline land cover conversion credit that accounts for hydrologic changes (Table 9) plus an additional credit for the upland areas treated because they drain through the riparian buffer zone (Table 10). The additional riparian credit provided is based on a ratio of one acre of upland impervious acre treatment to one acre of land cover conversion.

The additional load reductions for riparian forest planting are calculated by applying CAST Forest Buffer upland treatment efficiencies to the statewide weighted urban unit load. Conservation landscaping that occurs in the riparian zone does not have a CAST upland treatment efficiency. Therefore, those efficiencies and resulting load reductions were determined using the same proportionate relationship between the forest planting and conservation landscaping nutrients and sediment load reductions for non-riparian BMPs. The additional load reductions for riparian land cover conversion BMPs are found in Table 10.

Table 10. Additional Load Reductions and EIA_f for Land Cover Conversion BMPs Implemented in a Riparian Area

Land Cover Conversion BMP	Efficiency			Load Reduced (lbs/acre/yr)			EIA_f per Acre of Upland Treatment
	TN	TP	TSS	TN	TP	TSS	
Forest Planting Upland Treatment	25%	50%	50%	3.22	0.71	1,606	0.41
Conservation Landscaping Upland Treatment	12%[1]	15%[2]	0%	1.52	0.21	0.00	0.12

Notes:
[1] Conservation Landscaping Upland TN efficiency = Forest Planting Upland TN Efficiency × (Conservation Landscaping TN reduction / Forest Planting TN reduction).
[2] Conservation Landscaping Upland TP efficiency = Forest Planting Upland TP Efficiency × (Conservation Landscaping TP reduction / Forest Planting TP reduction).

Riparian land cover conversion BMP credit is the sum of the base land cover conversion BMP credit (Table 9) and the additional upland treatment credit (Table 10). The enhanced load reductions and the EIA_f available for forest planting and conservation landscaping in riparian areas are provided in Table 11.

Table 11. Enhanced Load Reductions and EIA_f for Riparian Land Cover Conversion BMPs

Land Cover Conversion BMP	Total Load Reduced (lbs/acre/yr)			EIA_f per Acre of Land Cover Converted[1]
	TN	TP	TSS	
Riparian Forest Buffers	14.34	2.50	4,411	1.50
Riparian Conservation Landscaping	6.75	0.74	0.00	0.50

Note:
[1] EIA_f for a riparian land cover conversion BMP is the sum of the base land cover conversion BMP credit (Table 9) and the additional upland treatment credit (Table 10).

c) Forest Conservation

EIA credit for forest conservation is available for the permanent conservation of existing acres of forest. Forest land cover has the lowest Phase 6 Model unit loads for nutrients and sediments, and conserving established forest acres that are vulnerable to development pressure is critical to ensuring that water quality does not worsen. Credit is available to MS4 jurisdictions that have implemented forest easements that limit development and go above and beyond the conservation programs incorporated into the Phase III WIP 2025 base land-use condition.

The Phase III WIP sets nutrient and sediment load reduction goals based on the projected growth in the State. *Maryland's Phase III Watershed Implementation Plan (August 2019)* utilizes the "Maryland Policy" Land Policy BMP scenario in the projected 2025 conditions, which includes assumptions about the continued conservation of forests due to existing policies in the State. State forest and agricultural conservation programs are estimated in projections out to the year 2025 using a trend of implementation of these programs in the past. The assumptions included in the Land Policy BMP scenario for Maryland are intended to reflect Maryland's continued implementation of the Forest Conservation Act, Critical Area Law, and other preservation programs. If an MS4 jurisdiction can establish that its forest conservation programs result in less development on forest than the WIP 2025 forecast, then it has successfully prevented a future load increase.

Requirements and Verification

Forest conservation credit is contingent upon the MS4 jurisdiction's ability to document that the easement exceeds the criteria described in Table 12 and is not part of a development required practice such as sheet flow to conservation area. Credit will only be available for the portion of the easement that goes above and beyond the conservation assumptions in Maryland's Phase III WIP. For example, if the Forest Conservation Act requires a minimum easement of 5 and a jurisdiction establishes a 10 acre easement, the forest conservation credit can be claimed for 5 acres.

Forest easements that are eligible for forest conservation credit should be proximate to a development in order to demonstrate that the easement is preventing a future load increase by preventing a loss of forest to an urban land use. Jurisdictions are required to submit locations and sizes of State-required forest conservation easements in order to verify the acres claimed for forest conservation credit do not overlap with State required mitigation. In addition, forest conservation easements should be demonstrably permanent, be at least 50% forest cover at the time of creation, and have a management plan that limits or restricts actions like mowing and tree removal.

Table 12. Easement Criteria based on the Phase III WIP Scenario Assumptions that must be Exceeded to Qualify for Forest Conservation Credit

Easement cannot be an area under easement for State required mitigation.
Easement cannot be a part of or reported to the following State programs: • Program Open Space • Rural Legacy • Maryland Agricultural Land Preservation Foundation (MALPF) • Maryland Environmental Trust (MET)
Easement cannot be part of a sheetflow to conservation area BMP.
Easement cannot be on a Land Use Conservation BMP.

To receive credit, MS4 jurisdictions must submit the following:

1. Documentation of forest conservation easements required by the Forest Conservation Act for mitigation within the jurisdiction.

2. Documentation of easements beyond State required forest conservation easements for which credit is requested, along with information on the development they are intended to prevent (e.g. development name, jurisdiction construction permit number).

3. Documentation of tri-annual inspections to ensure compliance with easement requirements and retention of credit.

Load reductions are based on the difference between a total urban (inclusive of urban impervious and turf) unit load and the forest unit load (Table 13). An example credit calculation can be found in Appendix F.

Table 13. Load Reductions and EIA_f for Forest Conservation BMPs

Land Conservation BMP	Load Reduced (lbs/acre/yr)			EIA_f per Acre of Forest Conserved
	TN	TP	TSS	
Forest Conservation	10.57	1.10	2,465	0.46

d) Urban Soil Restoration Credit

Soil restoration is the process of enhancing the porosity of soils compacted by human activity in urban areas. The technique involves the excavation or tilling of the compacted soils and amending the tilled soils, typically with compost. Soil restoration may be used to improve the performance of rooftop and non-rooftop disconnection applications, or as a filtering media within grass swales and bio-swales. Soil restoration techniques that are used in conjunction with another BMP whose design criteria already specified soil ripping/restoration do not receive this separate credit. Rather, the application is considered as a part of that BMP.

Soil restoration may also be used as a standalone restoration technique to reduce runoff and increase recharge in urbanized areas. The pollutant removal efficiencies and EIA_f

applied to this technique are based on the depth of soil excavation, the amount of amendments used, and the condition of the area prior to restoration. Soil restoration may be used to correct compacted pervious soils that have some, little, or no vegetation, or soils under impervious areas that have been removed. In each case, the level of restoration is determined by the depth of excavation and tilling. The following two levels of soil restoration are accepted for EIA credit:

- Level 1 is used where compaction is moderate. Compacted soils are ripped to a depth of 15 inches.

- Level 2 is used where compaction is severe or where a more permeable soil profile (e.g., hydrologic soil group B or C) is desired. Soils are excavated to a depth of 20 inches using the complete cultivation method.

Table 14 provides the pollutant removal efficiencies and EIA_f for each level and existing soil condition.

Table 14. Load Reductions and EIA_f for Urban Soil Restoration

Level	Depth (inches)	Load Reduced (lbs/acre/yr)			EIA_f per Acre of Soil Treatment
		TN	TP	TSS	
Compacted Pervious					
1	15	4.4	0.72	278	0.40
2	20	8.9	1.44	557	0.80
Impervious					
1	15	13.7	0.70	1,696	0.91
2	20	15.0	0.77	1,864	1.00

Soils where the depth to a water impermeable layer is less than 20 inches and/or the depth to the high water table is less than 24 inches are considered as hydrologic soil group (HSG) D when determining runoff characteristics. These soil characteristics are not available for the urban soil restoration credit. Appendix G provides the design criteria that must be met for each level of restoration.

4. Septic Practices

Impervious acre restoration credits for septic pumping, denitrification, and connections to a wastewater treatment plant (WWTP) can use the number of systems improved as the unit measure. Table 15 provides EIA_f for these septic practices. Septic pumping is an annual practice. The EIA credit for septic pumping is based on the annual number of systems pumped averaged over the span of the 5 year permit term. Septic connection to an Enhanced Nutrient Removal (ENR) WWTP assumes a Best Available Technology (BAT) baseline of 50% nitrogen removal according to the Phase 6 Model.

For septic pumping credits, an MS4 jurisdiction can propose a comprehensive program for the Department's approval that includes septic system maintenance education and outreach, and homeowner registration and participation. Under this approach, each registered homeowner may be credited for every year of the permit term, without an annual pump-out, if the septic system is well maintained. The Department's approval is contingent upon the MS4 jurisdiction's septic maintenance program being able to ensure that registered homeowners pump out their septic tanks when the storage chambers reach capacity (i.e., bottom of the scum layer is within 6 inches of the bottom of the outlet, or top of the sludge layer is within 12 inches of the outlet), and the septic systems are inspected annually for maintenance verification.

Table 15. Load Reductions and EIA_f for Alternative Septic BMPs

BMP	Notes	Pollutant Removal Efficiency (%)[1]			EIA_f per System
		TN	TP	TSS	
Septic Pumping	Pumping system is maintained and verified for annual credit	0.00	0.00	0.00	0.02
Septic Denitrification	Permanent credit for installing enhanced septic denitrification	0.00	0.00	0.00	0.16
Septic Connection	Permanent credit for converting a septic system to a WWTP connection	0.00	0.00	0.00	0.23

Note:
[1] Actual load reductions must be reported through the local health department. Septic system credits only apply to impervious acre restoration requirements.

5. Shoreline Management

Shoreline management is defined by the expert panel report, *Recommendations of the Expert Panel to Define Removal Rates for Shoreline Management Projects*, amended June 2017 (2017 Shoreline Management Report), as any tidal shoreline practice that prevents and/or reduces tidal sediments to the Chesapeake Bay. Basic qualifying conditions for pollutant load reductions and EIA credits for shoreline management projects can be found in Appendix H and the 2017 Shoreline Management Report. Shoreline management should be implemented in areas where there is a demonstrated need to control erosion to the Bay and where there will be a water quality benefit from the practice. In accordance with Maryland's Living Shoreline Regulations (2013), improvements to protect a property against shoreline erosion must consist of marsh creation or other nonstructural shoreline stabilization measures that preserve the natural environment, and only under certain specific conditions shall structural measures be allowed (COMAR, i.e. Code of Maryland Regulations, 26.24.04).

Hard shore armor negatively impacts nearshore habitats and is not the recommended shoreline management practice in the Bay. The State regulatory review process will evaluate these projects on a case by case basis. Refer to the 2017 Shoreline Management Report and Appendix H of this Guidance for basic qualifying conditions. If those conditions are not met, the practice would not be reported to the CBP for model credit, and it would not be eligible for EIA credits.

The CBP Shoreline Management Panel developed four general protocols to define the pollutant load reductions. In cases when the shoreline management practice parameters are unavailable for the protocols, such as in some planning efforts, historic projects, and/or nonconforming projects, default reduction values can be used. The Department considers non-conforming projects to include those where Protocol 1 (Prevented Sediment) reductions are negligible, but the project results in ecological lift, such as when a hardened shoreline is replaced by a living shoreline. The panel recommended that the shoreline management credits be limited to 5 years, although the credits can be renewed based on a field inspection that verifies the project still exists, is adequately maintained, and is operating as designed.

Table 16 provides the nutrient and sediment load reductions and EIA_f for the shoreline management default rate. The default rate provided in this Guidance is calculated to be consistent with Protocol 1, which assumes that a practice is 100% effective at reducing fast-land erosion. For any shoreline projects, monitoring data can be substituted for the protocol load reductions to calculate load reductions and an EIA.

Table 16. Load Reductions and EIA_f for the Shoreline Management Default Rate

BMP	Load Reduced (lbs/ft/yr)			EIA_f per Linear Foot
	TN	TP	TSS	
Shoreline Management (Default Rate)	0.173	0.122	328	0.04

6. Stream Restoration and Outfall Stabilization

The stream restoration BMP was revised in 2014 to reflect four general protocols to define the pollutant load reductions associated with individual stream restoration projects with the understanding that every project is unique with respect to its design, stream order, landscape position, and function. In 2019, a fifth protocol was approved for outfall and gully stabilization. In 2020, an additional protocol that details specific credit calculations for legacy sediment removal projects is expected to be approved. Details on the protocols, basic qualifying conditions, and reporting requirements can be found in the *Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects*, *Consensus Recommendations for Improving the Application of the Prevented Sediment Protocol for Urban Stream Restoration Projects Built for Pollutant Removal Credit*, and *Recommendations for Crediting Outfall and Gully Stabilization Projects in the Chesapeake Bay Watershed*. Basic qualifying conditions for pollutant load reductions and EIA credits can also be found in Appendix H.

Planning rates are used for estimating purposes only and must always be replaced with individual site-specific values prior to reporting for nutrient and sediment reduction credit and impervious acre restoration credit. The planning rates will not be accepted as a credit after a new project has been completed. If an MS4 jurisdiction did not collect the necessary data required in the five stream restoration/outfall stabilization protocols, the project will not receive an equivalent impervious acre credit. MS4 jurisdictions must also follow post-construction verification requirements set by CBP.

Table 17 provides the pollutant load reductions and EIA_f for the stream restoration project and outfall stabilization project planning rate. Appendix D provides the methodology used to calculate the EIA_f for alternative practices, including stream restoration. Appendix E provides the methodology for determining stream bed and bank (STB) loads that were used in the EIA_f calculation.

Table 17. Load Reductions and EIA_f for Planning Stream Restoration and Outfall Stabilization Projects

BMP	Load Reduced (lbs/ft/yr)			EIA_f per Linear Foot
	TN	TP	TSS	
Stream Restoration (Planning Rate)	0.075	0.068	248	0.02
Outfall Stabilization (Planning Rate)	0.075	0.068	248	0.02

7. Elimination of Discovered Nutrient Discharges from Grey Infrastructure

The CBP approved the *Recommendations of the Expert Panel to Define Removal Rates for the Elimination of Discovered Nutrient Discharges from Grey Infrastructure* (2014 Grey Infrastructure Report). This BMP is applicable to the Illicit Discharge Detection and Elimination (IDDE) program activities required under the MS4 permit. Nutrient reductions are calculated on a per-discharge basis and the calculation depends on the type of discharge eliminated. Refer to the 2014 Grey Infrastructure Report for the protocols required to calculate reductions for each type of discharge. The following individual discharges are eligible for TN and TP reductions within the Phase 6 Model:

N-1 Laundry Washwater
N-2 Commercial Car Washing
N-3 Floor Drains
N-4 Miscellaneous High Nutrient Non-Sanitary Discharges
N-5 Sanitary Direct Connections
N-6 Sewage Pipe Exfiltration
N-7 Drinking Water Transmission Loss
N-8 Dry Weather Sanitary Sewer Overflows

The Watershed Technical Workgroup (WTWG) developed a technical appendix to describe how the expert panel's recommendations would be integrated into the modeling tools. This BMP was developed and approved under the Phase 5 Model. The WTWG discussed Phase 6 Model implications, including a recommendation to cap nutrient reductions from this practice if the grey infrastructure loads were not explicitly simulated (*Appendix E: Technical Requirements for the Reporting and Crediting of the Elimination of Discovered Nutrient Discharges from Grey Infrastructure in Scenario Building and the Watershed Model*, page 108). Grey infrastructure loads are not explicitly simulated in the Phase 6 Model. The Department determined a maximum cumulative EIA credit per permit term based on assumptions provided in the 2014 Grey Infrastructure Report.

The 2014 Grey Infrastructure Report estimated that nutrient discharges from grey infrastructure potentially contribute 20% of the dry weather load. The expert panel defined the dry weather load as 20% of the total annual nitrogen and phosphorus discharged from urban pervious land, also known as the turf unit load. Furthermore, the expert panel limited the lifespan of an eliminated discharge to 10 years under the assumption that grey infrastructure will continue to deteriorate over time. For the purposes of calculating the maximum cumulative impervious acres that can be restored for eliminating individual discharges within a 5 year permit term, the estimated 10 year load is reduced by half. Below is a summary of assumptions:

- Dry Weather Load = 20% of the load from pervious land (i.e., turf unit load)
- Load Attributable to Grey Infrastructure = 20% of the Dry Weather Load
- Lifespan of the BMP as determined by the expert panel = 10 years
- Maximum cumulative EIA during the 5 year permit term = 50% of the maximum cumulative EIA over the 10 year lifespan of individual discharge credits

Consistent with 2014 Grey Infrastructure Report, an individual discharge credit must be taken off of the impervious acre restoration progress once it surpasses 10 years. In order to maintain impervious acres restored after the 10 year lifespan expires, new discharges will need to be eliminated and reported.

An example calculation to determine the maximum cumulative EIA for eliminating individual discharges during the permit term is found in Table 18. The following example assumes that 60,000 acres of the MS4 jurisdiction is pervious.

Table 18. Example Calculation of the Maximum Cumulative EIA Credit for the Elimination of Individual Discharges from Grey Infrastructure

	TN (lbs/acre/yr)	**TP (lbs/acre/yr)**	**TSS (lbs/acre/yr)**
Statewide Turf Unit Load (pervious unit load)	13.43	2.10	3,552
Total Pervious Load (turf unit load multiplied by the total pervious acres in an MS4 jurisdiction[1])	806,000	126,000	213 M
Total Dry Weather Load (20% of the total pervious load)	161,000	25,200	42.6 M
Maximum Load Attributable to Grey Infrastructure over 10 Years (20% of the dry weather load)	32,200	5,050	0.00[2]
Individual Maximum for a 5 Year Permit Term (50% of the maximum load calculated above)	16,100	2,530	0.00
	TN EIA	**TP EIA**	**TSS EIA**
Equivalent Impervious Acres (calculated using the aggregate impervious – true forest delta as explained in Section V.)	891	1,130	0.00
EIA Credit Maximum over a 5 Year Permit Term	**680 acres**		

Notes:
[1] For the purposes of this example, the calculation is based on an MS4 jurisdiction consisting of 60,000 pervious acres.
[2] No TSS reduction is assigned to this BMP by the 2014 Grey Infrastructure Report.

Equation 7 and Equation 8 provide a simplified 2-step process for calculating the maximum EIA.

Equation 7. Step 1 – Permit Term Maximum TN and TP Load Reductions Used to Determine the Maximum EIA Credit for Eliminating Individual Nutrient Discharges

$$\begin{aligned} &Maximum\ Load\ Reduction\ in\ a\ 5\ Year\ Permit\ Term \\ &\quad = Statewide\ Turf\ Unit\ Load\ (TN\ or\ TP) \\ &\quad \times Pervious\ Acres\ in\ the\ MS4\ Jurisdiction \times 0.02 \end{aligned}$$

Equation 8. Step 2 – Permit Term Maximum EIA Credit for Eliminating Individual Nutrient Discharges

$$Maximum\ EIA\ Credit\ in\ a\ Permit\ Term = \frac{\left[\left(\frac{[Maximum\ TN\ Load\ Reduction]}{[I-F_{TN}]}\right)+\left(\frac{[Maximum\ TP\ Load\ Reduction]}{[I-F_{TP}]}\right)+0\right]}{3}$$

Where:

$I - F_{TN}$ = Aggregate impervious unit load minus true forest unit load for TN (i.e., 18.08 lbs/acre/yr)
$I - F_{TP}$ = Aggregate impervious unit load minus true forest unit load for TP (i.e., 2.23 lbs/acre/yr)

Qualifying Conditions

The following qualifying conditions must be met to receive an EIA for the elimination of individual illicit discharges:

- An MS4 jurisdiction must implement an advanced program as defined by the 2014 Grey Infrastructure Report (Table 7, page 30) to demonstrate that the jurisdiction's program is not merely meeting minimum permit requirements. The MS4 jurisdiction will need to provide documentation demonstrating that the program fulfills these criteria.
- Creditable discharges are those discovered through active implementation of dry weather outfall screenings or commercial/industrial visual surveys under the IDDE program to demonstrate a proactive versus reactive program. Credits are also applicable to the elimination of illicit discharges resulting from an investigation that was prompted by a citizen report. Reported discharges that are unexpected nutrient discharges from pipe breaks, spills, leaks, and overflows that require immediate emergency repairs to stop the discharge are not creditable.
- The corrective measures taken must not be used to fulfill any other regulatory mandate (e.g., work conducted under a sanitary sewer consent decree).
- The values and calculations must follow the protocols assigned to each type of discharge as detailed in the 2014 Grey Infrastructure Report.

Reporting Requirements

The following information must be submitted with the MS4 jurisdiction's annual report to receive restoration credit:

- Type of discharge eliminated
- Total nitrogen and phosphorus removed (lbs)
- EIA credit
- Protocol used
- Nutrient concentration, pre and post elimination (mg/l)
- Discharge flow volume (gallons)
- Discharge flow rate (gallons per day)
- Estimated flow duration (days, up to a maximum of 365)
- River basin segment where the discharge was corrected
- Year that the discharge was eliminated
- Verification that the discharge was eliminated. Refer to the 2014 Grey Infrastructure Report for verification requirements assigned to each type of discharge
- On a case by case basis, the Department may request additional information deemed necessary to verify that nutrient reductions are calculated in accordance with the 2014 Grey Infrastructure Report

VI. Incentivizing Stormwater Management Co-Benefits

As discussed in Section IV: Pollutant Load Reductions for Upland Best Management Practices, pollutant load reduction crediting for stormwater BMPs is based on the CBP ST or RR adjustor curves (see Appendix A). The impervious acre credit for upland BMPs is based on the impervious acres in a BMP's drainage area and the depth of rainfall treated. Treatment of a rainfall depth of 1 inch (P_E = 1 inch) is required to receive credit equal to the impervious acres in the BMP's drainage area. This water quality treatment volume for a P_E of 1 inch is referred to as the WQ_T. When treating more than 1 inch of rainfall depth, or when providing greater temporary storage in the form of extended detention, or when enhancing the natural functions of a BMP, additional impervious acre credits may be available.

There are three ways of obtaining additional impervious acre credit using upland BMPs:

1. Providing WQ_T for a rainfall depth above 1 inch (P_E > 1 inch) in a practice that follows water quality design criteria for BMPs in the Manual;

2. Providing additional storage above a treated rainfall depth of 1 inch (P_E > 1 inch) via extended detention; or

3. Using green stormwater infrastructure.

1. Credit for Additional Water Quality Treatment Volume

There will be instances where an upland BMP or BMP retrofit provides water quality treatment for more than 1 inch of rainfall depth. Impervious acre credits are available for a water quality treatment volume (i.e., WQ_T) for a rainfall depth up to 3.0 inches. Following the CBP adjustor curves, there is a 1:1 linear relationship between rainfall depth treated and pollutant removal efficiencies up to a rainfall depth treated of 1 inch. However, for BMPs treating more than 1 inch of rainfall depth, the ratio of pollutant removal efficiency to rainfall depth treated decreases to 0.25:1. Specifically, for any additional WQ_T provided for a rainfall depth treated over 1 inch up to 3.0 inches, an additional 25% impervious acre credit is available.

Equation 9. WQ_T Credit for Rainfall Depths Greater than 1 Inch and Less than or Equal to 3 Inches

$$WQ_T\ Credit = \left[\frac{1\ inch + \ [(P_E - 1\ inch) \times 0.25]}{1\ inch}\right] \times IA$$

Where:

WQ_T = Water quality treatment volume
P_E = Rainfall depth treated
IA = Impervious acres in the drainage area

2. Credit for Additional Storage (Watershed Management Credit)

Upland BMPs with greater storage volume may be more resilient to changing weather patterns such as increasing annual precipitation and more frequent, intense short duration storms. The Department provides an additional impervious acre credit when the rainfall depth treated for Watershed Management (WM) is greater than the minimum 1 inch ($P_E > 1$ inch) using extended detention according to Appendix D.11 of the Manual. The WM credit incentivizes additional storage volume that helps to reduce downstream flooding and channel erosion. WM credits are available for this temporary storage volume for a rainfall depth between 1.0 inch and 3.0 inches. Specifically, for any additional rainfall depth treated for WM over 1 inch using 24 hour extended detention, an additional 25% impervious acre credit is available. This credit is added to the WQ_T credit. The WM credit applies only to the extended detention volume above the WQ_T for the practice. As shown below, Equation 10 calculates the additional credit available for the extended detention storage volume for a P_E greater than 1.0 inch and less than or equal to 3.0 inches.

Equation 10. WM Credit for Rainfall Depths Greater than 1 Inch and Less than or Equal to 3.0 Inches Managed with Extended Detention

$$WM\ Credit = \left[\frac{\left(P_E\ - P_{WQT}\right) \times 0.25}{1\ inch}\right] \times IA$$

Where:

WM = Watershed management
P_E = Rainfall depth treated
P_{WQT} = Rainfall depth treated for water quality
IA = Impervious acres in the drainage area

3. Green Stormwater Infrastructure Credit

The Green Stormwater Infrastructure (GSI) credit is provided when a BMP provides water quality treatment and incorporates natural processes using vegetation and soils. BMPs with enhanced design features that use natural processes provide healthy, sustainable, and functional ecosystems. BMPs with these features also mimic the pollutant load reduction efficiencies of RR practices. BMPs considered RR practices by the CBP are 35% more effective at removing TN, TP, and TSS than ST practices (see the CBP's BMP Removal Rate Adjustor Curves in Appendix A). Therefore, these practices achieve a GSI credit equal to 1.35 × impervious acre credit achieved through water quality treatment. As noted in Section III: Impervious Acre Credits of Upland Best Management Practices, all Chapter 5 BMPs constructed to meet the required design criteria listed in the Manual are considered RR practices and therefore automatically receive the GSI credit.

A subset of Chapter 3 BMPs (see Table 19) constructed to meet the required design criteria in the Manual can incorporate the additional enhanced design features listed in Table 20 to achieve the GSI credit.

Table 19. Eligibility for Green Stormwater Infrastructure Credits

Upland BMPs	Must Meet Required Manual Design Criteria	Must Meet Required Manual Design Criteria and Provide Enhanced Features
Chapter 5 Practices		
Green Roofs	X	
Permeable Pavements	X	
Reinforced Turf	X	
Disconnection of Rooftop Runoff	X	
Disconnection of Non-Rooftop Runoff	X	
Sheetflow to Conservation Areas	X	
Rainwater Harvesting	X	
Submerged Gravel Wetlands	X	
Landscape Infiltration	X	
Dry Wells	X	
Micro-Bioretention and Rain Gardens	X	
Bio-Swales, Grass Swales, Wet Swales, Dry Swales	X	
Chapter 3 Practices (Sections 3.1 and 3.2 of the Manual)		
Micropool Extended Detention Pond		X
Wet Pond		X
Wet Extended Detention Pond		X
Multiple Pond System		X
Pocket Pond		X
Shallow Wetland		X
Extended Detention Shallow Wetland		X
Pond/Wetland System		X
Pocket Wetland		X
Chapter 3 Practices (Sections 3.3 and 3.4 of the Manual Except Otherwise Noted[1])		
Infiltration Trench		X
Infiltration Basin		X
Surface Sand Filter		X
Organic Filter		X
Pocket Sand Filter		X
Bioretention		X

Note:
[1] Infiltration trenches under pavement, underground sand filters, and perimeter sand filters are not eligible for GSI credit.

Table 20. Green Stormwater Infrastructure Enhanced Features

Chapter 3.1 - 3.2 Stormwater Ponds and Wetlands
Required
1. Flow paths must be 1.5:1 (length relative to width). 2. Surface area of the wetland must be at least 1.5% of the total drainage area to the facility. 3. Any extended detention volume must not comprise more than 50% of the total wet pool volume, and the maximum extended detention water surface elevation must not extend more than three feet above the normal pool. 4. There must be at least 3 separate hydrologic zones (e.g., deep water pool, shallow water bench, shoreline fringe, riparian fringe; see Appendix A of the Manual). 5. These hydrologic zones must be planted throughout with at least 5 wetland species and include a variety of plant types (e.g., grasses, shrubs, trees). For more information on plant types, see *Vegetation in Stormwater Best Management Practices* (MDE, November 2019). 6. Vegetation must be established to cover a minimum of 50% of the pond surface, as measured at the permanent pool design water surface elevation. 7. The landscaping plan must include plants (i.e., aquatic, emergent, upland) along the aquatic bench, safety bench, and side slopes. 8. A vegetated buffer must extend 25 feet outward from the maximum water surface elevation with an additional 15 foot setback to structures (e.g., houses, sheds, roads).
Recommended
1. At least 25% of the total design volume (P_E) should be in deepwater zones with a minimum depth of 4 feet. 2. A minimum of 35% of the total surface area should have a depth of 6 inches or less. 3. At least 65% of the total surface area should be shallower than 18 inches. 4. The vegetated buffer and interior side slopes should be managed as a meadow or forest (mowing twice per year at a maximum).
Chapter 3.3 - 3.4 Stormwater Infiltration and Filtering Systems
Required
1. A minimum 85% vegetation cover must be established within 3 years including at least 5 species and a variety of plant types (grasses, shrubs, trees). For more information, see *Vegetation in Stormwater Best Management Practices* (MDE, November 2019). 2. The landscaping plan must not include invasive species or vines, and these must be removed as they are discovered during maintenance. 3. A vegetated buffer must extend 25 feet outward from the maximum design water surface elevation with an additional 15 foot setback to structures.
Recommended
1. Native plant species are strongly encouraged in the landscaping plan. 2. The vegetated buffer and interior side slopes should be managed as a meadow or forest (mowing twice per year at a maximum).

The following equations are used to calculate the GSI credits:

Equation 11. GSI Credit for Chapter 5 Practices Meeting all Required Design Criteria

$$GSI\ Credit = 1.35 \times \left\{\left[\frac{(1\ inch + [(P_E - 1\ inch) \times 0.25]}{1\ inch}\right] \times IA\right\}$$

Where:

GSI = Green stormwater infrastructure
P_E = Rainfall depth treated
IA = Impervious acres in the drainage area

Equation 12. Credit for Chapter 3 Practices Meeting all Required Design Criteria

$$Impervious\ Acre\ Credit = \ Impervious\ Acre\ Credit\ Achieved\ through\ WQ_T$$

Equation 13. GSI Credit for Subset of Chapter 3 Practices Meeting all Required Design Criteria and all Required Enhanced Features

$$GSI\ Credit = 1.35 \times \left\{\left[\frac{(1\ inch + [(P_E - 1\ inch) \times 0.25]}{1\ inch}\right] \times IA\right\}$$

Where:

GSI = Green stormwater infrastructure
P_E = Rainfall depth treated
IA = Impervious acres in the drainage area

4. Combining Water Quality Treatment Credits, GSI Credits, and WM Credits

Upland BMPs may include additional WQ_T, greater WM storage volume, or enhanced GSI design features, or a combination of any of the three credits. If the GSI credit is applicable, it replaces the WQ_T credit. If an upland BMP can claim the WM credit and the GSI credit, the WM credit above the WQ_T volume is added to the GSI credit for the total available credit for the project. Example scenarios of all three credits and how to combine credits can be found in Appendix I.

For water quality practices with extended detention, the volume of storage provided in extended detention that is equal to the wet pool WQ_T can be credited as WQ_T. Instead of using WM credits, this volume can be used for WQ_T credits up to a total treatment volume for a P_E of 3.0 inches (i.e., when the wet pool WQ_T is 1.5 inches and the extended detention volume is an additional 1.5 inches). This is because 50% of the total water quality volume provided in these BMPs can be in the form of extended detention. While the total value of credits calculated using this approach is the same, using this alternative method to calculate the credits becomes especially beneficial if the BMP receives GSI credit. An example of this scenario can be found in Appendix I.

VII. Water Quality Trading

MS4 jurisdictions may acquire TN, TP, and TSS credits in accordance with the requirements of the Maryland Water Quality Trading Program (WQTP), COMAR 26.08.11, to meet impervious acre restoration requirements in their MS4 permits.

1. Calculating Credits

In order to use nutrient credits acquired through the WQTP to meet the MS4 permit impervious acre restoration requirements, the impervious acres must be translated into WQTP credits. This is a two-step process, where the impervious acres are first translated into EOS load reductions and then the load reductions are converted into WQTP credits.

The translation of the impervious acres into TN, TP, and TSS load reductions follows the same method used to account for alternative practices through an EIA_f. Using this method, a treated impervious acre is estimated to be equivalent to the TN, TP, and TSS load reductions achieved from converting one acre of aggregate impervious land into true forest. Thus, the requirement to treat an impervious acre can be met through the WQTP under this permit by acquiring 18.08 lbs of TN (EOS), 2.23 lbs of TP (EOS), and 8,046 lbs of TSS (EOS).

Because a WQTP credit is defined as a pound of TN, TP, or TSS delivered to the Bay, referred to as EOT, the EOS load must be converted to an EOT load. MS4 jurisdictions can use the conversion factors shown in Table 21. These factors were calculated based on jurisdiction-wide weighted average watershed delivery factors. The MDOT/SHA delivery factors are based on statewide-weighted averages.

Table 21. Conversion Factors for EOT Loads used for Water Quality Trading Program Calculations

EOS-EOT conversion factor	Anne Arundel	Baltimore	Baltimore City	Carroll	Charles	Frederick	Harford	Howard	Montgomery	Prince George's	State Highway Administration
TN	0.91	0.69	0.81	0.49	0.83	0.73	0.85	0.49	0.62	0.78	0.80
TP	0.86	0.66	0.82	0.46	0.77	0.60	0.75	0.49	0.51	0.73	0.74
TSS	0.74	0.51	0.70	0.35	0.66	0.53	0.60	0.22	0.39	0.47	0.56

Equation 14. Calculating TN, TP, and TSS Trading Credits for Impervious Acre Restoration

$$TN\ Credits\ to\ be\ Acquired = Impervious\ Acres\ to\ be\ Acquired \times 18.08\ (lbs/acre) \times TN\ EOS\text{-}EOT\ Conversion\ Factor$$

$$TP\ Credits\ to\ be\ Acquired = Impervious\ Acres\ to\ be\ Acquired \times 2.23\ (lbs/acre) \times TP\ EOS\text{-}EOT\ Conversion\ Factor$$

$$TSS\ Credits\ to\ be\ Acquired = Impervious\ Acres\ to\ be\ Acquired \times 8{,}046\ (lbs/acre) \times TSS\ EOS\text{-}EOT\ Conversion\ Factor$$

MS4 jurisdictions can meet their restoration requirements by acquiring credits of TN, TP, and TSS using Equation 14. Alternatively, the requirements can be achieved by acquiring an excess amount of one of the pollutants in lieu of acquiring another. Under this option, 18.08 lbs of TN (EOS) is equivalent to 2.23 lbs of TP (EOS), or 8,046 lbs of TSS (EOS). For example, if an MS4 jurisdiction opted to meet the restoration requirements through the WQTP by purchasing nitrogen credits alone, it would need to purchase 54.24 lbs of TN (EOS) per EIA.

2. Credit Vintage

To meet its restoration requirements with WQTP credits, an MS4 jurisdiction must secure the required number of credits from the same year (vintage year) as that of the permit expiration.

3. Qualifying Credit

The WQTP crediting procedures should not be used to acquire credits from practices listed in Table 1 or Table 2 of this document and implemented within an MS4's jurisdictional boundary. The Department recommends that any restoration projects and credits within an MS4's jurisdictional boundary include a memorandum of understanding or other legal document that formalizes credit ownership and long-term maintenance responsibility. Nutrient credits for BMPs implemented within an MS4's jurisdictional boundary, but from which credits have been certified and traded to another entity through the WQTP, cannot be claimed by that jurisdiction as restoration credit (i.e., double-counting of nutrient credits).

BMPs in this Guidance that are implemented on agricultural land must comply with the following:

- Federal and State cost share funds, such as Conservation Reserve Enhancement Program (CREP) and Maryland Agricultural Water Quality Cost-Share (MACS) Program, must not be used to acquire MS4 credit.
- To acquire MS4 credit for work performed on land with an Agricultural Use Assessment as determined by the Department of Assessments and Taxation, farming operations must first be compliant with State laws and regulations (e.g., nutrient management plans, excluding livestock from stream setbacks, phosphorus management requirements).
- Any federal or State cost share conservation practices disturbed or removed as a result of

construction must be re-established consistent with the Natural Resources Conservation Service (NRCS) standard and specifications as determined by a local soil conservation district.

- Credit will not be given for new conservation practices to offset the removal of existing ones.

4. Geography

Nutrient credits acquired for MS4 compliance must be generated by a source located within a Chesapeake Bay TMDL watershed that overlaps with the MS4's jurisdictional boundary. A dynamic map showing watershed and county boundaries can be accessed at: arcg.is/1TKjqG.

5. Generating Tradeable Credit

An MS4 jurisdiction may generate tradeable credit for the WQTP once it has fully met its restoration requirement.

VIII. Expert Panel Updates and Innovative Practices

1. Future Chesapeake Bay Program Expert Panel Updates

The CBP periodically approves new BMPs or revises efficiencies of existing BMPs. The Department will share this information with Maryland's MS4 regulated community, provide guidance on proper application in Maryland, and place Technical Memorandums on the Department's webpage.

2. Proposal of Innovative BMPs for MS4 Credit

MS4 jurisdictions are encouraged to continue to explore innovative practices and new solutions to improve water quality. Several new BMPs were discussed with MS4 jurisdictions and environmental non-governmental organizations during the Guidance committee meetings. These BMPs include non-forested riparian buffer protection, forest regeneration, and self-converted wetland ponds. Additional programmatic BMPs that have been of interest include pet waste reduction, stormwater education, and trash removal.

When monitoring data exist to support additional credits for new practices, MS4 jurisdictions may submit that information to the Department for consideration. The Department can approve certain practices when proper documentation and monitoring are provided to verify pollutant removal efficiencies. The policies and procedures for the approval of new and innovative technologies may be found on the Department's website. These must be followed for all MS4 jurisdictions interested in pursuing new practices or products either for approval as an acceptable BMP for new development and redevelopment or for use in retrofit applications. The Department's approval for using these practices to meet MS4 restoration requirements is subject to the following:

1. Any MS4 jurisdiction requesting approval of an innovative stormwater practice for restoration must submit to the Department documentation demonstrating practice effectiveness. At a minimum, this documentation must include:

    a. Clear representations of the specific pollutant removal efficiencies for the device in a typical mode of use and under conditions that would be expected normally within the jurisdiction;

    b. Pollutant removal efficiencies that are supported using one or more of the following:

        i. Monitoring data collected under typical field conditions using a methodology consistent with the standards described in the Department's *Alternative/Innovative Technology Review Checklist* (October 2019);

        ii. Monitoring studies conducted by the MS4 jurisdiction and approved by the Department; or

        iii. Review and approval of the practice by EPA or the CBP.

c. Product specifications, installation requirements, and operation and maintenance procedures;

d. Hydraulic performance specifications (e.g., treatment volume, throughput);

e. References and examples of actual installations of the practice;

f. Minimum and recommended maintenance requirements for the practice and any components;

g. Discussion of any special licensing, hauling, or access requirements, and safety issues associated with the operation and maintenance of the practice; and

h. Proof that the practice has been submitted to the CBP Water Quality Goal Implementation Team (WQGIT) or Urban Stormwater Workgroup (USWG) for consideration as an EPA-recognized stormwater BMP.

2. If credit is sought under an MS4 jurisdiction's WIP or MS4 permit, the practice must be documented in that jurisdiction's TMDL implementation plan;

3. All practices must be maintained in accordance with State requirements as defined in COMAR 26.17.02;

4. The MS4 jurisdiction is responsible for determining the appropriate impervious acre reduction for MS4 restoration efforts for the specific practices based on the methodology described in this Guidance; and

5. If formal documentation listed in Section 1.b above is absent, interim pollutant removal efficiencies may be established by the Department based on supporting documentation provided by the applicant until monitoring is conducted. These interim efficiencies will be recognized for a period not to exceed two years. If no further monitoring is provided after two years, the practice will be disallowed as an acceptable stormwater retrofit BMP.

The Department will evaluate all information to make a determination on credit toward meeting pollutant load reduction targets under established TMDLs and impervious acre treatment requirements. The Department will work closely with the CBP workgroups to determine a credit system that is equitable and consistent with other activities in the Chesapeake Bay region. As new technology, innovative practices, monitoring, and research offer additional information, the Department will make that information available to the MS4 regulated community.

IX. Acronyms

BAT	Best Available Technology
BMP	Best Management Practice
CAST	Chesapeake Assessment Scenario Tool
CBP	Chesapeake Bay Program
CEAP	Conservation Affects Assessment Project
COMAR	Code of Maryland Regulations
CREP	Conservation Reserve Enhancement Program
Department, the	Maryland Department of the Environment
ED	Extended Detention
EIA	Equivalent Impervious Acre
EIA_f	Equivalent Impervious Acre Conversion Factor
EOS	Edge-of-Stream
EOT	Edge-of-Tide
EPA	U.S. Environmental Protection Agency
ESD	Environmental Site Design
FTW	Floating Treatment Wetlands
GSI	Green Stormwater Infrastructure
HSG	Hydrologic Soil Group
I – F	Aggregate Impervious Unit Load Minus True Forest Unit Load
IA	Impervious Acre
IDDE	Illicit Discharge Detection and Elimination
LOD	Limit of Disturbance
MACS	Maryland Agricultural Water Quality Cost-Share Program
MALPF	Maryland Agricultural Land Preservation Foundation
Manual, the	Maryland Stormwater Design Manual (2000)
MEP	Maximum Extent Practicable
MET	Maryland Environmental Trust
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PCB	Polychlorinated Biphenyl
P_{design}	Rainfall Treated by Stormwater Management Practices (inches)
P_E	Rainfall Target Used to Size ESD Practices
Q	Rainfall Depth Treated per Impervious Acre (inches)
RR	Runoff Reduction
SPARROW	Spatially Referenced Regressions On Watershed Attributes
SPSC	Regenerative Step Pool Stormwater Conveyance System
ST	Stormwater Treatment
STB	Stream Bed and Bank Load
SW-WLA	Stormwater Wasteload Allocation
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Sediment

USDA	U.S. Department of Agriculture
USGS	U.S. Geological Society
USWG	Urban Stormwater Workgroup
WinSLAMM	Source Loading and Management Model for Windows
WIP	Watershed Implementation Plan
WM	Watershed Management
WQGIT	Water Quality Goal Implementation Team
WQ_T	Water Quality Treatment Volume
WQTP	Maryland Water Quality Trading Program
WQ_V	Water Quality Volume
WRTDS	Weighted Regressions on Time, Discharge and Season
WTWG	Watershed Technical Workgroup
WWTP	Wastewater Treatment Plant

X. References

This Guidance reflects the contributions of multiple stakeholders. In 2018, the Department convened a committee representing environmental non-governmental organizations and medium and large municipal separate storm sewer system (MS4) jurisdictions. Monthly meetings covered accounting for stormwater management co-benefits, incentivizing green infrastructure, encouraging restoration activities in upland areas, new best management practice (BMP) efficiencies, restoration cost considerations, and new BMPs not currently credited. The Department thanks the Audubon Naturalist Society; Blue Water Baltimore; Chesapeake Bay Foundation; Clean Water Action; Maryland League of Conservation Voters; Potomac Conservancy; Anne Arundel, Baltimore, Carroll, Harford, and Montgomery Counties; Baltimore City; and the U.S. Environmental Protection Agency for their time, expertise, invaluable ideas, and commitment to improving water quality in the Chesapeake Bay and Maryland's local streams.

In addition, the Guidance incorporates information from the following sources:

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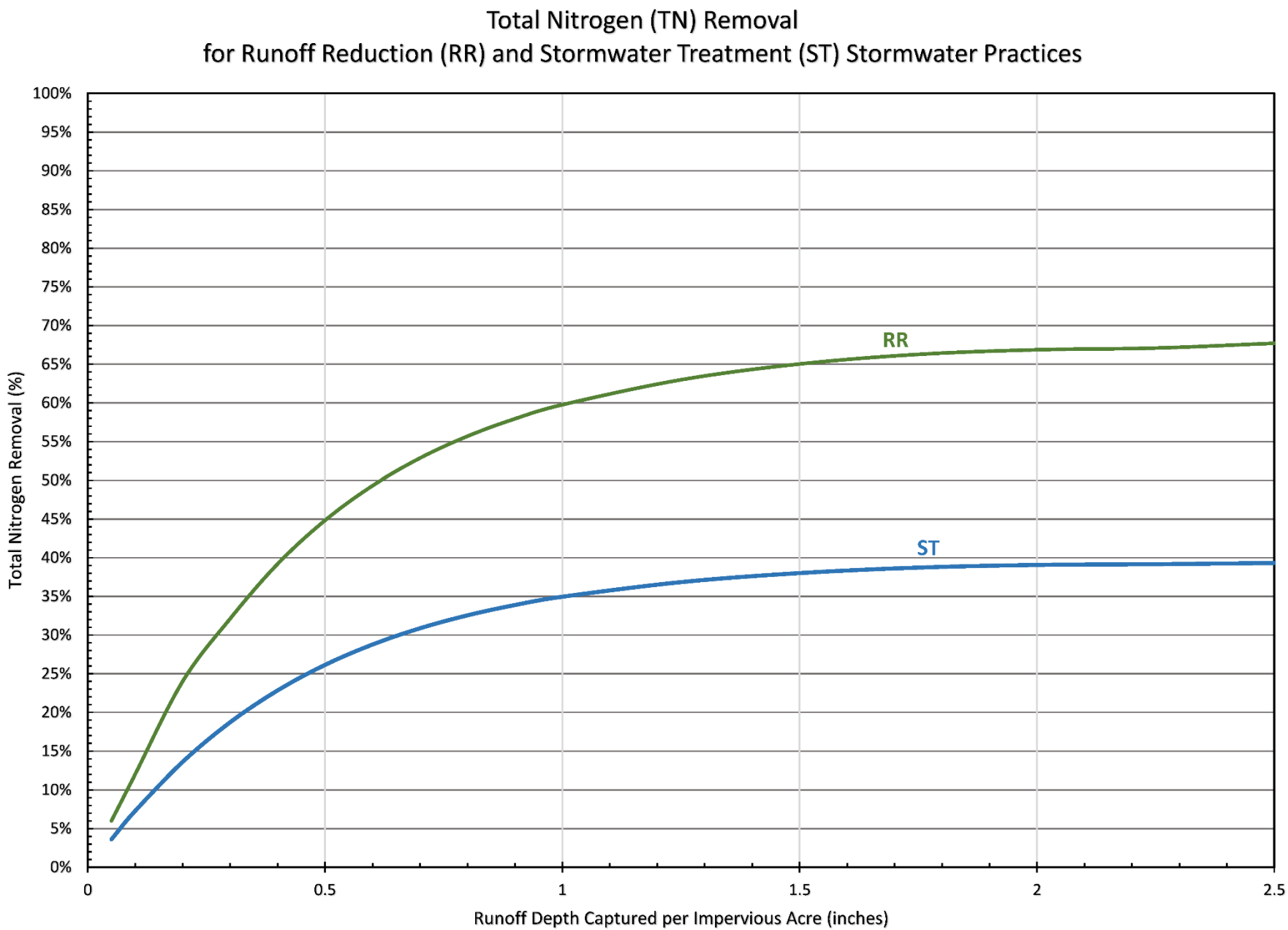
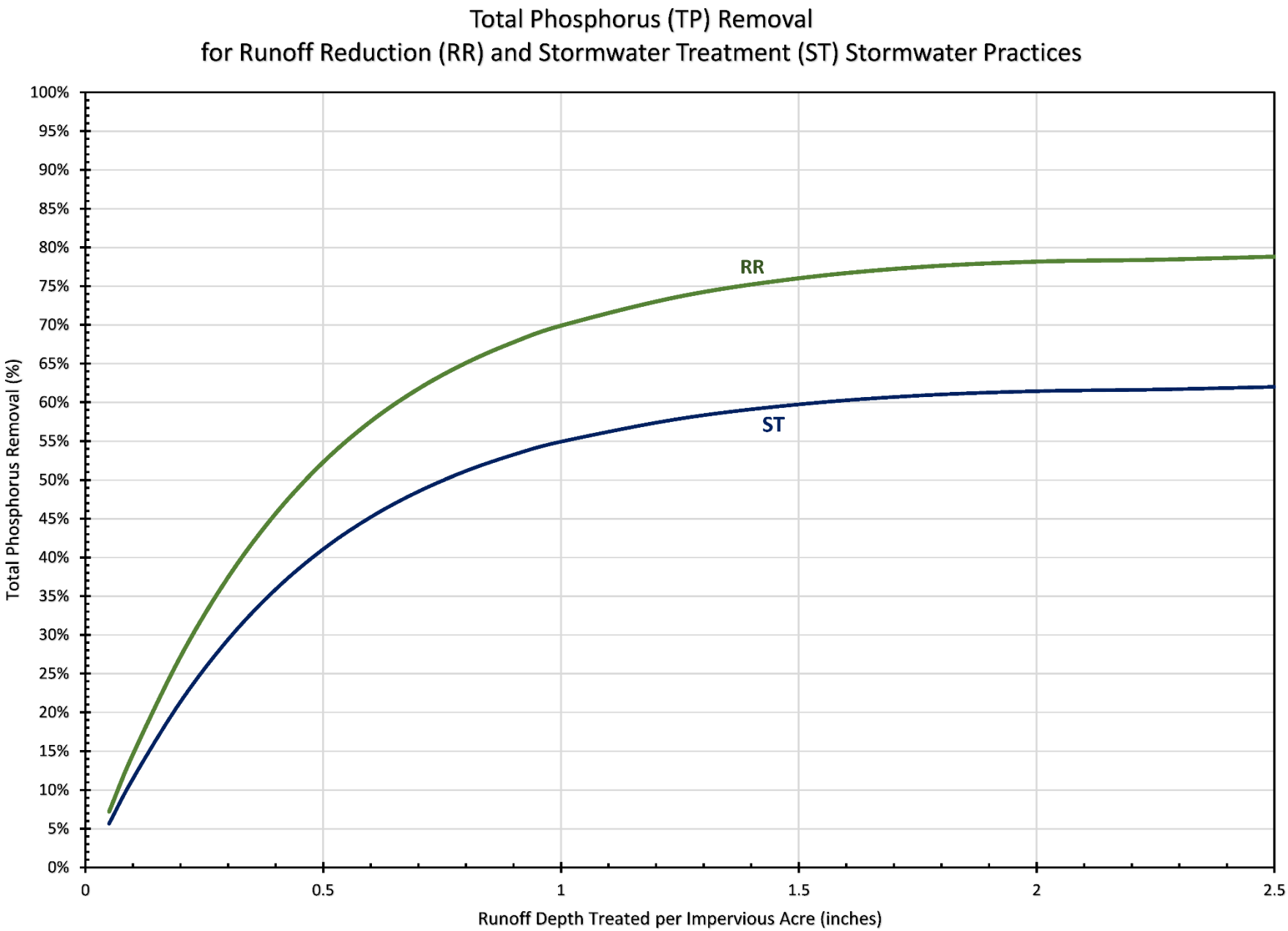
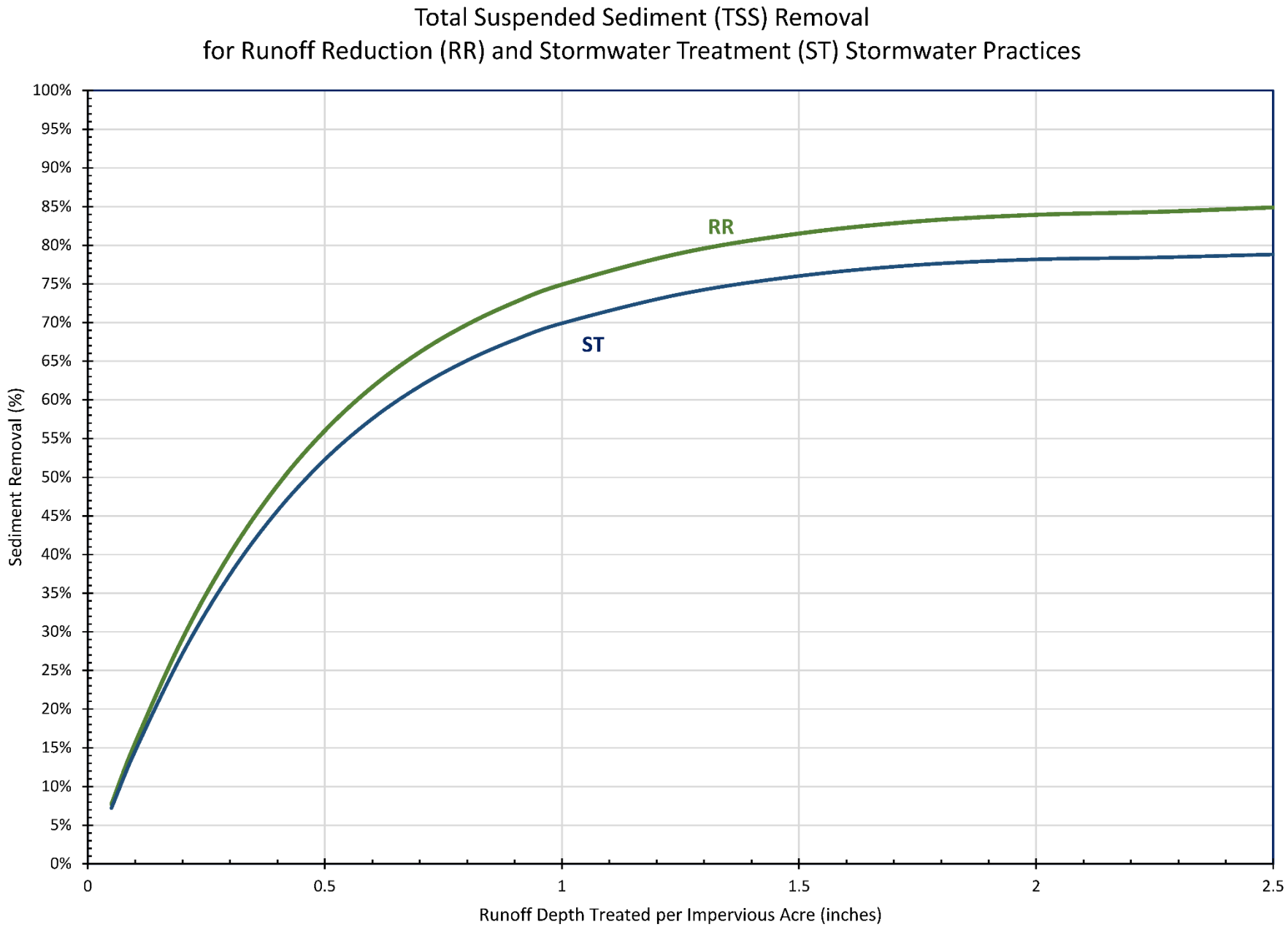
Appendix A: Adjustor Curves

The following pollutant removal adjustor curves are from the Chesapeake Bay Program (CBP) publication *Recommendations of the Expert Panel to Define Removal Rates for New State Stormwater Performance Standards* (Schueler and Lane, 2012 and 2015). The curves provide pollutant removal efficiencies for nutrient and sediment load reductions for best management practice (BMP) implementation. BMPs are classified as either runoff reduction (RR) or stormwater treatment (ST) as outlined in Table 2 (see Section IV).

Throughout the Guidance, the impervious acre credit is used to account for MS4 restoration achieved through BMP implementation. The impervious acre credit is also the surrogate parameter for showing progress in total nitrogen (TN), total phosphorus (TP), and total suspended sediment (TSS) load reductions for meeting Chesapeake Bay and local TMDLs. For an impervious surface, the runoff depth captured is 95% of the rainfall depth treated by a BMP. Therefore, when using these adjustor curves, the rainfall depth treated may be used as a substitute for the runoff depth captured (X axis) when determining pollutant removal efficiencies.


Total Nitrogen (TN) Removal
for Runoff Reduction (RR) and Stormwater Treatment (ST) Stormwater Practices
Total Nitrogen Removal (%)
100%
95%
90%
85%
80%
75%
70%
65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
RR
ST
0
0.5
1
1.5
2
2.5
Runoff Depth Captured per Impervious Acre (inches)


Total Phosphorus (TP) Removal
for Runoff Reduction (RR) and Stormwater Treatment (ST) Stormwater Practices
Total Phosphorus Removal (%)
100%
95%
90%
85%
80%
75%
70%
65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
RR
ST
0
0.5
1
1.5
2
2.5
Runoff Depth Treated per Impervious Acre (inches)


Total Suspended Sediment (TSS) Removal
for Runoff Reduction (RR) and Stormwater Treatment (ST) Stormwater Practices
Sediment Removal (%)
100%
95%
90%
85%
80%
75%
70%
65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
RR
ST
0
0.5
1
1.5
2
2.5
Runoff Depth Treated per Impervious Acre (inches)

Appendix B: Phase 6 Chesapeake Bay Watershed Model Land Cover Runoff Loads and Load Reductions

As part of the Chesapeake Bay total maximum daily load (TMDL) midpoint assessment, the Chesapeake Bay Program (CBP) transitioned from the Phase 5 to the Phase 6 Chesapeake Bay Watershed Model (Phase 6 Model). The new model was developed using a multiple model approach, drawing upon total nitrogen (TN), total phosphorus (TP), and total suspended sediment (TSS) loading estimates from the U.S. Geological Society's (USGS) SPARROW model (an empirical regression model), the Phase 5 Chesapeake Bay Watershed Model, and the U.S. Department of Agriculture's (USDA) Conservation Affects Assessment Project (CEAP) model. The overall calibration of input loads to the Bay using USGS's Weighted Regressions on Time, Discharge and Season (WRTDS) observations represents an improvement over Phase 5. The Phase 6 Model also includes significant improvements in the resolution and accuracy of model inputs. These improvements include the following:

- High resolution (i.e., 1 meter) land cover data were used as the base dataset for developing the model land cover.
- Refined Load Sources with unique unit loads were incorporated, particularly in the developed sector. The Phase 5 Model simulated aggregate impervious and pervious urban land cover classifications. The Phase 6 Model simulates both road and non-road impervious surfaces, tree canopy over impervious, turfgrass, and tree canopy over turfgrass.
- In the Phase 5 Model, stream bed and bank (STB) loads were implicitly included in all land cover loads, due to the nature of the data used to inform the unit loads. The Phase 6 Model explicitly simulates STB loads as a discreet source, as well as tidal shoreline loads.
- The Phase 6 Model incorporates updated and refined historic best management practice (BMP) data. The CBP partnership spent several years collecting updated information on historic BMPs for model incorporation.
- The Phase 6 Model incorporates many new BMPs for which expert panel reports were developed and approved, and it includes refinements to the TN, TP, and TSS reduction efficiencies for existing BMPs.

This Guidance refers to two primary spatial scales at which loads are estimated. In the Phase 6 Model, edge-of-stream (EOS) loads represent the input loads to smaller, headwater streams in a watershed and edge-of-tide (EOT) loads represent the input loads to the tidal Chesapeake Bay. To ensure consistency in the calculation of equivalent impervious acres (EIA), the Department developed a revised total EOS unit load, which is the sum of the STB load attributed to each Load Source and the Load Source's terrestrial load. More information on the methodology and reasoning behind the development of the revised unit loads and how they are used in calculating the EIA_f (i.e., equivalent impervious acre conversion factor) can be found in Appendix D. Revised EOS loads in the Phase 6 Model are used for estimating loads to local, non-tidal watersheds.

EOT loads correspond to Delivered Loads in the Phase 5 Model. Chesapeake Bay TMDLs and watershed implementation plans (WIPs) are presented in terms of EOT loads. The EOT load can be calculated outside of the model as follows:

Equation 15. Edge-of-Tide Loads

$$EOT\ Load\ (lbs/yr) = EOS\ Load\ (lbs/yr) \times Delivery\ Factor$$

The delivery factors are unique per Phase 6 modeling segment and are provided in Appendix L of this Guidance. Generally speaking, the greater the proximity of a modeling segment to the tidal Bay, the greater the TN, TP, and TSS delivery. Delivery factors also decrease for modeling segments draining to impoundments. In addition to Appendix L, these factors can be found via the "EOT Factor Map" on the Department's water quality trading website: mde.maryland.gov/programs/Water/WQT/Pages/WQT_Tools_Resources.aspx.

Load Sources are aggregated for the purposes of calculating pollutant load reduction credits in this Guidance, since the distinction between some individual Load Sources in the model is merely arbitrary. For example, any minimal differences between "MS4" and "Non-Regulated" unit loads within a modeling segment are merely a product of model calibration and do not reflect actual differences in relative unit loads.

There are two major types of impervious surface simulated in the Phase 6 Model: road impervious and non-road impervious. In order to keep data collection efforts for load reduction credit calculations simple, these calculations will be based on an aggregate impervious surface unit load. Therefore, MS4 jurisdictions do not need to collect data on how much road and non-road impervious surface drains to a given BMP. There are certain BMPs, however, such as "Street Trees" (i.e., land cover conversion BMP representing a shift from Impervious Road to Tree Canopy over Impervious) and street sweeping, which make the assumption that only Impervious Road surface is being treated. In these instances, the calculations apply the specific Impervious Road surface unit load (see Table 4). Appendix C presents the specific Load Sources used in the formulas for each BMP.

When crediting TN, TP, and TSS load reductions toward permit and TMDL goals, these reductions should be calculated from a No Action, or No BMP, modeling scenario. Statewide average, No Action TN, TP, and TSS EOS revised unit loads (i.e., loading rates) for applicable urban and natural Load Sources are presented in Table 4. Steps for calculating load reductions for TN are listed below.

TN Load Reductions of Stormwater Best Management Practices

Steps for calculating EOT TN load reductions:

1. Determine the Phase 6 modeling segment delivery factor (see Appendix L).

2. Determine the impervious drainage area treated by the practice.

3. If the project is a retrofit, determine the pre-restoration stormwater BMP type, inches of rainfall depth treated, and the corresponding upland BMP efficiency. Otherwise, use the drainage area to calculate the TN load without a BMP efficiency.

4. Calculate the pre-restoration TN load reduction using Equation 4 of this Guidance, and repeated below.

$$Load\ Reduction\ (lbs/yr) = Urban\ Unit\ Load\ (lbs/acre/yr) \times Impervious\ Surface\ in\ BMP\ Drainage\ Area\ (acres) \times \left[\frac{BMP\ Efficiency}{100}\right] \times Phase\ 6\ Modeling\ Segment\ Delivery\ Factor$$

5. Determine the post-restoration stormwater BMP type, inches of rainfall depth treated, and the corresponding upland BMP TN efficiency.

6. Calculate the post-restoration TN load reduction using Equation 4.

7. Subtract the result from the pre-restoration TN load to determine the TN credit obtained from the stormwater BMP:

$$TN\ Credit\ (lb/yr) = Pre\text{–}Restoration\ TN\ Load\ Reduction\ (lbs/yr) - Post\text{–}Restoration\ TN\ Load\ Reduction\ (lbs/yr)$$

Example – Wet pond in modeling segment H24021PM1_3510_4000:

1. Phase 6 Modeling Segment Delivery Factor = 0.65 (See Appendix L)

2. Drainage Area = 100 acres "Impervious"

3. Pre-Restoration stormwater BMP type = None, 0 inches rainfall depth treated

4. Upland BMP TN efficiency = 0% (see Table 3)

5. $Pre\text{–}Restoration\ TN\ Load = 20.39\ (lbs/acre/yr) \times 100\ (acres)\ \times 0.65 = 1{,}325.35\ (lbs/yr)$

6. Post-Restoration stormwater BMP type = Stormwater treatment (ST) practice, 1 inch rainfall depth treated

7. Upland BMP TN efficiency = 35%

8. $Post\text{–}Restoration\ TN\ Load = 20.39\ (lbs/acre/yr) \times 100\ (acres) \times \left(\frac{35}{100}\right) \times 0.65 = 463.87\ (lbs/yr)$

9. $TN\ Credit\ Calculation = 1{,}325.35\ (lbs/yr) - 463.87\ (lbs/yr) = 861.48\ (lbs/yr)$

Appendix C: Best Management Practice Load Reduction Formulas and Pollutant Removal Efficiencies

BMP	Load Reduction Formula	TN Efficiency/Per Unit Load Reduction	TP Efficiency/Per Unit Load Reduction	TSS Efficiency/Per Unit Load Reduction
Efficiency BMPs				
Structural				
Stormwater Treatment (ST)	[Aggregate Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × ST Efficiency]	ST efficiency variable by P_E (see Table 3)	ST efficiency variable by P_E (see Table 3)	ST efficiency variable by P_E (see Table 3)
Runoff Reduction (RR)	[Aggregate Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × RR Efficiency]	RR efficiency variable by P_E (see Table 3)	RR efficiency variable by P_E (see Table 3)	RR efficiency variable by P_E (see Table 3)
Nonstructural				
Street Sweeping - Advanced Technology				
1 pass/12 weeks	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	0%	1%	2%
1 pass/2 weeks	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	2%	5%	11%
1 pass/4 weeks	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	1%	3%	6%
1 pass/8 weeks	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	1%	2%	4%
1 pass/week	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	3%	8%	16%
2 passes/week	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	4%	10%	21%
Fall 1 pass/1-2 weeks else monthly	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	2%	5%	10%
Spring 1 pass/1-2 weeks else monthly	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	1%	4%	7%
Street Sweeping - Mechanical Broom Technology				
1 pass/4 weeks	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	0%	0%	0%

BMP	Load Reduction Formula	TN Efficiency/Per Unit Load Reduction	TP Efficiency/Per Unit Load Reduction	TSS Efficiency/Per Unit Load Reduction
1 pass/week	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	0%	0%	1%
2 passes/week	[Road Imp. Unit Load (lbs/acre/yr) × Imp. Area (acres) × Efficiency]	0%	0%	1%
Urban Soil Restoration - Impervious				
Level 1	[Aggregate Imp. Unit Reduction (lbs/acre/yr) × Imp. Area (acres)]	13.7 lbs/acre/yr	0.70 lbs/acre/yr	1,696 lbs/acre/yr
Level 2	[Aggregate Imp. Unit Reduction (lbs/acre/yr) × Imp. Area (acres)]	15 lbs/acre/yr	0.77 lbs/acre/yr	1,864 lbs/acre/yr
Urban Soil Restoration - Pervious				
Level 1	[Turf Unit Reduction (lbs/acre/yr) × Turf Area (acres)]	4.4 lbs/acre/yr	0.72 lbs/acre/yr	278 lbs/acre/yr
Level 2	[Turf Unit Reduction (lbs/acre/yr) × Turf Area (acres)]	8.9 lbs/acre/yr	1.44 lbs/acre/yr	557 lbs/acre/yr
Floating Treatment Wetlands				
10% Pond Surface Area Coverage	[Urban Unit Load (lbs/acre/yr) × Urban Area (acres) × Efficiency]	1%	2%	2%
11-20% Pond Surface Area Coverage	[Urban Unit Load (lbs/acre/yr) × Urban Area (acres) × Efficiency]	2%	3%	5%
21-30% Pond Surface Area Coverage	[Urban Unit Load (lbs/acre/yr) × Urban Area (acres) × Efficiency]	3%	5%	7%
31-40% Pond Surface Area Coverage	[Urban Unit Load (lbs/acre/yr) × Urban Area (acres) × Efficiency]	3%	7%	9%
41-50% Pond Surface Area Coverage	[Urban Unit Load (lbs/acre/yr) × Urban Area (acres) × Efficiency]	4%	8%	12%
Load Reduction BMPs				
Stream Restoration/Outfall Stabilization				
Planning Rate[1]	[Length of Stream Restored (ft) × Unit Load Reduction (lbs/ft)]	0.075 lbs/ft	0.068 lbs/ft	248 lbs/ft
Protocols	See expert panel report	N/A	N/A	N/A

[1] Planning rate cannot be used for determining final project credit.

BMP	Load Reduction Formula	TN Efficiency/Per Unit Load Reduction	TP Efficiency/Per Unit Load Reduction	TSS Efficiency/Per Unit Load Reduction
Shoreline Management				
Planning/Default Rate[2]	[Length of Shoreline Restored (ft) × Unit Load Reduction (lbs/ft)]	0.173 lbs/ft	0.122 lbs/ft	328 lbs/ft
Protocols	See expert panel report	N/A	N/A	N/A
[2] Planning/Default rate should only be used for planning purposes or for non-conforming projects.				
Storm Drain Cleaning				
Organic[3]	[Mass of Wet Solids Collected (tons/yr) × Conversion Factor (lbs/ton)]	4.44 lbs/ton	0.48 lbs/ton	400 lbs/ton
Inorganic[4]	[Mass of Wet Solids Collected (tons/yr) × Conversion Factor (lbs/ton)]	3.78 lbs/ton	0.84 lbs/ton	1,400 lbs/ton
[3] Wet weight to dry weight conversion is built into conversion factor. [4] Wet weight to dry weight conversion is built into conversion factor.				
Land Cover Conversion BMPs				
Non-Riparian				
Imp. Surface Reduction (Imp. to Turf)	[Imp. Unit Load (lbs/acre/yr) – Turf Unit Load (lbs/acre/yr)] × Area Converted (acres)]	6.96 lbs/acre/yr	0.45 lbs/acre/yr	5,241 lbs/acre/yr
Street Trees (Imp. to Tree Canopy over Imp.)	[[Road Imp. Unit Load (lbs/acre/yr) – Tree Canopy Over Imp. Unit Load (lbs/acre/yr)] × Area Converted (acres)]	3.10 lbs/acre/yr	0.76 lbs/acre/yr	1,404 lbs/acre/yr
Urban Tree Canopy Planting (Turf to Tree Canopy over Turf)	[[Turf Unit Load (lbs/acre/yr) – Tree Canopy Over Turf Unit Load (lbs/acre/yr)] × Area Converted (acres)]	3.20 lbs/acre/yr	0.50 lbs/acre/yr	206 lbs/acre/yr
Forest Planting (Turf to Forest)	[[Turf Unit Load (lbs/acre/yr) – True Forest Unit Load (lbs/acre/yr)] × Area Converted (acres)]	11.12 lbs/acre/yr	1.78 lbs/acre/yr	2,805 lbs/acre/yr
Forest Conservation (Urban to Forest)	[[Urban Unit Load (lbs/acre/yr) – True Forest Unit Load (lbs/acre/yr)] × Area Converted (acres)]	10.57 lbs/acre/yr	1.10 lbs/acre/yr	2,465 lbs/acre/yr
Conservation Landscaping (Turf to Mixed Open)	[[Turf Unit Load (lbs/acre/yr) – Mixed Open Unit Load (lbs/acre/yr)] × Area Converted (acres)]	5.24 lbs/acre/yr	0.53 lbs/acre/yr	0.00 lbs/acre/yr

BMP	Load Reduction Formula	TN Efficiency/Per Unit Load Reduction	TP Efficiency/Per Unit Load Reduction	TSS Efficiency/Per Unit Load Reduction
Riparian				
Forest Planting (Turf to Forest)	[[Turf Unit Load (lbs/acre/yr) – True Forest Unit Load (lbs/acre/yr)] × Area Converted (acres)] + [Urban Unit Load (lbs/acres/yr) × Area Converted (acres) × Efficiency]	14.34 lbs/acre/yr & 25%	2.50 lbs/acre/yr & 50%	4,411 lbs/acre/yr & 50%
Conservation Landscaping (Turf to Mixed Open)	[[Turf Unit Load (lbs/acre/yr) – Mixed Open Unit Load (lbs/acre/yr)] × Area Converted (acres)] + [Urban Unit Load (lbs/acre/yr) × Area Converted (acres) × Efficiency]	6.75 lbs/acre/yr & 12.5%	0.74 lbs/acre/yr & 25%	0.00 lbs/acre/yr & 25%
Septic BMPs				
Connections[5]	[Septic Unit Load (lbs/system) × Efficiency]	50%	N/A	N/A
Denitrification	[Septic Unit Load (lbs/system) × Efficiency]	50%	N/A	N/A
Pumping	[Septic Unit Load (lbs/system) × Efficiency]	5%	N/A	N/A

[5] Creditable connection efficiency set to BAT upgrade efficiency based on the Department's Wastewater crediting policy.

Appendix D: Methodology for Calculating Equivalent Impervious Acres

The Department is using the Phase 6 Model land cover pollutant unit loads and best management practice (BMP) load reduction rates to determine total nitrogen (TN), total phosphorus (TP), and total suspended sediment (TSS) reductions. These pollutant unit loads and reduction rates are also being used to determine the equivalent impervious acre (EIA) credits provided by alternative BMPs. The Phase 6 Model is more detailed in its calculation of pollutant loads than Phase 5. As a result, the discrepancy between the model phases must be accounted for to ensure consistent load reduction and equivalent impervious acre conversion factor (EIA_f) calculations.

Terrestrial vs. Stream Bed and Bank Loads

The Phase 6 Model significantly differs from the Phase 5 Model in how loads are attributed. In the Phase 5 Model, the total unit loads per land cover Load Source reflect inputs from both terrestrial loads (i.e. over land) and stream bed and bank loads (STB). However, the total unit loads per land cover Load Source in the Phase 6 Model only reflect terrestrial loads. To ensure consistency in the calculation of EIAs between the two models, the Department estimated a total unit load, which is the sum of the Load Source's terrestrial load and STB load attributed to that Load Source. The method for calculating the STB load attributed to each Load Source can be found in Appendix E.

Calculating Deltas

Calculating the EIA_f for each alternative BMP is a two-step process. First, the pollutant load reductions for TN, TP, and TSS are calculated for the alternative BMP. Next, these pollutant load reductions are divided by the delta between aggregate impervious and true forest unit loads for TN, TP, and TSS. The difference between true forest and aggregate impervious loads signifies maximum restoration potential. The Aggregate Impervious – True Forest deltas for TN, TP, and TSS are shown in Table 22 and are calculated by subtracting the Total Forest Unit Load from the Total Impervious Unit Load.

Table 22. Aggregate Impervious – True Forest Delta Calculation using Revised Phase 6 Model Pollutant Unit Loads

		TN (lbs/acre/yr)	TP (lbs/acre/yr)	TSS (lbs/acre/yr)
1.	Impervious STB	5.73	1.83	7,125
2.	Impervious Terrestrial	14.66	0.72	1,668
3.	**Total – Aggregate Impervious (1 + 2)**	**20.39**	**2.55**	**8,793**
4.	True Forest STB	0.88	0.27	719
5.	True Forest	1.43	0.05	28
6.	**Total – True Forest (4 + 5)**	**2.31**	**0.32**	**747**
7.	**Aggregate Impervious – True Forest Delta (3 – 6)**	**18.08**	**2.23**	**8,046**

All alternative BMPs except land use conversion practices use the Aggregate Impervious unit load – True Forest unit load deltas in their EIA_f calculation as shown in Equation 5 of this Guidance and repeated below.

$$EIA_f = \frac{\left(\frac{TN\ Load\ Red.}{I-F_{TN}}\right)+\left(\frac{TP\ Load\ Red.}{I-F_{TP}}\right)+\left(\frac{TSS\ Load\ Red.}{I-F_{TSS}}\right)}{3}$$

Where:

EIA_f = Equivalent impervious acre conversion factor
TN Load Red. = BMP load reduction for TN (lbs/unit/yr)
TP Load Red. = BMP load reduction for TP (lbs/unit/yr)
TSS Load Red. = BMP load reduction for TSS (lbs/unit/yr)
$I - F_{TN}$ = Aggregate impervious unit load minus true forest unit load for TN (lbs/acre/yr)
$I - F_{TP}$ = Aggregate impervious unit load minus true forest unit load for TP (lbs/acre/yr)
$I - F_{TSS}$ = Aggregate impervious unit load minus true forest unit load for TSS (lbs/acre/yr)

Land use conversion practices are calculated using the upland stormwater management practice method for determining an equivalent impervious acre. This method uses the stormwater treatment (ST) 1 inch performance delta instead of the Aggregate Impervious unit load – True Forest unit load for its EIA_f calculation (see Table 23). The ST 1 inch delta calculation is shown in Equation 16. This is the ST 1 inch treatment efficiency multiplied by the Total Impervious unit load.

Table 23. ST 1 Inch Delta Calculation using Revised Phase 6 Model Impervious Unit Loads

		TN (lbs/acre/yr)	TP (lbs/acre/yr)	TSS (lbs/acre/yr)
1.	**ST 1 Inch Pollutant Removal Efficiency**	**0.35**	**0.55**	**0.70**
2.	Impervious STB Unit Load	5.73	1.83	7,125
3.	Impervious Terrestrial Unit Load	14.66	0.72	1,668
4.	**Total Impervious Unit Load (2+3)**	**20.39**	**2.55**	**8,793**
5.	**ST 1 Inch Delta (1×4)**	**7.14**	**1.40**	**6,155**

Equation 16. EIA_f Calculation for Land Use Conversion Practices

$$EIA_f = \frac{\left(\frac{TN\ Load\ Red.}{ST\ 1"\ delta_{TN}}\right)+\left(\frac{TP\ Load\ Red.}{ST\ 1"delta_{TP}}\right)+\left(\frac{TSS\ Load\ Red.}{ST\ 1"delta_{TSS}}\right)}{3}$$

Where:

TN Load Red. = Land cover conversion load reduction for TN (lbs/unit/yr)
TP Load Red. = Land cover conversion load reduction for TP (lbs/unit/yr)
TSS Load Red. = Land cover conversion load reduction for TSS (lbs/unit/yr)
ST 1"delta TN = ST 1 inch pollutant efficiency applied to total impervious unit load for TN
ST 1"delta TP = ST 1 inch pollutant efficiency applied to total impervious unit load for TP
ST 1"delta TSS = ST 1 inch pollutant efficiency applied to total impervious unit load for TSS

Appendix E: Methodology for Calculating the Stream Bed and Bank Load

The method for calculating the stream bed and bank load (STB) attributed to each Load Source is performed outside of the Phase 6 Model but follows the same principles that are used in the Chesapeake Assessment Scenario Tool (CAST). This methodology was provided to the Department by the Chesapeake Bay Program (CBP) (Devereux 2019). For each pollutant, the Load Source-specific ratio was calculated between the CAST scenario edge-of-stream (EOS) load output not including STB and the calibration average EOS load not including STB. Next, the calculated ratio was multiplied by the STB base source-specific load. For the total suspended sediment (TSS) STB load only, an additional 4/3 of the CAST scenario EOS impervious TSS load was added, consistent with the Phase 6 Model methodology. These equations are summarized below:

Equation 17. Calculations for STB Loads for TN, TP, and TSS

$$TN\ STB\ Load = \left(\frac{Scenario\ EOS\ without\ STB\ TN}{CAL\ EOS\ without\ STB\ TN}\right) \times STB\ Base\ TN$$

$$TP\ STB\ Load = \left(\frac{Scenario\ EOS\ without\ STB\ TP}{CAL\ EOS\ without\ STB\ TP}\right) \times STB\ Base\ TP$$

$$TSS\ STB\ Load = \left\{\left(\frac{Scenario\ EOS\ without\ STB\ TSS}{CAL\ EOS\ without\ STB\ TSS}\right) \times STB\ Base\ TSS\right\} + \left(\frac{4}{3} \times Scenario\ Impervious\ TSS\right)$$

Where:

TN = Total nitrogen
TP = Total phosphorus
TSS = Total suspended sediment
STB = Stream bed and bank load source
EOS = Edge-of-stream
CAL = Calibration average

The STB base load used in each equation is a set load determined during the development and calibration of the Phase 6 Model. It is presented in terms of nitrate, organic nitrogen, and ammonia for TN, and phosphate and organic phosphorus for TP. However, the results are summed to TN and TP for convenience. The calibration average EOS load is the average of the annual calibration scenarios from 1984 to 2013. Both the STB base load and the calibration average EOS load are not CAST outputs and were provided by CBP. All calculations are performed at the land river modeling segment scale and include the agencies as defined in CAST. Counties and municipalities are implicitly included.

STB Load Normalization

Because a single STB base load exists for all Load Sources, the STB source-specific load calculated using Equation 17 is an overestimation. This overestimation was accounted for and corrected by the Department using the following steps:

1. Calculate the ratio of the CAST scenario EOS load output to the calibration average EOS load for the aggregate of all other Load Sources and sum the result with the Load Source-specific ratio calculated above.

2. To account for Load Source group breakouts, renormalize the Load Source-specific ratio by first dividing it by the sum of the ratios calculated in Step 1 and then multiplying the result by the CAST scenario EOS load output to the calibration average EOS load ratio for the aggregate of all Load Sources.

3. Disaggregate the final STB load by multiplying the Load Source-specific STB base load by the renormalized ratio. If calculating the TSS STB load, add in 4/3 of the CAST scenario impervious EOS load. The impervious load includes CAST MS4 and Non-Regulated Buildings and Other, and Roads.

Appendix F: Examples of Calculating Equivalent Impervious Acre Credits for Alternative Best Management Practices

Street Sweeping

Equivalent Impervious Acre Conversion Factors (EIA_f) for Street Sweeping

BMP	EIA_f per Mile Swept
Advanced Sweeping	
1 pass/12 weeks	0.027
1 pass/8 weeks	0.059
1 pass/4 weeks	0.087
Spring 1 pass/1-2 weeks else monthly	0.106
Fall 1 pass/1-2 weeks else monthly	0.148
1 pass/2 weeks	0.156
1 pass/week	0.235
2 passes/week	0.304
Mechanical Broom	
1 pass/4 weeks	0.001
1 pass/week	0.004
2 passes/week	0.008

1. Determine the number of lane miles swept and the street sweeping best management practice (BMP) type.

2. Find the corresponding EIA_f according to Table 1 (and repeated above).

3. Multiply that EIA_f by the number of lane miles swept.

   Note: Street sweeping is an annual BMP. Equivalent impervious acre (EIA) credit is based on the annual number of miles swept averaged over the span of the 5 year permit term.

$$Number\ of\ Miles\ Swept \times EIA_f = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction is using advanced sweeping technology and sweeping 100 lane miles once every 12 weeks.

2. The EIA_f for advanced sweeping – 1 pass/12 weeks is 0.027.

3. Multiply the EIA_f of 0.027 by the number of lane miles swept (i.e., 100 lane miles). The EIA credit for 100 lane miles of street sweeping is 2.7 acres.

$$100\ Lane\ Miles \times 0.027\ EIA_f = 2.7\ Equivalent\ Impervious\ Acres\ Credit$$

Storm Drain Cleaning

EIA_f for Storm Drain Cleaning

Material Removed	EIA_f per Ton of Material Removed
Organic	0.17
Inorganic	0.25

1. Determine if material is organic or inorganic based on the majority content of solids.
2. Find the corresponding EIA_f according to Table 1 (and repeated above).
3. Measure the mass (tons) of solids/organic matter that are captured and properly disposed of by the storm drain cleaning practice on an annual basis.
4. Multiply the EIA_f by the mass collected.

Note: Storm drain cleaning is an annual BMP. EIA credit is based on the annual aggregate load captured over the span of the 5 year permit term.

$$Mass\ Collected\ (tons) \times EIA_f = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. The MS4 jurisdiction has determined that the majority content of solids vacuumed from the storm drain are organic.
2. The EIA_f for removing 1 ton of organic material is 0.17.
3. The amount of solids removed is 2,000 lbs or 1 ton.
4. Multiply the EIA_f of 0.17 by the mass of material removed in tons (i.e., 1 ton). The EIA credit for removing 1 ton of organic material is 0.17 acres.

$$1\ Ton\ of\ Organic\ Materials\ Removed \times 0.17\ EIA_f = 0.17\ Equivalent\ Impervious\ Acres\ Credit$$

Floating Treatment Wetland

EIA_f for Floating Treatment Wetlands (FTW)

BMP	% of Pond Wet Surface Area Covered by FTW	EIA_f per Impervious Acre
FTW1	10%	0.008
FTW2	11-20%	0.017
FTW3	21-30%	0.026
FTW4	31-40%	0.034
FTW5	41-50%	0.042

1. Determine the number of impervious acres draining to the stormwater pond.
2. Determine the percent of the pond's wet surface area that is covered by the FTW and the corresponding EIA_f according to Table 1 (and repeated above).
3. Multiply that EIA_f by the impervious acres within the pond's drainage area.

   $$Total\ Impervious\ Acres\ within\ the\ Pond's\ Drainage\ Area \times EIA_f = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. A stormwater pond receives drainage from 50 acres of impervious surfaces.
2. The FTW design covers 30% of the pond's wet surface area, so the corresponding EIA_f is 0.026.
3. Multiply the EIA_f of 0.026 by the total impervious acres in the pond's drainage area (i.e., 50 acres). The EIA credit for the FTW is 1.30 acres.

   $$50\ Impervious\ Acres \times 0.026\ EIA_f = 1.30\ Equivalent\ Impervious\ Acres\ Credit$$

Non-Riparian Land Cover Conversion

EIA_f for Non-Riparian Land Cover Conversion BMPs

Land Cover Conversion BMP	EIA_f per Acre of Land Cover Converted
Forest Planting	1.10
Conservation Landscaping	0.37
Impervious Surface Reduction	0.71
Street Trees	0.40
Urban Tree Canopy Planting	0.28

1. Determine the number of acres to be converted and the type of land cover conversion.
2. Find the corresponding EIA_f according to Table 1 (and repeated above).
3. Multiply that EIA_f by the number of converted acres.

$$Acres\ of\ Land\ Converted\ \times EIA_f = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction is planning to implement a forest planting BMP and convert 100 acres of turf to forest.
2. The EIA_f for forest planting without a riparian buffer is 1.10.
3. Multiply the EIA_f of 1.10 by the converted acres (i.e., 100 acres). The EIA credit for 100 acres of forest planting is 110 acres.

$$100\ Acres\ of\ Land\ Converted\ from\ Turf\ to\ Forest \times 1.10\ EIA_f =$$
$$110\ Equivalent\ Impervious\ Acres\ Credit$$

Riparian Land Cover Conversion

EIA_f for Riparian Land Cover Conversion BMPs

Land Cover Conversion BMP	EIA_f per Acre of Land Cover Converted
Riparian Forest Buffers	1.50
Riparian Conservation Landscaping	0.50

1. Determine the number of acres to be converted and the type of land cover conversion. (Note: The only land cover conversion BMPs that offer additional credit for a riparian buffer are forest planting and conservation landscaping.)

2. Find the corresponding EIA_f according to Table 1 (and repeated above).

3. Multiply that EIA_f by the number of converted acres.

$$Acres\ of\ Land\ Converted\ within\ a\ Riparian\ Buffer \times EIA_f = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction is planning to implement a forest planting BMP as a riparian buffer and convert 100 acres of turf to forest.

2. The EIA_f for forest planting with a riparian buffer is 1.50.

3. Multiply EIA_f of 1.50 by the converted acres (i.e., 100 acres). The EIA of 100 acres of forest planting is 150 acres.

$$100\ Acres\ of\ Land\ Converted\ to\ Forest\ within\ a\ Riparian\ Buffer \times 1.50\ EIA_f = 150\ Equivalent\ Impervious\ Acres\ Credit$$

Forest Conservation

1. Determine the number of forest acres to be conserved.

2. Multiply the number of forest acres by the EIA_f, from Table 1 (i.e., 0.46).

$$Acres\ of\ Forest\ Preserved \times 0.46\ EIA_f = Equivalent\ Impervious\ Acre\ Credit$$

Example

1. An MS4 jurisdiction is planning to conserve 100 acres of forest.

2. Multiply the EIA_f of 0.46 by the conserved forest acres eligible for credit (i.e. 100 acres). The EIA credit for 100 acres of forest conservation is 46 acres.

$$100\ Acres\ of\ Forest\ Preserved \times 0.46\ EIA_f = 46\ Equivalent\ Impervious\ Acres\ Credit$$

Septic Practices

EIA_f for Alternative Septic BMPs

BMP	EIA_f per System
Septic Pumping	0.02
Septic Denitrification	0.16
Septic to WWTP Connection	0.23

1. Determine the number of septic systems pumped, septic systems converted to a wastewater treatment plant (WWTP) connection, or denitrification systems installed.

2. Find the corresponding EIA_f according to Table 1 (and repeated above).

3. Multiply that EIA_f by the number of septic systems as determined in Step 1.

$$Number\ of\ Septic\ Systems \times EIA_f = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction has pumped 100 septic systems.

2. The EIA_f for septic pumping is 0.02.

3. Multiply 0.02 acres by the number of septic systems (i.e., 100). The EIA credit for 100 septic systems pumped out is 2 acres.

$$100\ Septic\ Systems\ Pumped \times 0.02\ EIA_f = 2\ Equivalent\ Impervious\ Acres\ Credit$$

(Note: Septic pumping is an annual BMP. EIA credit is based on the number of systems pumped averaged over the span of the 5 year permit term.)

Shoreline Management (Default Rate)

1. Determine the number of feet of shoreline managed.

2. Multiply the EIA_f from Table 1 (i.e., 0.04 acres) by the number of shoreline feet.

$$Number\ of\ Feet\ of\ Shoreline\ Managed \times 0.04\ EIA_f = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction is managing 100 feet of shoreline.

2. Multiply the EIA_f of 0.04 acres by the feet of shoreline managed (i.e., 100). The EIA credit for 100 feet of shoreline management is 4 acres.

$$100\ Feet\ of\ Shoreline\ Managed \times 0.04\ EIA_f = 4\ Equivalent\ Impervious\ Acres\ Credit$$

Stream Restoration (Planning Purposes Only)

1. Determine the number of stream feet to be restored.

2. Multiply the EIA_f from Table 1 (i.e., 0.02 acres) by the number of stream feet.

$$Length\ of\ Planned\ Stream\ Restoration\ in\ Feet \times 0.02\ EIA_f = Equivalent\ Impervious\ Acre\ Credit$$

Example:

1. An MS4 jurisdiction plans to restore 100 stream feet.

2. Multiply the EIA_f of 0.02 acres by the stream feet to be restored (i.e., 100 feet). The EIA planning credit for 100 feet of stream restoration is 2 acres.

$$Planned\ Stream\ Restoration\ of\ 100\ Feet \times 0.02\ EIA_f = 2\ Equivalent\ Impervious\ Acres\ Credit$$

Note that the 0.02 equivalent impervious acre is a stream restoration planning rate. Once stream restoration projects are completed, the project-specific measurements and pollutant load reductions calculated in accordance with the stream restoration protocols must be used to determine the EIA credit.

Stream Restoration/Shoreline Management using Protocols

1. Determine under which protocols the stream restoration or shoreline management project is eligible for credit.

2. Sum load reductions from each protocol preformed on the project.

3. Using Equation 5, substitute load reductions determined in Step 2 to calculate the project's EIA credit.

Example:

1. An MS4 jurisdiction's stream restoration project is eligible for credit under Protocols 1 and 2.

2. Protocol 1 resulted in load reductions of 1,538 lbs TN, 708 lbs TP, and 122 tons TSS. Protocol 2 resulted in a load reduction of 73 lbs TN. The total nutrient and sediment credits for this project are:

   TN = 1,538 lbs + 73 lbs = 1,611 lbs
   TP = 708 lbs
   TSS = 122 tons = 244,000 lbs

3. Substituting the load reductions from Step 2 into Equation 5, the project's EIA credit is 146 acres.

$$EIA = \frac{\left(\frac{1{,}611}{18.08}\right) + \left(\frac{708}{2.23}\right) + \left(\frac{244{,}000}{8{,}046}\right)}{3} = 146\ Equivalent\ Impervious\ Acres\ Credit$$

Appendix G: Design Criteria for Urban Soil Restoration

Feasibility and Testing:

- Soil amendments must not be applied where:
    - The depth to the seasonal high water table, bedrock, hard pan, or other confining layer is less than two feet below the soil surface;
    - Average slope exceeds ten percent; or
    - Soils are saturated or seasonally wet.
- Soil testing must be conducted at two stages:
    - Prior to construction to a depth of 1 foot below the proposed application area to determine soil properties related to saturation, bulk density, pH, salts, and nutrients. This will determine what soil amendments may be needed; and
    - One week after amendment incorporation to determine if any additional nutrient requirements, and pH and/or organic adjustments, are needed to further plant growth.

Design Criteria:

- When used to restore compacted soils and improve soil porosity, the area must be excavated or ripped to the depth and soil amendments added according to the degree of compaction (i.e., Level 1, 2).
- Soil restoration to depths up to 15 inches requires removal of the existing soil and physical mixing of the soil with compost (excavation and mixing method, see below). Soil restoration to depths greater than 15 inches requires complete cultivation (see below).
- When used in conjunction with another best management practice (BMP):
    - Soil must be excavated to the design depth (e.g., for filtering practices, between 12 to 24 inches); and amendments added using an excavation and mixing method; and
    - For media depths greater than 15 inches, the complete cultivation method should be used.
- Once the soil restoration has been completed, the site should be planted and stabilized immediately.
- Excavation and Mixing Method:
    - Remove the compacted soils, working in strips perpendicular to the slope/flowpath and using multiple lifts if necessary;
    - Separate and remove a minimum of 25% of the densest subsoil for removal. Stockpile the remaining soil next to the excavated area;
    - Scarify the bottom of the excavated area;
    - Replace the soil in a minimum of two lifts. More lifts may be needed depending on the equipment used. For each lift:
        - Replace soil by loosening, aerating and mixing; and
        - Incorporate the required soil amendments uniformly throughout each lift.
    - Rake to level the amended area, removing woody debris and any rocks larger than 1 inch in diameter;

    - The finished grade of the amended area must be a minimum of 4 inches above the existing grade to account for settlement. The finished grade must be adjusted to account for field conditions and soil texture; final grades should match original grade three months after installation.
- Complete Cultivation Method:
    - Remove the top layer of soil to a depth of 6 inches to 12 inches. Drop the removed material next to the excavated area. Removed soil that is in large lumps or is blocky may require further breaking up.
    - Cultivation of the second layer can be started after completing the removal of the upper layer. Cultivation is accomplished by lifting and raking the soil in place. Long teeth on the bucket can assist in this process. If the material is not easily crumbled (i.e., is friable) by lifting and raking, then scrape in soil in 6 inch to 12 inch layers. Lifting and dropping the material in place can also be used to break up blockier soils.
    - Mix any soil amendments into the stockpiled soil (see above). After soil amendments have been added, pull the top, stockpiled layer back into the excavation. Level the amended area as needed;
    - Incorporate soil amendments with a 6 inch rototiller;
    - Rake to level the amended area, removing woody debris and any rocks larger than 1 inch in diameter;
    - The finished grade of the amended area must be a minimum of 4 inches above the existing grade to account for settlement. The finished grade must be adjusted to account for field conditions and soil texture; final grades should match original grade three months after installation.

Appendix H: Minimum Qualifying Conditions for Stream Restoration and Shoreline Management Projects

Stream Restoration

Not all stream restoration projects may qualify for sediment or nutrient reductions in the Phase 6 Chesapeake Bay Watershed Model (Phase 6 Model), and subsequently they may not be eligible for equivalent impervious acre (EIA) credits. The stream restoration expert panel report, *Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects (January 2014),* outlines the qualifying conditions for stream restoration projects that qualify for nutrient and sediment load reduction credits. In order for a project to qualify for EIA credits, it must meet the key criteria identified below, as well as all other criteria outlined within the expert panel report.

1. Stream restoration projects that are primarily designed to protect public infrastructure by bank armoring or rip rap do not qualify for a credit. For further information regarding what does and does not constitute bank armoring, and specifically what is eligible for credit, please see the approved memo, *Consensus Recommendations for Improving the Application of the Prevented Sediment Protocol for Urban Stream Restoration Projects Built for Pollutant Removal Credit (February 2020),* specifically Table 3 of the report.

2. The stream reach must be greater than 100 feet in length and be still actively enlarging or degrading in response to upstream development or adjustment to previous disturbances in the watershed (e.g., a road crossing and failing dams).

3. In addition, there may be certain project design conditions that must be satisfied in order to be eligible for credit under one or more of the specific protocols described in the stream restoration expert panel report.

   Protocol 3:

   - Maximum ponded volume in the flood plain that receives credit should be 1.0 foot to ensure interaction between runoff and wetland plants.
   - Minimum watershed to floodplain surface area ratio of 1% (credit is discounted proportionately for projects that cannot meet the 1% minimum).

4. A qualifying project must meet certain presumptive criteria to ensure that high functioning portions of the urban stream corridor are not used for in-stream stormwater treatment (i.e., where existing stream quality is still good). These may include one or more of the following:

   - Geomorphic evidence of active stream degradation, i.e., Bank Erosion Hazard Index (BEHI) score
   - An IBI (i.e., index of biological integrity) of fair or worse
   - Hydrologic evidence of floodplain disconnection
   - Evidence of significant depth of legacy sediment in the project reach

5. Before credits are granted, stream restoration projects will need to meet post-construction monitoring requirements, exhibit successful vegetative establishment, and have undergone initial project maintenance.

6. A qualifying project must demonstrate that it will maintain or expand existing riparian vegetation in the stream corridor, and compensate for any project related riparian losses in project work areas as determined by regulatory agencies.

7. All qualifying projects must have a designated authority responsible for development of a project maintenance program that includes routine maintenance and long-term repairs.

Shoreline Management

Not all shoreline management projects may qualify for sediment or nutrient reductions in the Phase 6 Model, and subsequently they may not be eligible for EIA credits. The Shoreline Management Expert Panel report, *Recommendations of the Expert Panel to Define Removal Rates for Shoreline Management Projects (June 2017),* outlines the qualifying conditions for shoreline management projects that qualify for nutrient and sediment load reduction credits. In order for a project to qualify for EIA credits, it must meet the criteria detailed in Table 24.

Table 24. Basic Qualifying Conditions for Pollutant Load Reductions and EIA Credit for Shoreline Management Practices

Shoreline Management Practice	Load Reduction Criteria[1]
Living Shoreline a) Nonstructural; b) Hybrid system including a sill; and c) Hybrid system including a breakwater	1. The site is currently experiencing shoreline erosion or is replacing existing armor. The site was graded, vegetated, and excess sediment was removed or used[2], and 2. When a marsh fringe habitat (a or b) or beach/dune habitat (c) is created, enhanced, or maintained.
Revetment and/or Breakwater System without a Living Shoreline	1. The site is currently experiencing shoreline erosion, and 2. A living shoreline is not technically feasible or practicable as determined by substrate, depth, or other site constraints, and 3. When the breakwater footprint would not cover submerged aquatic vegetation (SAV), shellfish beds, and/or wetlands.
Bulkhead/Seawalls	1. The site is currently experiencing shoreline erosion, and 2. The site consists of port facilities, marine industrial facilities, or other marine commercial areas where immediate offshore depth (e.g., depths deeper than 10 feet 35 feet from shore) precludes living shoreline stabilization or the use of a breakwater or revetment.

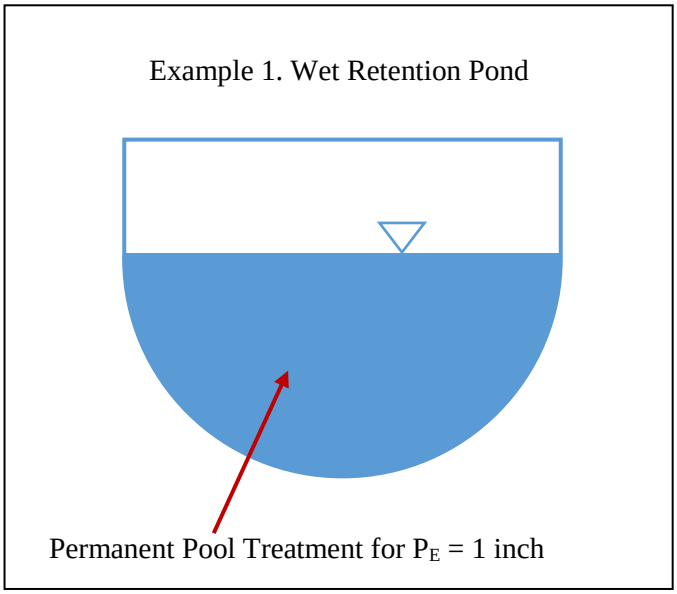
Notes:
[1] Projects that impact the Chesapeake Bay Preservation Act protected vegetation without mitigation receive no pollutant load reduction toward the Chesapeake Bay total maximum daily load or EIA credit. The Department may, on a case-by-case basis, determine a practice is ineligible for credit when the unintended consequences of negative impacts to wetlands and SAVs caused by these shoreline management techniques outweigh the benefits.
[2] Bank analysis that demonstrates the site has bank stability and does not have erosion can serve to meet this qualifying condition. This should be coordinated through the regulatory approval process to ensure proper methods, reporting, and requirements are done and are accepted so that the project meets this basic qualifying condition.

Appendix I: Example Impervious Acre Calculations for the Water Quality Treatment, Watershed Management, and Green Stormwater Infrastructure Credits

Water Quality Treatment (WQ_T) and Watershed Management (WM) Credits

Example 1:

Wet retention pond with a permanent pool water quality treatment volume for rainfall depth of 1 inch. Impervious area in the drainage area to the pond is 10 acres.



Solution:

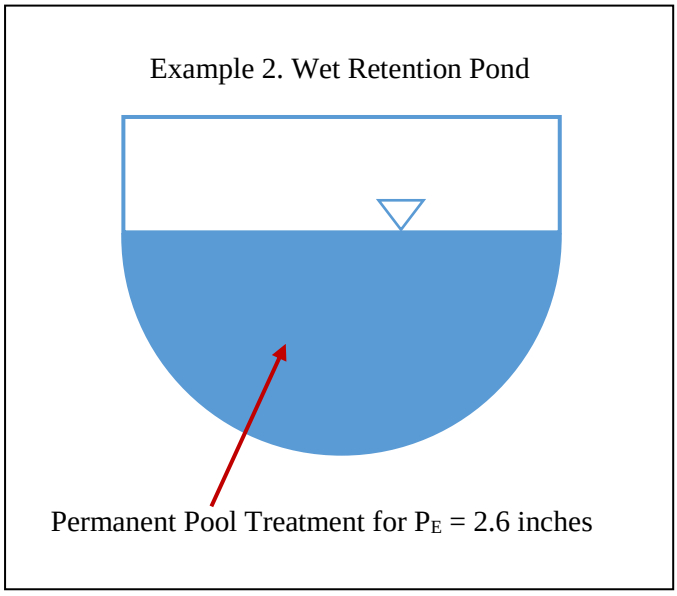
Since the rainfall depth treated (P_E) = 1 inch, the WQ_T credit is:

$$WQ_T\ Credit = \left(\frac{P_E}{1\ inch}\right) \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WQ_T\ Credit = \left(\frac{1\ inch}{1\ inch}\right) \times 10\ acres\ = \mathbf{10\ acres}$$

Example 2:

Wet retention pond with a permanent pool water quality treatment volume for rainfall depth of 2.6 inches. Impervious area in the drainage area to the pond is 10 acres.



Solution:

Since the rainfall depth treated (P_E) is > 1 inch, the WQ_T credit is:

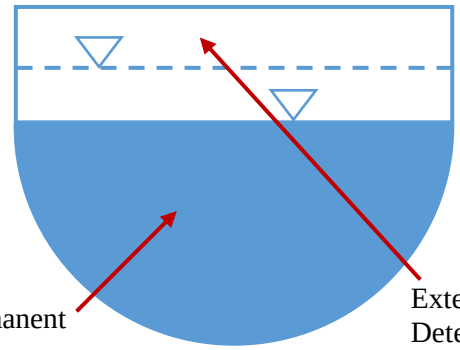
$$WQ_T\ Credit = \left[\frac{1\ inch + [(P_E - 1\ inch) \times 0.25]}{1\ inch}\right] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WQ_T\ Credit = \left[\frac{1\ inch + [(2.6\ inches - 1\ inch) \times 0.25]}{1\ inch}\right] \times 10\ acres = \mathbf{14\ acres}$$

Example 3:

Wet extended detention pond with a permanent pool treatment volume for rainfall depth of 1 inch and extended detention volume for an additional rainfall depth of 2 inches. The total rainfall depth managed is 3 inches. Impervious area in the drainage area to the pond is 10 acres.

Example 3. Wet Extended Detention Pond



Permanent Pool Treatment for P_E = 1 inch

Extended Detention Treatment for P_E = 2 inches

Solution:

Since the rainfall depth treated (P_E) in the permanent pool = 1 inch, the WQ_T credit is:

$$WQ_T\ Credit = \left(\frac{P_E}{1\ inch}\right) \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WQ_T\ Credit = \left(\frac{1\ inch}{1\ inch}\right) \times 10\ acres\ = \mathbf{10\ acres}$$

WM credit is available for extended detention volume above the permanent pool volume for up to a total rainfall depth treated of 3 inches:

$$WM\ Credit = \left[\frac{(P_E - Rainfall\ Depth\ Treated\ for\ WQ_T) \times 0.25}{1\ inch}\right] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WM\ Credit = \left[\frac{(3\ inches - 1\ inch) \times 0.25}{1\ inch}\right] \times 10\ acres = \mathbf{5\ acres}$$

$$Total\ Credit = WQ_T\ Credit + WM\ Credit = 10\ acres + 5\ acres = \mathbf{15\ acres}$$

Alternative Solution:

Alternatively, a portion of the extended detention volume equal to the permanent pool volume is eligible for WQ_T credit. The remaining extended detention volume is then eligible for WM credit:

P_E treated by permanent pool = 1 inch (use toward WQ_T)
P_E treated by extended detention used toward water quality treatment = 1 inch (use toward WQ_T)
Remaining P_E treated by extended detention = 1 inch (use for WM credit)

$$WQ_T\ Credit = \left[\frac{1\ inch + [(P_E - 1\ inch) \times 0.25]}{1\ inch}\right] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WQ_T\ Credit = \left[\frac{1\ inch + [(2\ inches - 1\ inch) \times 0.25]}{1\ inch}\right] \times 10\ acres = \mathbf{12.5\ acres}$$

$$WM\ Credit = \left[\frac{(P_E - Rainfall\ Depth\ Treated\ for\ WQ_T) \times 0.25}{1\ inch}\right] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WM\ Credit = \left[\frac{(3\ inches - 2\ inches) \times 0.25}{1\ inch}\right] \times 10\ acres = \mathbf{2.5\ acres}$$

$$Total\ Credit = WQ_T\ Credit + WM\ Credit = 12.5\ acres + 2.5\ acres = \mathbf{15\ acres}$$

Note: While these two solutions result in the same total credit, the difference will become important when applying green infrastructure credits to the project.

Adding Green Stormwater Infrastructure (GSI) Credits

Using the same examples (1-3) above and adding green infrastructure features:

Example 4:

Wet retention pond with a permanent pool water quality treatment volume for a rainfall depth of 1 inch. The impervious area in the drainage area to the pond is 10 acres. Green infrastructure features are added to meet GSI credit requirements.

Solution:

Since the rainfall depth treated in the permanent pool = 1 inch, the WQ_T credit is:

$$WQ_T\ Credit = \left(\frac{P_E}{1\ inch}\right) \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WQ_T\ Credit = \left(\frac{1\ inch}{1\ inch}\right) \times 10\ acres = \mathbf{10\ acres}$$

$GSI\ Credit = 1.35 \times 10\ Impervious\ Acres\ Credit\ from\ WQ_T = \mathbf{13.5\ acres}$ (This is the total credit for the project)

Example 5:

Wet retention pond with a permanent pool treatment volume for a rainfall depth of 2.6 inches. The impervious area in the drainage area to the pond is 10 acres. Green infrastructure features are added to meet GSI credit requirements.

Solution:

Since the rainfall depth treated in the permanent pool is > 1 inch, the WQ_T credit is:

$$WQ_T\ Credit = \left[\frac{1\ inch + [(P_E - 1\ inch) \times 0.25]}{1\ inch}\right] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WQ_T\ Credit = \left[\frac{1\ inch + [(2.6\ inches - 1\ inch) \times 0.25]}{1\ inch}\right] \times 10\ acres = \mathbf{14\ acres}$$

$GSI\ Credit = 1.35 \times [14\ Impervious\ Acres\ Credit\ from\ WQ_T] = \mathbf{18.9\ acres}$ (This is the total credit for the project)

Example 6:

Wet extended detention pond with a permanent pool treatment volume for rainfall depth of 1 inch and extended detention volume for an additional rainfall depth of 2 inches. Total rainfall depth treated is 3 inches. Impervious area in drainage area to pond is 10 acres. Green infrastructure features are added as required to meet GSI credit requirements.

Solution:

Since the rainfall depth treated (P_E) in the permanent pool = 1 inch, the WQ_T credit is:

$$WQ_T\ Credit = \left(\frac{P_E}{1\ inch}\right) \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WQ_T\ Credit = \left(\frac{1\ inch}{1\ inch}\right) \times 10\ acres = \mathbf{10\ acres}$$

WM credit is available for extended detention volume above the permanent pool volume for up to a total rainfall depth treated of 3 inches:

$$WM\ Credit = \left[\frac{(P_E - Rainfall\ Depth\ Treated\ for\ WQ_T) \times 0.25}{1\ inch}\right] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WM\ Credit = \left[\frac{(3\ inches - 1\ inch) \times 0.25}{1\ inch}\right] \times 10\ acres = \mathbf{5\ acres}$$

$GSI\ Credit = 1.35 \times 10\ Impervious\ Acres\ Credit\ from\ WQ_T = \mathbf{13.5\ acres}$ (This credit replaces the impervious acre credit)

$$Total\ Credit = GSI\ Credit + WM\ Credit = 13.5\ acres + 5\ acres = \mathbf{18.5\ acres}$$

Alternative Solution:

Alternatively, a portion of the extended detention volume equal to the permanent pool volume is eligible for WQ_T credit. Only the remaining extended detention volume is then eligible for WM credit:

P_E treated by permanent pool = 1 inch (use toward WQ_T)
P_E treated by extended detention used toward impervious acre credit = 1 inch (use toward WQ_T)
Remaining P_E treated by extended detention = 1 inch (use for WM credit)

$$WQ_T\ Credit = \left[\frac{1\ inch + [(P_E - 1\ inch) \times 0.25]}{1\ inch}\right] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WQ_T\ Credit = \left[\frac{1\ inch + [(2\ inches - 1\ inch) \times 0.25]}{1\ inch}\right] \times 10\ acres = \mathbf{12.5\ acres}$$

$$WM\ Credit = \left[\frac{(P_E - Rainfall\ Depth\ Treated\ for\ WQ_T) \times 0.25}{1\ inch}\right] \times Impervious\ Acres\ in\ Drainage\ Area$$

$$WM\ Credit = \left[\frac{(3\ inches - 2\ inches) \times 0.25}{1\ inch}\right] \times 10\ acres = \mathbf{2.5\ acres}$$

$GSI\ Credit = 1.35 \times 12.5\ Impervious\ Acres\ Credit\ from\ WQ_T = \mathbf{16.88\ acres}$ (This credit replaces the WQ_T)

$$Total\ Credit = GSI\ Credit + WM\ Credit = 16.88\ acres + 2.5\ acres = \mathbf{19.38\ acres}$$

Appendix J: Data Reporting, Verification, and Inspection Frequencies

Municipal separate storm sewer system (MS4) permits require that the MS4 Geodatabase include data for all best management practices (BMPs) implemented for new development, redevelopment, and MS4 restoration. In addition, the impervious acres credit must be calculated from the approved plans for each restoration or redevelopment project and recorded in the MS4 Geodatabase. MS4 jurisdictions can refer to the Department's User's Guide for specific instructions on the reporting and use of the MS4 Geodatabase. The below reporting structure (Table 25, Table 26, and Table 27) provides BMP classification codes that must be used for reporting.

Table 25. BMP Classification Codes for RR and ST Practices

Manual	Description	Class	Code
Ponds			
P-1	Micro-Pool Extended Detention (ED)	S	PMED
P-2	Wet Pond	S	PWET
P-3	Wet ED Pond	S	PWED
P-4	Multiple Pond	S	PMPS
P-5	Pocket Pond	S	PPKT
Wetlands			
W-1	Shallow Wetland	S	WSHW
W-2	ED Shallow Wetland	S	WEDW
W-3	Pond/Wetland System	S	WPWS
W-4	Pocket Wetland	S	WPKT
Infiltration			
I-1	Infiltration Trench	S	ITRN
I-2	Infiltration Basin	S	IBAS
M-3	Landscape Infiltration	E	MILS
M-4	Infiltration Berm	E	MIBR
M-5	Dry Well	E	MIDW
Filtering Systems			
F-1	Surface Sand Filter	S	FSND
F-2	Underground Filter	S	FUND
F-3	Perimeter Filter	S	FPER
F-4	Organic Filter	S	FORG
F-5	Pocket Filter	S	FPKT
F-6	Bioretention[1]	S	FBIO
M-2	Submerged Gravel Wetland	E	MSGW
M-6	Micro-Bioretention[1]	E	MMBR
M-7	Rain Garden[1]	E	MRNG
M-9	Enhanced Filter[2]	E	MENF
	Regenerative Step Pool Stormwater Conveyance System[3]	S	SPSC
Open Channel Systems			
O-1	Dry Swale	S	ODSW
O-2	Wet Swale	S	OWSW
M-8	Grass Swale	E	MSWG

Manual	Description	Class	Code
M-8	Bio-Swale	E	MSWB
M-8	Wet Swale	E	MSWW
Alternative Surfaces			
A-1	Green Roof, Extensive[4]	E	AGRE
A-1	Green Roof, Intensive[4]	E	AGRI
A-2	Permeable Pavement[4]	E	APMP
A-3	Reinforced Turf[4]	E	ARTF
Nonstructural Techniques			
N-1	Rooftop Disconnect	E	NDRR
N-2	Non-Rooftop Disconnect	E	NDNR
N-3	Sheetflow to Conservation Area	E	NSCA
Other Systems			
M-1	Rainwater Harvesting	E	MRWH

Notes:
[1] Can be an infiltration practice
[2] Not a standalone practice
[3] Dry channel SPSC is considered an upland stormwater retrofit by the CBP Stream Restoration Expert Panel. This practice may use the same pollutant load reductions as a filtering practice
[4] Typically a proprietary system

Table 26. BMP Classification Codes for Alternative Practices

Alternative BMP (Class A)	Code
Mechanical Street Sweeping	MSS
Regenerative/Vacuum Street Sweeping (i.e., Advanced Street Sweeping)	VSS
Impervious Surface Reduction (i.e., impervious to pervious)	IMPP
Impervious Surface to Forest (i.e., IMPP + FPU)	IMPF
Forestation on Pervious Urban (i.e., Forest Planting)	FPU
Catch Basin Cleaning	CBC
Storm Drain Vacuuming (i.e., Storm Drain Cleaning)	SDV
Stream Restoration	STRE
Outfall Stabilization	OUT
Shoreline Management	SHST
Septic Pumping	SEPP
Septic Denitrification	SEPD
Septic Connections to WWTP	SEPC

There are several new alternative BMPs (see Table 27 below) where the classification codes are not recognized by the MS4 Geodatabase. For these practices, please enter the corresponding class code (i.e., "A") in the *BMP_CLASS* field, the code "OTH" in the *BMP_TYPE* or *ALTBMP_TYPE* field, and the code from Table 27 in the *GEN_COMMENTS* field. This will allow for the reporting of these practices until the MS4 Geodatabase is updated.

Table 27. BMP Classification Codes for New Alternative Practices

Alternative BMP (Class A)	Code
Conservation Landscaping	CLTM
Elimination of Discovered Nutrient Discharges from Grey Infrastructure (IDDE)	IDDE
Floating Treatment Wetlands	XFTW
Forest Conservation	FCO
Riparian Conservation Landscaping	RCL
Riparian Forest Planting	RFP
Street Trees	STCI
Urban Soil Restoration (Compacted Pervious Surfaces)	USRP
Urban Soil Restoration (Removed Impervious Surfaces)	USRI
Urban Tree Canopy (i.e., Pervious Turf to Tree Canopy over Turf)	UTC

The MS4 Geodatabase also contains information regarding inspection and maintenance. Successful restoration requires that BMPs function properly to ensure that the expected water quality improvements are achieved. Therefore, BMP inspection and routine maintenance need to be conducted in order for MS4 jurisdictions to claim credit. Otherwise, the credits will be removed until proper performance is verified. All runoff reduction (RR) and stormwater treatment (ST) BMPs must be regularly maintained and inspected a minimum of every three years. Alternative BMPs must follow inspection frequencies as specified by the Chesapeake Bay Program (CBP) expert panels, except for land cover conversion BMPs, which must be inspected triennially. See Table 28 for inspection frequencies. The BMP data must include the last inspection date and whether the facility has been properly maintained. A "failed" designation assigned to any BMP indicates that the facility is not functioning as designed.

Table 28. BMP Inspection Frequencies

BMP	Inspection Frequency
Efficiency BMPs	
Stormwater Treatment (ST)	Triennial
Runoff Reduction (RR)	
Urban Soil Restoration	
Street Sweeping	Annual
Floating Treatment Wetlands	Credit valid 3 years; inspections extend credit
Load Reduction BMPs	
Stream Restoration/Outfall Stabilization	Credit valid 5 years; inspections extend credit
Shoreline Management	
Storm Drain Cleaning	Annual
Land Cover Conversion BMPs	
Non-Riparian	Triennial
Riparian	
Septic BMPs	
Connections	N/A
Denitrification	Annual
Pumping	

Appendix K: Reporting New Development

Best management practices (BMPs) implemented to meet new development requirements may not be used for credit toward stormwater wasteload allocations (SW-WLAs) or impervious acre restoration. However, local governments are required to report data for new development, redevelopment, and restoration projects on the Department's MS4 Geodatabase so that net pollutant loads will be calculated in the Chesapeake Bay Watershed Model. The discussion below will provide guidance on the proper reporting of urban BMP data.

Current Maryland regulations require that environmental site design (ESD) be used to the maximum extent practicable (MEP) to reduce the runoff from new development and replicate the hydrologic characteristics of forested conditions. To meet this requirement on a new development project, ESD practices must be used either exclusively or, where necessary, in combination with structural practices to provide sufficient treatment and reduce the volume of runoff from the 1 year, 24 hour design storm. For new development projects, this standard is based on the median value of the 1 year storm for Maryland, or 2.7 inches of rainfall.

Pollutant removal rates for upland stormwater practices are determined using the Adjustor Curves from the Chesapeake Bay program (CBP) publication *Recommendations of the Expert Panel for New State Stormwater Performance Standards* (Schueler and Lane, 2012 and 2015) that are found in Appendix A. These curves are a function of the type of practices used and the rainfall depth treated per impervious acre. On these curves, BMPs are classified as either runoff reduction (RR) or stormwater treatment (ST) practices as outlined in Table 2 (see Section IV).

Maryland's ESD sizing criteria (see Chapter 5, pp 5.18-19 of the 2000 Stormwater Design Manual, i.e. the Manual) mandates that ESD practices be used to treat the runoff from 1 inch of rainfall (i.e., P_E = 1 inch) on all new developments where stormwater management is required. After all reasonable opportunities for using ESD practices are exhausted, structural practices (i.e., those found in Chapter 3 of the Manual) may be used to address any remaining requirements. As discussed in Section IV, the ESD practices listed in the Manual are considered RR practices when using the adjustor curves. Likewise, the structural practices found in Chapter 3 of the Manual are considered ST practices.

When using the adjustor curves to determine removal efficiency for each pollutant (i.e., TN, TP, and TSS), the runoff depth (in inches) per impervious acre treated is used to determine the RR and ST pollutant removal efficiencies. Also, the most significant difference between the RR and ST curves for each pollutant is from 0 to 1 inch of runoff depth. For runoff depths greater than 1 inch, there is little difference in the slopes of the two RR and ST curves.

The ESD sizing criteria are based on capturing and treating the runoff from 2.7 inches of rainfall. For an impervious surface, the runoff depth from 2.7 inches of rainfall is approximately 2.6 inches. Therefore, new development projects that fully meet the ESD to the MEP mandate should use 2.6 inches for the runoff depth treated per impervious acre.

Because ESD practices must be used to treat at least 1 inch of rainfall, the RR curves are used to determine pollutant removal rates up to a runoff depth of 1 inch. However, and as noted above, there is little to no difference between the RR and ST slopes/curves beyond 1 inch. Therefore,

the RR curves may be used to determine pollutant removal efficiencies where ESD and structural practices are used to address new development stormwater management requirements. Where the ESD to the MEP requirements are fully addressed (i.e., the P_E is fully addressed), the runoff depth of 2.6 inches is used in conjunction with the curves. Equation 20 may be used to determine the runoff depth treated where the ESD requirements are not fully addressed.

Equation 18. Calculation of Rainfall Depth Treated per Impervious Acre to Account for ESD to the MEP

$$Q = \left(\frac{P_{design}}{P_E}\right) \times 2.6\ inches$$

Where:

Q = Runoff depth treated per impervious acre (inches) to be used with the adjustor curves
P_{design} = The rainfall treated by stormwater management practices (inches)
P_E = The rainfall target used to size ESD practices

Table 29 provides the pollutant removal rates for stormwater management meeting ESD to MEP.

Table 29. Pollutant Removal Rates for ESD to the MEP

Sediment	85%
Total Phosphorus	78.8%
Total Nitrogen	67.9%

Appendix L: Phase III Watershed Implementation Plan - Maryland Delivery Factor Summary Table (Edge-of-Stream to Edge-of-Tide Conversion Factors)

Land River Segment	TN	TP	TSS
Allegany County			
N24001PU0_3871_3690	0.59	0.18	0.14
N24001PU1_3100_3690	0.63	0.46	0.30
N24001PU1_3580_3780	0.64	0.47	0.47
N24001PU1_3850_4190	0.81	0.64	0.11
N24001PU1_3940_3970	0.55	0.52	0.55
N24001PU2_3140_3680	0.94	0.36	0.33
N24001PU2_3180_3370	0.56	0.28	0.26
N24001PU2_3370_4020	0.66	0.33	0.28
N24001PU3_3680_3890	0.75	0.44	0.48
N24001PU4_3780_3930	0.78	0.45	0.39
N24001PU4_3890_3990	0.92	0.74	0.72
N24001PU4_3970_3890	0.78	0.70	0.38
N24001PU4_3990_3780	0.94	0.85	0.69
N24001PU4_4440_3970	0.87	0.85	0.84
N24001PU5_3930_4170	0.69	0.27	0.22
N24001PU5_4170_4020	0.78	0.39	0.11
N24001PU6_3870_3690	0.83	0.38	0.27
N24001PU6_4020_3870	0.70	0.26	0.15
Anne Arundel County			
N24003WL0_4390_0000	0.94	0.98	1.00
N24003WL0_4391_0000	1.00	1.00	1.00
N24003WL0_4392_0000	1.00	1.00	1.00
N24003WL0_4393_0000	1.00	1.00	1.00
N24003WL0_4394_0000	1.00	1.00	1.00
N24003WL0_4420_0000	0.78	0.44	0.19
N24003WL0_4421_0000	0.95	1.00	1.00
N24003WL0_4422_0000	1.00	1.00	1.00
N24003WL0_4423_0000	1.00	1.00	1.00
N24003WL0_4424_0000	1.00	1.00	1.00
N24003WL0_4425_0000	1.00	1.00	1.00
N24003WL0_4600_0000	0.86	0.85	0.78
N24003WL0_4601_0000	1.00	1.00	1.00
N24003WL0_4602_0000	0.96	1.00	1.00
N24003WL0_4603_0000	1.00	1.00	1.00
N24003WL0_4770_0000	1.00	1.00	1.00
N24003WL0_4771_0000	0.81	0.82	0.78

Land River Segment	TN	TP	TSS
N24003WL0_4772_0000	0.92	1.00	1.00
N24003WM0_3961_0000	0.92	0.82	0.36
N24003WM0_3962_0000	1.00	1.00	1.00
N24003WM0_3963_0000	1.00	1.00	1.00
N24003WM0_3966_0000	1.00	1.00	1.00
N24003WM3_4060_0001	0.66	0.35	0.18
N24003XL3_4710_0000	0.83	0.67	0.41
N24003XL3_4711_0000	0.84	0.72	0.49
N24003XL3_4712_0000	0.86	0.68	0.39
N24003XL3_4713_0000	0.78	0.69	0.45
N24003XL3_4950_0000	0.72	0.62	0.42
N24003XU2_4270_4650	0.76	0.81	0.22
N24003XU2_4480_4650	0.74	0.77	0.16
N24003XU3_4650_0001	0.80	0.57	0.16
Baltimore City			
N24510WM0_3650_0001	0.76	0.71	0.43
N24510WM0_3740_0001	0.41	0.65	0.44
N24510WM0_3741_0000	0.85	0.81	0.60
N24510WM0_3960_0000	1.00	1.00	1.00
N24510WM0_3961_0000	1.00	1.00	1.00
N24510WM0_3962_0000	1.00	1.00	1.00
N24510WM0_3964_0000	1.00	1.00	1.00
N24510WM1_3910_0001	0.60	0.67	0.43
N24510WM3_4060_0001	0.67	0.52	0.42
Baltimore County			
N24005SL2_2910_3060	0.95	0.68	0.37
N24005WM0_3650_0001	0.72	0.58	0.38
N24005WM0_3740_0001	0.39	0.62	0.41
N24005WM0_3741_0000	0.82	0.71	0.44
N24005WM0_3742_0000	1.00	1.00	1.00
N24005WM0_3743_0000	1.00	1.00	1.00
N24005WM0_3744_0000	1.00	1.00	1.00
N24005WM0_3745_0000	0.80	0.93	1.00
N24005WM0_3881_3880	0.00	0.00	0.00
N24005WM0_3964_0000	1.00	1.00	1.00
N24005WM0_3965_0000	1.00	1.00	1.00
N24005WM1_3660_3910	0.46	0.55	0.38
N24005WM1_3910_0001	0.54	0.54	0.32
N24005WM3_3880_4060	0.54	0.37	0.22
N24005WM3_4060_0001	0.63	0.40	0.21

Land River Segment	TN	TP	TSS
N24005WU0_3021_3020	0.14	0.15	0.00
N24005WU0_3540_0000	1.00	1.00	1.00
N24005WU0_3541_0000	1.00	1.00	1.00
N24005WU0_3542_0000	1.00	1.00	1.00
N24005WU0_3670_0001	0.28	0.49	0.34
N24005WU0_3671_0000	0.91	0.80	0.48
N24005WU0_3820_0000	1.00	1.00	1.00
N24005WU0_3821_0000	1.00	1.00	1.00
N24005WU1_3350_3490	0.31	0.38	0.06
N24005WU1_3482_0001	0.70	0.51	0.35
N24005WU1_3490_3480	0.31	0.37	0.06
N24005WU2_3020_3320	0.39	0.34	0.06
N24005WU2_3320_3480	0.41	0.41	0.07
N24005WU3_3480_3481	0.44	0.39	0.06
N24005WU3_3481_0001	0.81	0.59	0.22
Calvert County			
N24009WL0_4772_0000	0.90	1.00	1.00
N24009WL0_4920_0000	1.00	1.00	1.00
N24009WL0_4921_0000	1.00	1.00	1.00
N24009WL0_4922_0000	1.00	1.00	1.00
N24009WL0_4923_0000	1.00	1.00	1.00
N24009WL0_4925_0000	1.00	1.00	1.00
N24009XL0_4954_0000	0.82	0.93	1.00
N24009XL0_5320_0001	0.76	0.51	0.31
N24009XL0_5341_0000	0.87	0.73	0.31
N24009XL0_5342_0000	0.80	0.52	0.37
N24009XL0_5343_0000	1.00	1.00	1.00
N24009XL0_5345_0000	1.00	1.00	1.00
N24009XL0_5346_0000	1.00	1.00	1.00
N24009XL0_5348_0000	1.00	1.00	1.00
N24009XL0_5350_0000	0.80	0.61	0.37
N24009XL3_4713_0000	0.84	0.70	0.43
N24009XL3_4950_0000	0.78	0.67	0.43
N24009XL3_4951_0000	0.79	0.63	0.37
N24009XL3_4952_0000	0.88	0.80	0.36
Caroline County			
N24011EL0_4591_0000	0.90	0.78	0.18
N24011EL2_4590_0001	0.47	0.80	0.08
N24011EL2_4630_0000	0.83	0.78	0.22
N24011EM0_4322_0000	0.92	0.88	0.36

Land River Segment	TN	TP	TSS
N24011EM0_4323_0000	0.85	0.76	0.31
N24011EM0_4324_0000	0.90	0.74	0.15
N24011EM0_4327_0000	0.82	0.68	0.15
N24011EM2_3980_0001	0.43	0.65	0.11
N24011EM2_4100_0001	0.48	0.79	0.15
N24011EM2_4101_0000	0.91	0.80	0.29
N24011EM3_4320_0000	0.88	0.73	0.18
N24011EM3_4321_0000	0.92	0.76	0.24
N24011EM3_4325_0000	0.91	0.79	0.22
N24011EM4_4740_0000	1.00	1.00	1.00
Carroll County			
N24013PM1_3120_3400	0.73	0.61	0.61
N24013PM1_3450_3400	0.74	0.66	0.64
N24013PM1_3711_3710	0.55	0.28	0.22
N24013PM2_2860_3040	0.74	0.70	0.52
N24013PM2_3400_3340	0.86	0.85	1.00
N24013PM3_3040_3340	0.66	0.61	0.47
N24013SL0_2831_2830	0.18	0.45	0.13
N24013SL3_2460_2430	0.33	0.17	0.14
N24013WM0_3881_3880	0.00	0.00	0.00
N24013WM1_3882_3880	0.46	0.38	0.23
N24013WM3_3880_4060	0.62	0.58	0.47
N24013WU0_3021_3020	0.14	0.17	0.00
N24013WU1_3350_3490	0.32	0.52	0.09
Cecil County			
N24015EU0_2940_0000	0.89	1.00	1.00
N24015EU0_2941_0000	0.87	0.73	0.84
N24015EU0_2985_0000	0.79	0.46	0.22
N24015EU0_3010_0000	0.94	1.00	1.00
N24015EU0_3050_0000	1.00	1.00	1.00
N24015EU0_3130_0000	1.00	1.00	1.00
N24015EU0_3131_0000	1.00	1.00	1.00
N24015EU0_3200_0000	0.90	0.82	0.48
N24015EU0_3201_0000	0.92	0.81	0.39
N24015EU0_3202_0000	1.00	1.00	1.00
N24015EU0_3203_0000	1.00	1.00	1.00
N24015EU0_3300_0000	0.80	1.00	1.00
N24015EU0_3301_0000	1.00	1.00	1.00
N24015EU0_3302_0000	1.00	1.00	1.00
N24015EU0_3360_0000	1.00	1.00	1.00

Land River Segment	TN	TP	TSS
N24015EU0_3361_0000	0.90	0.79	0.35
N24015EU0_3362_0000	1.00	1.00	1.00
N24015EU0_3363_0000	1.00	1.00	1.00
N24015EU0_3364_0000	1.00	1.00	1.00
N24015EU1_2650_0001	1.00	0.97	0.77
N24015EU1_2810_0001	0.86	1.00	0.56
N24015EU1_2980_0000	0.79	0.61	0.36
N24015EU1_2981_0000	0.80	0.59	0.35
N24015EU1_2982_0000	0.91	0.84	0.35
N24015EU1_2983_0000	0.88	0.72	0.34
N24015EU1_2984_0000	1.00	1.00	1.00
N24015SL2_2480_0001	0.86	0.71	0.43
N24015SL9_2720_0001	0.79	0.45	0.26
N24015SL9_2970_0000	1.00	1.00	1.00
N24015SL9_2971_0000	0.93	0.69	0.46
Charles County			
N24017PL0_5290_0000	1.00	1.00	1.00
N24017PL0_5390_0000	1.00	1.00	1.00
N24017PL0_5391_0000	1.00	1.00	1.00
N24017PL0_5392_0000	1.00	1.00	1.00
N24017PL0_5440_0000	0.75	0.58	0.24
N24017PL0_5450_0000	0.67	0.42	0.15
N24017PL0_5510_0001	0.47	0.49	0.25
N24017PL0_5530_5710	0.77	0.63	0.30
N24017PL0_5580_0000	1.00	1.00	1.00
N24017PL0_5581_0000	1.00	1.00	1.00
N24017PL0_5582_0000	0.66	0.43	0.16
N24017PL0_5583_0000	0.73	0.50	0.21
N24017PL0_5584_0000	1.00	1.00	1.00
N24017PL0_5585_0000	0.90	1.00	1.00
N24017PL0_5670_0000	1.00	1.00	1.00
N24017PL0_5671_0000	1.00	1.00	1.00
N24017PL0_5710_0001	0.81	0.61	0.18
N24017PL0_5720_0001	0.46	0.35	0.10
N24017PL0_5790_0000	1.00	1.00	1.00
N24017PL0_5791_0000	1.00	1.00	1.00
N24017PL0_5860_0000	1.00	1.00	1.00
N24017PL0_5930_0000	1.00	1.00	1.00
N24017PL1_5230_0001	0.50	0.70	0.63
N24017PL2_5300_5630	0.57	0.59	0.60

Land River Segment	TN	TP	TSS
N24017PL2_5630_0001	0.67	0.43	0.37
N24017PL2_5800_0000	0.80	0.57	0.25
N24017XL0_5340_0000	0.78	0.58	0.34
Dorchester County			
N24019EL0_4591_0000	0.92	0.77	0.17
N24019EL0_4592_0000	0.82	0.65	0.14
N24019EL0_4593_0000	0.91	0.86	0.32
N24019EL0_4598_0000	1.00	1.00	1.00
N24019EL0_4892_0000	1.00	1.00	1.00
N24019EL0_5151_0000	0.62	0.52	0.11
N24019EL0_5262_0000	1.00	1.00	0.83
N24019EL0_5280_0000	0.84	0.81	0.47
N24019EL0_5281_0000	0.96	1.00	1.00
N24019EL0_5282_0000	1.00	1.00	1.00
N24019EL0_5283_0000	1.00	1.00	1.00
N24019EL0_5284_0000	1.00	1.00	1.00
N24019EL0_5285_0000	1.00	1.00	1.00
N24019EL0_5590_0000	1.00	1.00	1.00
N24019EL0_5766_0000	1.00	1.00	1.00
N24019EL0_5890_0000	1.00	1.00	1.00
N24019EL1_5150_0001	0.58	0.84	0.26
N24019EL2_4630_0000	0.87	0.83	0.39
N24019EL2_4634_0000	0.84	0.62	0.09
N24019EM0_4322_0000	0.93	0.89	0.54
N24019EM0_4880_0000	1.00	1.00	1.00
N24019EM0_4881_0000	1.00	1.00	1.00
N24019EM0_4883_0000	1.00	1.00	1.00
N24019EM0_4884_0000	1.00	1.00	1.00
N24019EM0_4885_0000	1.00	1.00	1.00
N24019EM0_4886_0000	0.74	0.55	0.05
N24019EM0_4887_0000	1.00	1.00	1.00
N24019EM0_4888_0000	1.00	1.00	1.00
N24019EM0_4889_0000	1.00	1.00	1.00
N24019EM0_4890_0000	0.98	1.00	1.00
N24019EM0_4891_0000	1.00	1.00	1.00
N24019EM0_5260_0000	1.00	1.00	1.00
N24019EM0_5261_0000	1.00	1.00	1.00
N24019EM0_5263_0000	1.00	1.00	1.00
Frederick County			
H24021PM1_3510_4000	0.65	0.57	0.51

Land River Segment	TN	TP	TSS
H24021PM3_3040_3340	0.55	0.50	0.49
H24021PM4_3340_3341	0.55	0.36	0.31
N24021PM1_3450_3400	0.72	0.60	0.65
N24021PM1_3510_4000	0.66	0.62	0.56
N24021PM1_3710_4040	0.77	0.55	0.47
N24021PM1_3711_3710	0.63	0.31	0.24
N24021PM1_4000_4290	0.77	0.66	0.54
N24021PM2_2860_3040	0.81	0.85	1.00
N24021PM2_3400_3340	0.86	0.85	1.00
N24021PM3_3040_3340	0.68	0.63	0.46
N24021PM4_3340_3341	0.73	0.62	0.44
N24021PM4_3341_4040	0.76	0.68	0.49
N24021PM4_4040_4410	0.75	0.54	0.48
N24021PM7_4150_4290	0.86	0.62	0.45
N24021PM7_4200_4410	0.80	0.59	0.43
N24021PM7_4290_4200	0.92	0.69	0.67
N24021PM7_4410_4620	0.74	0.52	0.45
Garrett County			
H24023PU2_4720_4750	0.80	0.56	0.08
H24023PU3_4451_4450	0.77	0.61	0.08
N24023PU1_3850_4190	0.67	0.32	0.04
N24023PU1_3940_3970	0.53	0.47	0.57
N24023PU1_4190_4300	0.69	0.27	0.03
N24023PU1_4300_4440	0.77	0.54	0.68
N24023PU2_4720_4750	0.84	0.65	0.08
N24023PU2_4750_4451	0.87	0.69	0.10
N24023PU3_4450_4440	0.78	0.51	0.61
N24023PU3_4451_4450	0.77	0.51	0.08
Harford County			
N24025SL0_2721_2720	0.73	0.43	0.37
N24025SL2_2750_2720	0.77	0.57	0.48
N24025SL2_2910_3060	0.93	0.67	0.32
N24025SL2_3060_0001	0.94	0.76	0.34
N24025SL9_2720_0001	0.79	0.48	0.31
N24025SL9_2970_0000	1.00	1.00	1.00
N24025SL9_2971_0000	1.00	0.99	0.83
N24025WU0_3160_0000	0.72	0.58	0.12
N24025WU0_3161_0000	0.94	1.00	1.00
N24025WU0_3162_0000	1.00	1.00	1.00
N24025WU0_3163_0000	0.88	1.00	1.00

Land River Segment	TN	TP	TSS
N24025WU0_3164_0000	1.00	1.00	1.00
N24025WU0_3250_0001	0.55	0.59	0.40
N24025WU0_3251_0000	1.00	1.00	1.00
N24025WU0_3252_0000	1.00	1.00	1.00
N24025WU0_3253_0000	0.84	0.69	0.45
N24025WU0_3254_0000	0.92	0.88	0.69
N24025WU0_3255_0000	1.00	1.00	1.00
N24025WU0_3540_0000	1.00	1.00	1.00
N24025WU1_3240_3331	0.76	0.47	0.24
N24025WU1_3330_0001	0.81	0.44	0.18
N24025WU1_3331_3330	0.82	0.47	0.22
N24025WU1_3482_0001	0.71	0.57	0.32
N24025WU2_3020_3320	0.39	0.40	0.07
Howard County			
N24027WM1_3882_3880	0.51	0.35	0.23
N24027WM3_3880_4060	0.55	0.39	0.26
N24027WM3_4060_0001	0.60	0.35	0.22
N24027XU0_4090_4270	0.73	0.69	0.35
N24027XU0_4091_4270	0.71	0.72	0.39
N24027XU0_4092_4090	0.19	0.59	0.10
N24027XU0_4130_4070	0.12	0.14	0.01
N24027XU2_4070_4330	0.14	0.15	0.01
N24027XU2_4270_4650	0.75	0.91	0.40
N24027XU2_4330_4480	0.30	0.29	0.05
N24027XU2_4480_4650	0.77	0.80	0.43
Kent County			
N24029EU0_3360_0000	1.00	1.00	1.00
N24029EU0_3361_0000	0.86	0.70	0.24
N24029EU0_3362_0000	0.92	0.95	0.79
N24029EU0_3363_0000	1.00	1.00	1.00
N24029EU0_3570_0000	1.00	1.00	1.00
N24029EU0_3571_0000	1.00	1.00	1.00
N24029EU0_3572_0000	0.86	0.75	0.36
N24029EU0_3573_0000	1.00	1.00	1.00
N24029EU0_3700_0000	1.00	1.00	1.00
N24029EU0_3720_0000	0.90	0.83	0.47
N24029EU0_3724_0000	0.86	0.77	0.41
N24029EU0_3725_0000	0.87	0.78	0.40
N24029EU0_3726_0001	0.42	0.56	0.22
N24029EU0_4010_0000	0.88	0.83	0.40

Land River Segment	TN	TP	TSS
N24029EU0_4011_0000	1.00	1.00	1.00
N24029EU0_4012_0000	0.92	0.83	0.45
N24029EU0_4013_0000	1.00	1.00	1.00
N24029EU0_4014_0000	1.00	1.00	1.00
N24029EU0_4015_0000	1.00	1.00	1.00
N24029EU0_4016_0000	1.00	1.00	1.00
N24029EU0_4120_0000	1.00	1.00	1.00
N24029EU0_4122_0000	1.00	1.00	1.00
N24029EU0_4123_0000	1.00	1.00	1.00
N24029EU0_4125_0000	1.00	1.00	1.00
N24029EU2_3520_0001	0.52	0.79	0.25
Montgomery County			
N24031PL0_4510_0001	0.68	0.89	0.67
N24031PL1_4460_4780	0.66	0.62	0.36
N24031PL1_4540_0001	0.84	0.92	1.00
N24031PL1_4780_0001	0.91	0.92	0.82
N24031PM0_4640_4820	0.17	0.58	0.51
N24031PM1_4250_4500	0.75	0.59	0.47
N24031PM1_4251_4250	0.68	0.12	0.13
N24031PM1_4252_4250	0.67	0.17	0.11
N24031PM1_4500_4580	0.75	0.60	0.44
N24031PM4_4040_4410	0.65	0.36	0.44
N24031PM7_4410_4620	0.79	0.60	0.44
N24031PM7_4580_4820	0.77	0.50	0.47
N24031PM7_4620_4580	0.74	0.53	0.23
N24031PM7_4820_0001	0.87	0.70	0.53
N24031XU0_4130_4070	0.12	0.14	0.01
N24031XU2_4070_4330	0.15	0.16	0.01
N24031XU2_4330_4480	0.27	0.24	0.04
Prince George's County			
N24033PL0_4510_0001	0.71	1.00	0.68
N24033PL0_4961_0000	0.80	0.69	0.47
N24033PL0_5070_0001	0.67	0.58	0.27
N24033PL0_5290_0000	0.88	1.00	1.00
N24033PL0_5390_0000	0.88	0.70	0.14
N24033PL1_4540_0001	0.82	1.00	0.85
N24033PL1_5060_0000	0.74	0.58	0.33
N24033PL1_5061_0000	1.00	1.00	1.00
N24033PL1_5230_0001	0.52	0.74	0.51
N24033PL2_4810_0000	0.80	0.70	0.44

Land River Segment	TN	TP	TSS
N24033PL2_4811_0000	0.93	0.83	0.55
N24033PL2_5300_5630	0.55	0.53	0.32
N24033PL7_4960_0000	0.89	0.84	0.46
N24033PL7_4980_0000	1.00	1.00	1.00
N24033XL0_5340_0000	0.79	0.59	0.31
N24033XL1_4690_0001	0.40	0.70	0.39
N24033XL1_4691_0000	0.83	0.80	0.36
N24033XL3_4710_0000	0.83	0.67	0.41
N24033XL3_4711_0000	0.90	0.77	0.43
N24033XL3_4712_0000	0.87	0.62	0.40
N24033XL3_4713_0000	0.76	0.58	0.33
N24033XL3_4950_0000	0.81	0.64	0.38
N24033XL3_4951_0000	0.79	0.56	0.32
N24033XL3_4952_0000	0.91	0.71	0.53
N24033XU2_4330_4480	0.32	0.38	0.07
N24033XU2_4480_4650	0.74	0.84	0.28
N24033XU3_4650_0001	0.84	0.79	0.35
Queen Anne's County			
N24035EM2_3980_0001	0.41	0.60	0.11
N24035EM2_4100_0001	0.45	0.69	0.15
N24035EM2_4101_0000	0.87	0.74	0.32
N24035EU0_3700_0000	1.00	1.00	1.00
N24035EU0_3720_0000	0.93	0.73	0.23
N24035EU0_3721_0000	0.80	0.68	0.26
N24035EU0_3722_0000	0.83	0.68	0.22
N24035EU0_3830_0001	0.69	0.89	0.51
N24035EU0_4030_0000	0.89	0.88	0.56
N24035EU0_4120_0000	1.00	1.00	1.00
N24035EU0_4121_0000	1.00	1.00	1.00
N24035EU0_4122_0000	1.00	1.00	1.00
N24035EU0_4124_0000	1.00	1.00	1.00
N24035EU0_4260_0000	0.88	0.78	0.32
N24035EU0_4470_0000	0.84	0.72	0.30
N24035EU0_4471_0000	1.00	1.00	1.00
N24035EU0_4472_0000	0.89	0.78	0.34
N24035EU0_4473_0000	1.00	1.00	1.00
N24035EU0_4474_0000	1.00	1.00	1.00
N24035EU0_4475_0000	0.85	0.84	0.66
N24035EU0_4490_0000	1.00	1.00	1.00
N24035EU0_4491_0000	1.00	1.00	1.00

Land River Segment	TN	TP	TSS
N24035EU0_4610_0000	1.00	1.00	1.00
N24035EU0_4872_0000	1.00	1.00	1.00
N24035EU2_3520_0001	0.55	0.74	0.13
Somerset County			
N24039EL0_5761_0000	1.00	1.00	1.00
N24039EL0_5762_0000	0.85	0.68	0.15
N24039EL0_5763_0000	0.90	0.92	0.77
N24039EL0_5765_0000	1.00	1.00	1.00
N24039EL0_5890_0000	1.00	1.00	1.00
N24039EL0_5891_0000	1.00	1.00	1.00
N24039EL0_5892_0000	1.00	1.00	1.00
N24039EL0_5893_0000	1.00	1.00	1.00
N24039EL0_5894_0000	1.00	1.00	1.00
N24039EL0_6001_0000	0.79	0.70	0.23
N24039EL0_6002_0000	0.80	0.76	0.41
N24039EL0_6003_0000	0.98	1.00	1.00
N24039EL0_6004_0000	1.00	0.97	1.00
N24039EL0_6010_0000	0.93	0.97	1.00
N24039EL0_6011_0000	1.00	1.00	1.00
N24039EL1_5570_0001	0.50	0.85	0.36
N24039EL1_6000_0001	0.46	0.68	0.12
N24039EL3_5970_0000	0.91	0.83	0.34
N24039EL3_5971_0000	0.90	0.91	0.76
N24039EL3_5974_0000	0.94	1.00	1.00
St. Mary's County			
N24037PL0_5510_0001	0.44	0.55	0.33
N24037PL0_5670_0000	1.00	1.00	1.00
N24037PL0_5671_0000	0.77	0.50	0.33
N24037PL0_5672_0000	0.78	0.58	0.33
N24037PL0_5750_0001	0.56	0.57	0.39
N24037PL0_5830_0001	0.52	0.47	0.28
N24037PL0_5950_0000	0.97	1.00	1.00
N24037PL0_5951_0000	1.00	1.00	1.00
N24037PL0_5952_0000	0.80	0.59	0.23
N24037PL0_5960_0000	1.00	1.00	1.00
N24037PL0_5961_0000	0.79	0.54	0.28
N24037PL0_5962_0000	0.83	0.61	0.36
N24037PL0_5980_0000	1.00	1.00	1.00
N24037PL0_5981_0000	0.81	0.58	0.29
N24037PL0_5982_0000	1.00	1.00	1.00

Land River Segment	TN	TP	TSS
N24037PL0_5983_0000	1.00	1.00	1.00
N24037PL0_6020_0000	1.00	1.00	1.00
N24037PL0_6060_0000	1.00	1.00	1.00
N24037PL0_6110_0000	1.00	1.00	1.00
N24037PL1_5910_0001	0.69	1.00	0.82
N24037WL0_4924_0000	1.00	1.00	1.00
N24037WL0_5880_0000	1.00	1.00	1.00
N24037WL0_5881_0000	1.00	1.00	1.00
N24037XL0_4953_0000	0.86	0.68	0.40
N24037XL0_4955_0000	0.94	1.00	1.00
N24037XL0_4956_0000	1.00	1.00	1.00
N24037XL0_5340_0000	0.84	0.78	0.69
N24037XL0_5344_0000	1.00	1.00	1.00
N24037XL0_5347_0000	1.00	1.00	1.00
N24037XL0_5349_0000	1.00	1.00	1.00
Talbot County			
N24041EM0_4324_0000	0.81	0.70	0.33
N24041EM0_4551_0000	1.00	1.00	1.00
N24041EM0_4870_0000	1.00	1.00	1.00
N24041EM0_4871_0000	1.00	1.00	1.00
N24041EM0_4874_0000	1.00	1.00	1.00
N24041EM0_4875_0000	1.00	1.00	1.00
N24041EM0_4876_0000	1.00	1.00	1.00
N24041EM0_4882_0000	1.00	1.00	1.00
N24041EM2_4101_0000	0.90	0.78	0.33
N24041EM4_4740_0000	1.00	1.00	1.00
N24041EU0_4470_0000	0.92	0.81	0.44
N24041EU0_4474_0000	1.00	1.00	1.00
N24041EU0_4475_0000	0.90	0.75	0.31
N24041EU0_4550_0000	1.00	1.00	1.00
N24041EU0_4700_0000	0.93	0.98	0.70
N24041EU0_4873_0000	1.00	1.00	1.00
Washington County			
N24043PM7_4150_4290	0.87	0.59	0.64
N24043PU0_3000_3090	0.83	0.69	0.67
N24043PU0_3601_3602	0.92	0.62	0.51
N24043PU0_3611_3530	0.84	0.42	0.46
N24043PU0_3751_3752	0.83	0.65	0.59
N24043PU1_3030_3440	1.00	0.85	1.00
N24043PU1_3100_3690	0.64	0.39	0.42

Land River Segment	TN	TP	TSS
N24043PU2_2840_3080	0.87	0.50	0.46
N24043PU2_3080_3640	0.87	0.46	0.42
N24043PU2_3090_4050	0.86	0.68	0.60
N24043PU2_4050_4180	0.94	0.62	0.58
N24043PU3_2510_3290	0.57	0.09	0.33
N24043PU3_3290_3390	1.00	0.82	0.93
N24043PU3_3390_3730	0.92	0.66	0.55
N24043PU6_3440_3590	0.88	0.50	0.42
N24043PU6_3530_3440	0.84	0.44	0.46
N24043PU6_3590_3640	0.91	0.51	0.47
N24043PU6_3600_3602	0.94	0.62	0.49
N24043PU6_3602_3730	1.00	0.76	0.76
N24043PU6_3610_3530	0.95	0.66	0.76
N24043PU6_3640_3600	0.95	0.62	0.48
N24043PU6_3690_3610	0.75	0.27	0.24
N24043PU6_3730_3750	1.00	0.80	0.68
N24043PU6_3750_3752	1.00	0.79	0.82
N24043PU6_3752_4080	1.00	0.79	0.84
N24043PU6_4080_4180	1.00	0.78	0.79
N24043PU6_4180_4150	0.95	0.57	0.51
Wicomico County			
N24045EL0_4593_0000	0.88	0.67	0.08
N24045EL0_4594_0000	0.76	0.68	0.20
N24045EL0_4595_0000	0.86	0.76	0.24
N24045EL0_4596_0000	0.97	1.00	1.00
N24045EL0_4597_0000	0.90	0.68	0.10
N24045EL0_4598_0000	1.00	1.00	1.00
N24045EL0_4633_0000	0.62	0.49	0.09
N24045EL0_5040_0000	0.82	0.73	0.20
N24045EL0_5400_0001	0.38	0.59	0.10
N24045EL0_5760_0000	0.91	0.87	0.30
N24045EL0_5761_0000	0.99	1.00	1.00
N24045EL0_5762_0000	0.85	0.74	0.19
N24045EL0_5764_0000	1.00	1.00	1.00
N24045EL0_5767_0001	0.61	0.69	0.29
N24045EL1_5430_0001	0.50	0.93	0.27
N24045EL1_5570_0001	0.47	0.85	0.16
N24045EL2_4630_0000	0.97	0.97	0.96
N24045EL2_4634_0000	1.00	1.00	1.00
N24045EL2_5110_5270	0.28	0.71	0.13

Land River Segment	TN	TP	TSS
N24045EL2_5270_0001	0.45	0.75	0.16
N24045EL2_5272_5270	0.30	0.65	0.08
Worcester County			
N24047EL0_5271_0000	0.97	0.94	0.59
N24047EL1_5430_0001	0.53	0.84	0.17
N24047EL1_5570_0001	0.47	0.72	0.21
N24047EL1_5660_0000	0.88	0.70	0.20
N24047EL2_5110_5270	0.31	0.83	0.22
N24047EL2_5270_0001	0.47	0.75	0.16
N24047EL3_5870_0000	0.88	0.73	0.23
N24047EL3_5970_0000	0.95	0.94	0.44
N24047EL3_5971_0000	0.98	0.96	0.59
N24047EL3_5972_0000	0.70	0.59	0.15

Appendix M: Definitions

Advanced Street Sweeping	Either Regenerative-Air Sweepers (i.e., equipped with a sweeping head which creates suction and uses forced air to transfer street debris into the hopper) or Vacuum Assisted Sweepers (i.e., equipped with a high power vacuum to suction debris from street surface) (Source: 2016 Street Sweeping Report)
Agencies	Classification scheme used to further refine Load Sources in the Phase 6 Chesapeake Bay Watershed Model (Phase 6 Model) that generally correspond to source ownership.
Aggregate Impervious Land Cover	Phase 6 Model land cover consisting of impervious road and impervious non-road
Conservation Landscaping	Land cover conversion from pervious to an unmanaged (unfertilized, unmowed) meadow condition
Edge-of-Tide (EOT) Loads	Pollutant loads to the tidal Chesapeake Bay
Edge-of-Stream (EOS) Loads	Phase 6 Model pollutant loads to smaller, headwater streams, as defined by the National Hydrography Plus Dataset
Equivalent Impervious Acre (EIA) Credit	Credit associated with alternative practices that result in pollutant load reductions but are not directly associated with impervious area draining to them (e.g., street sweeping, stream restoration). The credit is based on the amount of total nitrogen, total phosphorus, and total suspended sediment reductions achieved
Floating Treatment Wetlands	Buoyant rafts of wetland vegetation that are planted in growing media and whose roots extend below the water's surface of a stormwater management pond
Forest Planting	The conversion of pervious (turf) to a forested land cover greater than one acre (a survival rate of 100 trees planted on one acre; at least 50% of trees have two inch diameter or greater 4.5 feet above ground)
Green Stormwater Infrastructure Credit	Additional impervious acre treatment credit for a best management practice (BMP) that provides water quality treatment and incorporates natural processes using vegetation and soils
Grey Infrastructure	Infrastructure designed to move urban stormwater away from the built environment and includes curbs, gutters, drains, piping, and collection systems (Source: EPA)

Illicit Discharge	Any non-stormwater discharge of pollutants to a municipal separate storm sewer system (MS4), except for discharges resulting from firefighting activities and other authorized non-stormwater discharges specified in the NPDES permits (Source: Chesapeake Bay Program)
Land Cover	Subset of Phase 6 Model Load Sources representative of ground cover conditions
Load Source	Unique sources of nitrogen, phosphorus, and sediment loads to the Chesapeake Bay that are explicitly simulated by the Phase 6 Model. Example sources include impervious roads, turf, and forest
Mechanical Street Sweeping	Mechanical Broom Sweepers that are equipped with water tanks, sprayers, brooms, and a vacuum system pump that gathers street debris (Source: 2016 Street Sweeping Report)
No Action Scenario	Phase 6 Model scenario that does not include the simulated effects of best management practices
Pollutant Removal Efficiencies	The effectiveness of a BMP at reducing nitrogen, phosphorus, and sediment loads, generally represented as a percentage
Riparian Conservation Landscaping	Grassland buffers that help filter nutrients, sediments, and other pollutants from runoff as well as remove nutrients from groundwater. These are buffers converted from managed turf land cover to an unmanaged meadow use
Riparian Forest Buffers	Linear wooded areas that help filter nutrients, sediments, and other pollutants from runoff as well as remove nutrients from groundwater
Riparian Land Cover Conversion	Forest planting and conservation landscaping practices that occur within 100 feet of a perennial stream.
Runoff Reduction (RR) Adjustor Curve	Nitrogen, phosphorus, and sediment removal rates for BMPs in Chapter 5 of the Design Manual based on the amount of runoff they treat and the degree of runoff reduction they provide
Segment Delivery Factor	The proportion of sediment transported from an upland area or headwater stream to a mainstem segment
Soil Restoration	The process of enhancing the porosity of soils compacted by human activity in urban areas by excavating or tilling compacted soils and amending the tilled soils, typically with compost
Stormwater Treatment (ST) Adjustor Curve	Nitrogen, phosphorus, and sediment removal rates for BMPs in Chapter 3 of the Design Manual based on the amount of runoff they treat and the degree of runoff reduction they provide

Stream	A channel with perennial flow
Stream Bed and Bank Load	A linear Phase 6 Model Load Source. This Load Source provides an estimate of the nitrogen, phosphorus, and sediment loads from the bed and banks of a channel with perennial flow
Street Trees	Any tree planting that occurs over an impervious surface (e.g., trees planted in sidewalk boxes on a roadside curb)
Terrestrial Load	Pollutant load associated with actual watershed area draining to a given waterbody and does not include any in-stream contributions
Total Urban Load	The summation of impervious and turf loads in the Phase 6 Model
True Forest Land Cover	Statewide average forest cover
Upland Best Management Practice	Stormwater BMPs that meet the water quality criteria and design standards in the 2000 Stormwater Design Manual. Upland BMPs include structural practices, nonstructural practices, and alternative surfaces
Urban Tree Canopy	The conversion of turf to tree canopy over turf
Water Quality Treatment Volume (WQ_T)	Rainfall depth treated in restoration practices
Watershed Management Credit	Additional impervious acre treatment credit for providing greater storage volume for a rainfall depth between 1.0 inch and 3.0 inches to address resiliency from changing weather patterns

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

Mr. Matthew W. Garbark, Acting Director
Baltimore City Department of Public Works
600 Abel Wolman Municipal Building
Baltimore, MD 21202

July 13, 2020

Dear Mr. Garbark:

The Maryland Department of the Environment (Department) on June 29, 2020, sent to the US Environmental Protection Agency (EPA) Baltimore City's National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4) draft permit. We expect to receive review comments from EPA in 30 - 90 days. Attached is a copy of the City's draft permit, accompanying fact sheet, and the *2020 Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* (2020 Guidance). These documents are a result of extensive collaboration among the Department and City staff, environmental stakeholders, State agencies, and the EPA, and continue the City's progress toward improving local water quality and in meeting Chesapeake Bay restoration requirements.

As part of this process, the Department developed a maximum extent practicable (MEP) analysis, in coordination with the University of Maryland's Environmental Finance Center, for Baltimore City to provide important information regarding its stormwater restoration capabilities. The MEP analysis took into account fiscal constraints (e.g., budgets, stormwater fees, citizen willingness to pay) and physical realities (e.g., project timelines that exceeded a five-year permit term). As a result of this effort, the City proposed a robust, locally-driven, best management practice portfolio (BMP portfolio) for implementation during its next permit term that included the restoration of 3,696 impervious acres.

The Department's MS4 permits must also be consistent with Maryland's Phase III Watershed Implementation Plan (Phase III WIP) and the Chesapeake Bay Total Maximum Daily Loads (TMDLs). The Phase III WIP set a stormwater target of restoring two percent per year of the City's impervious areas that have little or no stormwater management. Because the City's BMP portfolio of 3,696 impervious acres of restoration exceeds its Chesapeake Bay TMDL target, the Department has decided to incorporate the City's MEP level of effort directly in its permit. The Department commends the City for proposing this level of effort and is committed to providing further implementation guidance on new practices included in the 2020 Guidance to help the City implement additional restoration beyond its BMP portfolio.

During its prior permit term, Baltimore City and Maryland's other large and medium MS4 jurisdictions have established themselves as national leaders by collectively investing $685 million in clean water infrastructure. As a result, 35,000 impervious acres have been restored, reducing more than 67,000 lbs of phosphorus, 270,000 lbs of nitrogen, and 30,000,000 lbs of sediment annually to local waters and the Chesapeake Bay. The prior permits were also modified to allow trading under Maryland's landmark Water Quality Trading Program (WQT) that was used to acquire cost effective reductions totaling 5,000 lbs of phosphorus, 35,000 lbs of nitrogen, and 750,000 lbs of sediment. The Chesapeake Bay Trust, created by Maryland's General Assembly in 1985, awarded $36.5 million in grants to MS4 programs during this time period for hands-on projects that are ensuring a cleaner, greener, and healthier Chesapeake Bay. The Department's Water Quality Finance Administration (WQFA) guaranteed $107 million in low interest loans for MS4 restoration projects and another $135 million in low interest loans are pending for additional projects. The WQFA funding has allowed local jurisdictions to experiment with pay for performance contracting and public private partnerships that have increased the efficiency of BMP implementation while reducing cost. Maryland will continue to push for additional federal funding for local MS4 projects, especially for those that result in increased climate change resiliency to local communities and that can help in sustaining Chesapeake Bay restoration efforts further into the future.

The Department's development of this draft MS4 permit for Baltimore City continues its robust stormwater restoration strategy that is part of a larger effort that is incumbent on all sectors within Maryland and the surrounding region to do their fair share toward restoring the Chesapeake Bay, our nation's largest estuary. Upon receipt of the EPA's comments on this draft permit, the Department would like to schedule a meeting with you to discuss the next steps toward permit issuance. The Department appreciates the City's commitment to this important effort and looks forward to partnering with you in the coming years to make it happen.

Sincerely,

D. Lee Currey, Director
Water and Science Administration

Attachments

cc: Karl Berger, Washington Council of Governments

FACT SHEET

NPDES Permit Number:	**MD0068292**
MDE Permit Number:	**20-DP-3315**
Public Comment Period Expiration Date:	**(To be determined)**
Deadline for Requesting Judicial Review:	**(To be determined)**
Contact:	**Raymond Bahr 410-537-3543**

The Maryland Department of the Environment, Water and Science Administration (Department) proposes to issue a National Pollutant Discharge Elimination System (NPDES) permit for Municipal Separate Storm Sewer System (MS4) discharges to:

BALTIMORE CITY, MARYLAND
100 N. Holliday Street
Baltimore, MD 21202
410-396-4900

Introduction

The Department proposes to reissue the NPDES Municipal Separate Storm Sewer System permit for Baltimore City (permit number MD0068292, 20-DP-3315) authorizing the discharge of stormwater into, through, or from all municipal separate storm sewer systems owned or operated by Baltimore City. This fact sheet provides background information and explanations of the requirements in the City's permit. Contact information and procedures for submitting public comments can be found at the end of the fact sheet.

This permit represents the continued evolution of Baltimore City's NPDES municipal stormwater permit program. The City's initial permit in 1993 laid the foundation for a comprehensive approach for controlling stormwater runoff. Subsequent permits, along with those issued to other jurisdictions, helped Maryland to build one of the most progressive municipal stormwater programs in the country. Stormwater runoff from more than 35,000 impervious acres of roofs, roads, and parking lots have been treated with stormwater management practices, including green, innovative, and alternative practices, that reduce pollutants in local streams and rivers and help in restoring the Chesapeake Bay.

This permit requires Baltimore City to continue restoring impervious acres and implementing pollution reduction plans targeting specific pollutants. This permit builds on new scientific knowledge as well as lessons learned under the previous permits. With these advancements, Baltimore City will continue to be a leader in reducing stormwater pollutants locally and nationally. Most significantly, the new permit:

- Incorporates each jurisdiction's proposal for stormwater best management practice (BMP) implementation during the permit term toward impervious acre restoration
- Establishes impervious acre benchmarks throughout the five-year permit term
- Provides incentives to implement BMPs with co-benefits including green stormwater infrastructure and climate change resiliency
- Strengthens the illicit discharge detection and elimination (IDDE) program by prioritizing the outfalls for field screenings
- Requires IDDE coordination with other MS4s for conducting cross-jurisdictional investigations
- Increases coverage of good housekeeping and pollution prevention plans for additional City-owned properties
- Addresses chlorides, a pollutant of emerging concern, through better winter weather management of deicing and anti-icing materials
- Includes monitoring flexibility by allowing the City to collaborate with the Department in a Pooled Monitoring Advisory Committee administered by the Chesapeake Bay Trust
- Reflects the 2020 revision of the Accounting Guidance, which incorporates the Phase 6 Chesapeake Bay Watershed Model, new and updated BMPs approved by the Chesapeake Bay Program (CBP) expert panels, and nutrient trading

The permit also relies on well-established State programs. Maryland has a long history of developing statewide programs to reduce stormwater pollution that focus on protecting and restoring local water quality and the Chesapeake Bay. Maryland was one of the first in the nation to pass its Erosion and Sediment Control Law in 1970 for the control of stormwater runoff from construction sites. Numerous updates to the law and corresponding regulations over the years have added new and more stringent practices, better designs, more volume management, and more flexibility in implementation of controls.

The State's Stormwater Management Law passed in 1982 requires the implementation of BMPs in order to maintain after development, as nearly as possible, the pre-development runoff conditions. Over the years, this program has undergone significant revisions and enhancements, including the Stormwater Management Act of 2007 (Act), which introduced for the first time, environmental site design (ESD) to the maximum extent practicable (MEP) on all new development and redevelopment projects. The approach focuses on using natural drainage patterns and vegetation, and non-structural and small-scale practices (e.g., green infrastructure, low impact development, runoff reduction), that more effectively manage stormwater runoff at its source rather than the use of larger regional facilities.

Permit Authority

According to 40 Code of Federal Regulations (CFR) §122.26, owners or operators of large and medium municipal separate storm sewer systems must obtain a NPDES MS4 permit. This permit is a State permit subject to federal and State regulations. The Clean Water Act (CWA), and federal regulations provide the federal permit requirements. The Annotated Code of Maryland, Environment Article, Code of Maryland Regulations (COMAR), and policies and guidelines of the Department provide the State permitting requirements.

Permit History

Baltimore City is classified as a large MS4. The City's initial NPDES MS4 permit was issued on November 17, 1993, and reissued on February 8, 1999, January 3, 2005, and December 27, 2013. In 1993, the City's initial permit laid the foundation for a comprehensive approach to controlling runoff. This was done by inventorying and mapping storm drain system infrastructure; identifying sources of pollution; monitoring storm events to evaluate chemical, biological, and physical stream responses; and enhancing existing management programs as well as establishing new ones.

During the second permit, the City evaluated urban runoff and water quality; prioritized watersheds in order to perform more detailed analyses and guide management implementation; and began to restore existing impervious areas. During the City's third and fourth permit terms, extensive restoration efforts continued, and technologies were implemented for new and redevelopment projects that incorporated ESD to the MEP. Furthermore, the City began the development and implementation of plans to address stormwater wasteload allocations (WLAs) established under U.S. Environmental Protection Agency (EPA) approved total maximum daily load (TMDL) estimates.

This permit represents another step forward for Baltimore City's NPDES municipal stormwater program and continues a long history when it comes to stormwater management. The City implemented a stormwater management program in 1984 that enabled the City to enter into the MS4 permitting program ahead of the game. By the time federal stormwater permits were required in 1992, many of the City's impervious acres were already managed. Baltimore City proposed a robust portfolio of programmatic, upland, and in-stream BMPs for this permit term, continuing its leadership by providing its citizens with healthier streams and helping the State to meet its Chesapeake Bay restoration goals.

Regulated Permit Area

EPA defines "municipal separate storm sewer system" as "…a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body…having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes…; (ii) Designed or used for collecting or conveying storm water;" [40 CFR §122.26(b)(8)]. Under this definition, anywhere that a regulated jurisdiction "owns or operates" infrastructure that conveys runoff is covered under this NPDES MS4 permit. Maryland considers the entire geographic area within the political boundaries of a Phase I NPDES municipal stormwater jurisdiction as the regulated "permit area."

Since the inception of the NPDES municipal stormwater program, the Department has considered permit coverage to be jurisdiction-wide. This approach is based on the fact that specific permit provisions, such as erosion and sediment control and stormwater management

programs, are administered under State statute as Citywide requirements. As an example, private development requires the City's approval for erosion and sediment control and stormwater management, and is subsequently inspected, maintained, and enforced under local authority. The City also owns or operates a road system that extends throughout the entire City and generates stormwater discharges. In this context, the entire jurisdiction is the regulated permit area. Finally, as part of its preamble discussing this issue, EPA suggested that permit coverage may include areas where jurisdictions have control over land use decisions. Therefore, the Department defines regulated permit area as jurisdiction-wide and considers all provisions of this permit to apply to the geographic area of the City.

Stormwater System in Baltimore City

Baltimore City's population declined from 620,961 in 2010 to an estimated 602,495 in 2018, according to the United States Department of Commerce's Census information. Baltimore City covers an area of 92 square miles and has approximately 1,359 "minor" outfalls and 350 "major" outfalls. Major outfalls are defined by 40 CFR §122.26 (b)(5) as:

- An outfall pipe with an internal diameter of 36 inches or greater; or
- A discharge from a single conveyance other than a circular pipe that drains fifty acres or more; or
- An outfall pipe with an internal diameter of 12 inches or greater that drains an area that includes land zoned for industrial use.

Stormwater from these outfalls is discharged into the Patapsco/Back River Watershed basin, one of Maryland's ten major Chesapeake Bay tributary basins. Stream segments in these basins are impaired by sediments, nutrients, chlordane, polychlorinated biphenyls (PCBs), trash, and bacteria. TMDLs have been approved and stormwater WLAs established for portions of Lake Roland, Gwynns Falls, Jones Falls, Herring Run, Baltimore Harbor, Back River, and the Patapsco River. A WLA is that part of an impairing pollutant's total allowable discharge that is attributed to regulated point sources. More information regarding approved TMDLs for Baltimore City can be found at:
mde.maryland.gov/programs/Water/TMDL/ApprovedFinalTMDLs/Pages/index.aspx

Maryland's NPDES Municipal Stormwater Permit Requirements

The management, restoration, and monitoring programs required by this permit are designed to control stormwater discharges to the MEP. Public education and outreach, property management, and storm drain system IDDE programs reduce the input of pollutants to the City's storm drain systems. Erosion and sediment control and stormwater management programs control stormwater discharges from new and redevelopment through the implementation of BMPs. These management programs, integrated with stormwater restoration and monitoring, described in more detail below, provide a comprehensive and adaptive approach toward improving and restoring local water resources and the Chesapeake Bay.

Management Programs

Stormwater Management

This permit requires Baltimore City to continue the implementation of a stormwater management program in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland (www.lexisnexis.com/hottopics/mdcode/) and COMAR 26.17.02 (www.dsd.state.md.us/COMAR/subtitle_chapters/26_Chapters.aspx). The law and regulations require that ESD be used to the MEP to address runoff impacts associated with new and redevelopment. Maryland's stormwater regulations define ESD as "…using small-scale stormwater management practices, nonstructural techniques, and better site planning to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources." Under this definition, ESD includes conserving natural features, minimizing impervious surfaces, slowing down runoff to promote infiltration and evapotranspiration, and using other approved nonstructural practices or innovative technologies.

The criteria for sizing ESD practices are based on capturing and retaining enough rainfall so that the runoff leaving a site is reduced to a level equivalent to a wooded site in good condition. The goal is to provide enough treatment using ESD practices to address groundwater recharge, water quality, and stream channel protection requirements by replicating woods in good condition for the 1-year, 24-hour rainfall event, or approximately 2.7 inches of rainfall over 24 hours. Managing the 1-year rainfall event on a site is equivalent to treating 98% of Maryland's average annual rainfall.

All jurisdictions in the State, including Baltimore City, are required to maintain and implement a stormwater management ordinance that is in compliance with the requirements of Maryland's stormwater management program. These requirements include ensuring the proper construction and maintenance of all stormwater management features through timely inspections of new ESD practices and structural stormwater management facilities. Long-term maintenance of BMPs are ensured through triennial inspections of completed ESD treatment systems and structural facilities. Maintenance procedures, including triennial inspection policies, are described in COMAR 26.17.02.11.

By following the conditions in its approved ordinance, including mimicking natural hydrologic runoff characteristics, designing new projects to meet the woods in good condition criteria, and implementing ESD to the MEP, the City will be in compliance with this permit condition and with the requirements under 40 CFR for post-construction stormwater management.

Erosion and Sediment Control

This permit requires Baltimore City to implement an erosion and sediment control program in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland (www.lexisnexis.com/hottopics/mdcode/) and COMAR 26.17.01 (www.dsd.state.md.us/COMAR/subtitle_chapters/26_Chapters.aspx). By reference, this requires the City to ensure that all projects disturbing more than 5,000 square feet or 100 cubic yards have

an approved erosion and sediment control plan; regularly inspect all active projects; maintain an effective enforcement program; and have procedures to respond to complaints and violations regarding erosion and sediment control issues. The Department reviews Baltimore City's program at least once every two years and has minimum standards for the design and content of erosion and sediment control plans. The incorporation of the State's program by reference in this permit is an administratively efficient way to ensure compliance with construction runoff control requirements under 40 CFR.

Illicit Discharge Detection and Elimination

This permit requires Baltimore City to ensure that all non-stormwater discharges into, through, or from its storm sewer system, when found, are either permitted by the Department or eliminated. This is accomplished by maintaining a robust inspection and oversight program, including the ability to take appropriate action when illicit discharges do occur. As part of this program, Baltimore City is required to review all outfalls in its jurisdiction and prioritize outfall screening locations based on the potential for polluted discharges. The City is required to use the results of this review to choose and screen a minimum of 150 storm drain outfalls each year, looking for illicit discharges, or submit an alternative program for Department's approval that methodically identifies, investigates, and eliminates illegal discharges into, through, or from the City's MS4. Each outfall having a discharge shall be sampled using a chemical test kit. Additionally, routine surveys of commercial and industrial areas are required. The City is also required to maintain procedures for implementing the IDDE program, including investigating complaints and handling enforcement actions.

Property Management and Maintenance

The City is required to ensure that a Notice of Intent be submitted and a pollution prevention plan developed for all City-owned facilities requiring coverage under the General Discharge Permit for Stormwater Associated with Industrial Activities. For other City-owned properties, this MS4 permit requires the City to develop and implement a good housekeeping plan where the following activities are performed: maintenance or storage of vehicles or equipment; storage of fertilizers, pesticides, landscaping materials, hazardous materials; or any other materials in a position likely to pollute stormwater runoff. These plans include an assessment of the property, focusing on activities that may contaminate stormwater runoff, and the implementation of pollution prevention measures and stormwater BMPs to eliminate or treat any non-stormwater discharges.

This permit expands the requirements of the winter weather management program to address chloride, a pollutant of emerging concern. The City is required to reduce the use of deicing and anti-icing materials, without negatively affecting public safety, by developing a comprehensive Salt Management Plan based on the *Maryland Department of Transportation, State Highway Administration's Maryland Statewide Salt Management Plan, 2019*, or subsequent versions thereof. The plan shall include tracking and reporting of deicing material used and snow events, staff training and public education, and an evaluation of new equipment and methods.

This permit further requires the City to continue its efforts to reduce pollutants associated with the maintenance of City properties. Inlet cleaning, street sweeping, and litter pickup programs are all activities currently undertaken by Baltimore City along its roadways that shall continue. Additionally, the City is required to reduce the use of pesticides, herbicides, and fertilizers along roadways and on City-owned properties.

In addition to any requirements for trash TMDLs, this permit requires a Citywide program to support and implement strategies to reduce trash (e.g., litter and floatables) including through recycling. This permit requires the City to evaluate current trash and litter control efforts; develop strategies to reduce trash, floatables, and debris in all of its watersheds; and provide public education to aid these efforts.

Public Education and Public Outreach

Baltimore City implements a diverse public education and outreach program that focuses on pollution prevention and includes participating in numerous public and community events and disseminating information regarding pollution prevention activities. A requirement to implement a program that includes information about stormwater runoff, water conservation, lawn care management, trash reduction and recycling, and establishes a complaint hotline for citizens to report suspected illicit discharges and spills is included in this permit. This permit also requires the City to involve residents in public events tailored to local efforts, such as tree plantings, stream cleanups, and storm drain stenciling.

Stormwater Restoration

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP and such other provisions as the Department determines appropriate for the control of such pollutants. Additionally, by regulation under 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable stormwater WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs incorporated as Appendix A of the permit). The impervious acre restoration requirements and associated pollutant reductions described in Baltimore City's MS4 permit are consistent with "Maryland's Phase III Watershed Implementation Plan to Restore Chesapeake Bay by 2025" (Phase III WIP) and 2025 nutrient load targets, and for local TMDL implementation targets.

Under the previous permit, Baltimore City conducted a systematic assessment of water quality for each watershed within its jurisdiction to identify sources of pollutants in stormwater runoff and link them to specific water quality impacts. These watershed assessments included detailed water quality analyses, identified opportunities for water quality improvement, and were used as the basis for developing and implementing restoration plans to control stormwater discharges. As a result of these assessments, the City has worked on a Citywide TMDL Implementation Strategy (Strategy) that that must be continued under this permit. The BMPs listed in the City's Year 1 BMP Portfolio (Appendix B of the permit) are linked to the City's Strategy and will be

implemented during the first year of this permit. As part of each year's annual report, the City will propose a new list of BMPs to be implemented in the following year.

When new TMDLs are approved, Baltimore City is required by this permit to develop implementation plans for meeting the stormwater WLAs and submitting them to the Department for review within one year of EPA's approvals. This permit also requires the City to document the annual progress for all Chesapeake Bay and local TMDL implementation plans, approved by the Department, through monitoring and modeling of estimated net change in pollutant loads. Over the permit term, Baltimore City must evaluate and update the benchmarks, milestones, and specific stormwater BMPs that need to be implemented, in an iterative and ongoing process to ensure that water quality targets and final TMDL dates are met. Documentation of this process shall be reported in one Citywide TMDL Stormwater Implementation Plan.

The Department uses an impervious acre metric as a surrogate for measuring progress toward all TMDLs. Upland stormwater BMPs, implemented according to the criteria described in Chapters 3 and 5 of the 2000 Maryland Stormwater Design Manual (Manual), provide direct impervious area treatment, removing pollutants in runoff associated with these impervious areas. An equivalent impervious acre (EIA) credit has been developed for alternative BMPs such as street sweeping, tree planting, stream restoration, and the elimination of discovered nutrient discharges from grey infrastructure, among other approved practices. The EIA is based on reducing urban pollutant loads until they mimic the runoff from forest land cover.

In "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" (2020 Accounting Guidance), the Department provides updated information on how to calculate and report impervious area restoration and pollutant load reductions. The 2020 Accounting Guidance incorporates the Phase 6 Chesapeake Bay Watershed Model, new and updated BMPs approved by CBP expert panels, stormwater management co-benefits (i.e., climate change and green infrastructure credits), and nutrient trading options. The nutrient load reductions for these BMP options are consistent with those used in Maryland's Phase III WIP and 2025 nutrient load targets. The 2020 Accounting Guidance was developed with the contributions of environmental non-governmental organizations, MS4 jurisdictions, State agencies, and EPA, and supersedes the 2014 Accounting Guidance.

For this permit, the Department developed an MEP Analysis methodology with a set of metrics to assist Baltimore City in determining what level of restoration activity is achievable. The MEP Analysis was developed in coordination with the University of Maryland's Environmental Finance Center, which provided important national background, research, and recommendations. The MEP Analysis took into consideration Baltimore City's financial and physical capacities and limitations for implementing a comprehensive suite of restoration BMPs and stormwater management programs toward meeting the Chesapeake Bay TMDLs. The end result was an MEP list of restoration BMPs and programs (i.e., BMP Portfolio) that the City proposed for implementation under this permit term for the Department's review and approval.

According to Maryland's Phase III WIP, "[r]ecent MS4 implementation and trend analysis indicates" that Phase I MS4s "should be capable of annually restoring two percent of their impervious surface areas that currently have little or no stormwater treatment." This level of implementation was then used to estimate nutrient pollutant load reductions for Baltimore City and the State's other Phase I MS4s. The Department's decision to require the restoration of 3,696 impervious acres in this permit incorporates both Baltimore City's MEP Analysis, and the need to be consistent with the Phase III WIP and make significant and continued progress toward achieving the Chesapeake Bay's WLAs. To ensure a steady rate of progress during the permit term, cumulative benchmarks are included in the City's Stormwater Restoration section's Table 1. Baltimore City's restoration requirement is greater than the two percent Phase III WIP restoration goal by 1,551 impervious acres, advancing the achievement of all MS4 permittees cumulatively meeting the restoration goal.

Baltimore City will provide continual outreach to the public regarding the development of new TMDL stormwater implementation plans. This permit requires the City to provide notice of its procedures for the public to obtain information and offer comment on the assessments and plans for new TMDLs. A minimum 30-day comment period is required prior to finalizing any assessments or plans, as well as a summary in annual reports of how the City addressed or will address any material comment received from the public.

Assessment of Controls

BMP Effectiveness Monitoring

The Chesapeake Bay Program has determined that intensive monitoring on a small watershed scale where restoration efforts are being implemented is necessary to inform successful adaptive management. To support this initiative, Baltimore City's permit requires one of two options. If the City chooses, it may continue intensive monitoring and build upon past monitoring efforts at the Stony Run watershed. Alternatively, the City may choose and submit for approval a new location to assess the effects of a BMP installed for restoration. This option requires chemical, biological, and physical monitoring be used to assess small watershed restoration efforts, document BMP effectiveness, and calibrate water quality models. The 2020 MS4 Monitoring Guidelines provides technical information on the implementation of an acceptable monitoring program. The minimum criteria for chemical, biological, and physical monitoring are as follows:

Chemical Monitoring: Twelve storm events shall be monitored per year in the selected watershed. Discrete samples of stormwater flow representative of each storm event shall be collected at the monitoring stations for developing event mean concentrations (EMC) for the following pollutants:

Biochemical Oxygen Demand (BOD_5) or Total Organic Carbon (TOC)
Total Nitrogen (TN)
Nitrate plus Nitrite
Total Ammonia (sewer signal)
Total Suspended Solids

E. coli or *Enterococcus*
Total Phosphorus
Orthophosphate
Chloride

Continuous measurements are also required for temperature, pH, discharge (flow), turbidity, and conductivity.

Biological Monitoring: Benthic macroinvertebrate samples are required to be gathered each spring for gauging the biological response to stormwater discharges. A stream habitat assessment is also required using techniques defined by the EPA using Rapid Bioassessment Protocols (RBP), Maryland Biological Stream Survey (MBSS), or other similar method approved by the Department.

Physical Monitoring: A geomorphologic stream assessment is required and includes an annual comparison of permanently monumented stream channel cross-sections and the stream profile. A hydrologic and/or hydraulic model is required in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

Continuous Flow Measurements: Flow measurements are required at the monitoring locations and will be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models. Additionally, the City is required to provide a combined analysis of the chemical, biological, and physical monitoring results for the approved watershed.

The City alternatively may choose to collaborate with the Department in a Pooled Monitoring Advisory Committee (PMAC) administered by the Chesapeake Bay Trust. The committee will determine criteria for research proposals that address key questions pertaining to the cumulative impacts of watershed restoration and the effectiveness of specific restoration practices. All PMAC participants will determine monitoring needs, select appropriate studies, and contribute funding for specific projects that address permit requirements related to BMP effectiveness monitoring in a small watershed.

City Watershed Assessment Monitoring

The City is also required to select one of two available strategies for Citywide watershed assessment and trend monitoring. The City may choose to submit a comprehensive plan to monitor trends in biological, bacteria, and chloride impairments. This includes monitoring biota, habitat assessment, and bacteria (*E. coli*, *Enterococcus*, or fecal coliform), and an assessment of chloride by measuring conductivity as a surrogate. Alternatively, the City may choose to accomplish this requirement through participation in the PMAC with an annual monetary contribution.

Special Programmatic Conditions

Baltimore City is required to offset any additional loads through Maryland's Aligning for Growth policies and procedures as articulated through Chesapeake Bay milestone achievement. Baltimore City shall reflect these policies, programs, and implementation as part of its net WLA accounting. The City will further continue to work toward the completion of the State's Water Resources Element as required by the Maryland Economic Growth, Resource Protection and Planning Act of 1992 (Article 66B, Annotated Code of Maryland). The projects and programs proposed under this permit, as well as those implemented during the City's previous stormwater permits and as part of the other State and local regulations all work toward meeting these conditions.

Enforcement and Penalties

This permit regulates the discharge of stormwater into, through, or from Baltimore City's municipal separate storm sewer system. It also requires the City to take all reasonable steps to minimize or prevent discharges that are in violation of permit conditions. Failure to comply with a permit is a violation of the CWA and is grounds for enforcement action; penalty assessment; permit termination, revocation, or modification; or denial of a permit renewal application.

EPA affirmed in the preamble to its Municipal Separate Storm Sewer System Phase II Stormwater Rule (FR Vol. 64, No. 235, 68731) that water quality-based controls, which are implemented through the iterative process defined herein as the terms and conditions of this permit, are appropriate for the control of the discharge of pollutants into, through, or from the City's municipal separate storm sewer system and will result in reasonable progress toward attainment of water quality standards. Successive iterations of the mix of BMPs and measurable goals will be driven by the objective of ensuring maintenance of water quality standards.

Public Review and Participation Opportunities

Upon advertisement, the tentative determination will be available on the Department's website at:

mde.maryland.gov/programs/Water/StormwaterManagementProgram/Pages/storm_gen_permit.aspx

Copies of the draft permit may also be procured at a cost of $0.36 per page. Written requests for copies should be directed to Raymond P. Bahr, Maryland Department of the Environment, Water and Science Administration, Sediment, Stormwater, and Dam Safety Program, 1800 Washington Blvd., Ste. 440, Baltimore, Maryland 21230-1708. Additional information on stormwater management in Maryland can also be found on the Department's website or by calling Mr. Bahr at 410-537-3543 or 1-800-633-6101.

Once tentative determination is issued, the public will have 20 days to request a hearing and 30 days to provide written comments on the draft permit. If no hearing request is made nor

comments received, the tentative determination will become final. If requested, a public hearing will be held within one month of notification. The Department will respond to all pertinent comments during the final determination process. Once final determination is issued, the public will have 15 days to request a judicial review of the permit.

From: "Raymond Bahr -MDE-" <raymond.bahr@maryland.gov>
Sent: Mon, 13 Jul 2020 23:01:22 +0000
To: "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>
Cc: "Lee Currey -MDE-" <lee.currey@maryland.gov>; "jenniferm.smith@maryland.gov" <jenniferm.smith@maryland.gov>; "Karl Berger" <kberger@mwcog.org>
Subject: Re: Baltimore City's draft MS4 Permit
Attachments: BC_MS4 Draft Permit_6_24_2020.pdf

Hi Kim,

Please find the draft permit attached...

Ray

Raymond P Bahr
Deputy Program Manager
Sediment, Stormwater, and Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1708
(410) 537-3545

On Mon, Jul 13, 2020 at 6:13 PM Raymond Bahr -MDE- <raymond.bahr@maryland.gov> wrote:

> Hi Kim,
>
> Please find attached a letter from WSA's Director Lee Currey to DPW's Acting Director Matthew Garbark regarding Baltimore City's draft MS4 permit, accompanying fact sheet, and the *2020 Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* (2020 Guidance). Can you please make sure that Mr. Garbark receives these materials until a hard copy may be sent in the mail.
>
> These documents are a result of extensive collaboration between the Department and City staff and we want to thank you for your cooperation in this important program.
>
> Please let me know if you have any questions.
>
> Hope that all is well,
>
> Ray

Raymond P Bahr
Deputy Program Manager
Sediment, Stormwater, and Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1708
(410) 537-3545

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MARYLAND DEPARTMENT OF THE ENVIRONMENT
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

PART I. IDENTIFICATION

A. Permit Number: 20-DP-3315 MD0068292

B. Permit Area

This permit covers all stormwater discharges into, through, or from the municipal separate storm sewer system (MS4) owned or operated jurisdiction-wide by Baltimore City, Maryland.

C. Effective Date: To be determined (TBD)

D. Expiration Date: TBD

PART II. DEFINITIONS

Terms used in this permit are defined in relevant chapters of Title 40 of the Code of Federal Regulations (CFR) Parts 122-124 and the Code of Maryland Regulations (COMAR) 26.08.01, 26.17.01, and 26.17.02. Terms not defined in CFR or COMAR shall have the meanings attributed by common use.

PART III. WATER QUALITY

Baltimore City must manage, implement, and enforce stormwater management programs in accordance with the Clean Water Act (CWA) and corresponding stormwater National Pollutant Discharge Elimination System (NPDES) regulations, 40 CFR Part 122, to meet the following requirements:

1. Effectively prohibit pollutants in stormwater discharges or other unauthorized discharges into, through, or from the MS4 as necessary to comply with Maryland's receiving water quality standards;

2. Attain applicable stormwater wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with Title 33 of the U.S. Code (USC) §1342(p)(3)(B)(iii); 40 CFR §122.44(k)(2) and (3); and

3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with all the conditions contained in PARTs IV through VII of this permit shall constitute compliance with §402(p)(3)(B)(iii) of the CWA and adequate progress toward compliance with Maryland's receiving water quality standards and U.S. Environmental Protection Agency (EPA) approved stormwater WLAs for this permit term.

PART IV. STANDARD PERMIT CONDITIONS

A. Permit Administration

Baltimore City shall designate an individual to act as a liaison with the Maryland Department of the Environment (Department) for the implementation of this permit. The City shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the City shall submit in its annual reports to the Department an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. The Department shall be notified in annual reports of any changes in personnel or organization relative to NPDES program tasks.

B. Legal Authority

Baltimore City shall maintain adequate legal authority to meet this permit's requirements in accordance with NPDES regulations at 40 CFR §122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the City shall notify the Department in writing within 30 days and make the necessary changes to maintain adequate legal authority within one year of notification. All changes shall be included in the City's annual report.

C. Source Identification

Sources of pollutants in stormwater runoff jurisdiction-wide shall be identified by Baltimore City and linked to specific water quality impacts on a watershed basis. A georeferenced database shall be submitted annually in accordance with *Maryland Department of the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017),* hereafter (MS4 Geodatabase) that includes information on the following:

1. Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;

2. Industrial and commercial sources: industrial and commercial land uses and sites that the City has determined have the potential to contribute significant pollutants;

3. Urban best management practices (BMPs): stormwater management facility data for new and redevelopment, including outfall locations and delineated drainage areas;

4. Impervious surfaces: public and private land cover delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;

5. Monitoring locations: locations established by Baltimore City for chemical, biological, and physical monitoring of watershed restoration efforts and the *2000 Maryland Stormwater Design Manual,* or as part of a pooled monitoring approach as described in Part IV.F; and

6. Water quality improvement projects: Restoration projects implemented in accordance with Part IV.E.3 including stormwater BMPs, programmatic initiatives, and alternative control practices in accordance with the *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated Guidance for National Pollutant Discharge Elimination System Stormwater Permits (June 2020*), hereafter (2020 Accounting Guidance), including projects proposed, under construction, and completed with associated drainage areas delineated.

D. Management Programs

The following management programs shall be implemented jurisdiction-wide by Baltimore City. These management programs are designed to control stormwater discharges and reduce associated pollutant loadings to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. Annual reports for the City's management programs shall be in accordance with Part V.A of this permit and the MS4 Geodatabase.

1. Stormwater Management

An acceptable stormwater management program shall be maintained by the City in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the City shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the *2000 Maryland Stormwater Design Manual*. This includes:

i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for all new and redevelopment projects;
ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and
iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.

b. Maintaining programmatic and implementation information related to the stormwater management program including, but not limited to:

i. Number of Concept, Site Development, and Final plans received and number of those approved. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;
ii. Number of redevelopment projects received and number of those approved;
iii. Number of stormwater exemptions issued; and
iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan.

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by the City.

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the City's annual reports.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall be maintained by the City and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the City shall include, but not be limited to:

a. Implementing program improvements identified in any Department evaluation of the City's erosion and sediment control enforcement authority;

b. Ensuring that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by the Department; and

c. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

3. Illicit Discharge Detection and Elimination

The City shall implement an inspection and enforcement program to ensure that all discharges into, through, or from the MS4 that are not composed entirely of stormwater are either permitted by the Department or eliminated. Activities shall include, but not be limited to:

a. Reviewing all City outfalls to prioritize field screening efforts in areas with the greatest potential for polluted discharges. The City must use the results of this review to choose and field screen at least 150 outfalls annually. Each outfall having a discharge shall be sampled at the time of screening using a chemical test kit. An alternative program may be submitted by the City for the Department's approval that methodically identifies, investigates, and eliminates illegal discharges into, through, or from the City's MS4;

b. Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;

c. Maintaining written standard operating procedures for outfall screenings, illicit discharge investigations, annual visual surveys of commercial and industrial areas, responding to illicit discharge complaints, and enforcement implementation;

d. Maintaining a program to address and respond to illegal discharges, dumping, and spills; and

e. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. When a suspected illicit discharge discovered within the City's jurisdiction is either originating from or discharging to an adjacent MS4, the City must coordinate with that MS4 to resolve the investigation. Significant discharges shall be reported to the Department for enforcement and/or permitting.

4. Property Management and Maintenance

a. Coverage under Maryland's NPDES General Permit for Discharges of Stormwater Associated with Industrial Activity (SW Industrial GP) is typically required at facilities where the following activities are performed: maintenance or storage of vehicles or equipment; storage of fertilizers, pesticides, landscaping materials, hazardous materials, or other materials that could pollute stormwater runoff. The City shall:

i. Ensure that a Notice of Intent (NOI) has been submitted to the Department for each City-owned industrial facility requiring coverage under the SW Industrial GP; and
ii. Submit with the annual report a list of City properties requiring industrial stormwater permitting.

b. The City shall develop, implement, and maintain a good housekeeping plan (GHP) for City-owned properties not required to be covered under Maryland's SW Industrial GP where the activities listed in PART IV.D.4.a are performed. The GHP shall be submitted to the Department by the City in its third year annual report and implemented thereafter. A standard GHP may be developed for all City-owned property or separate GHPs may be developed for properties with similar use, e.g., recreation and parks properties, school properties. The GHP shall include, but not be limited to:

i. A description of property management activities;
ii. A map of the locations of properties covered by the GHP;

iii. A list of potential pollutants and their sources that result from facility activities;
iv. Written procedures designed to reduce the potential for stormwater pollution from property activities, including illicit discharges, dumping, and spills;
v. Written procedures for annually assessing City properties in order to prevent the discharge of pollutants, spills, and leaks into its municipal separate storm sewer system; and
vi. Annual training for all appropriate City staff and contractors regarding best practices for preventing, reducing, and eliminating the discharge of pollutants during property activities.

c. The City shall continue to implement a program to reduce pollutants associated with the maintenance of City-owned properties including, but not limited to, local roads and parks. The maintenance program shall include the following activities where applicable:

i. Street sweeping;
ii. Inlet inspection and cleaning; and
iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management.

d. The City shall reduce the use of winter weather deicing and anti-icing materials, without compromising public safety, by developing a City Salt Management Plan (SMP) to be submitted to the Department in its third year annual report and implemented thereafter. The SMP shall be based on the guidance provided on best road salt management practices described in the *Maryland Department of Transportation, State Highway Administration's Maryland Statewide Salt Management Plan*, developed and updated annually as required by the Maryland Code, Transportation §8-602.1. The City's SMP shall include, but not be limited to:

i. A plan for evaluation of new equipment and methods, and other strategies for continual program improvement;
ii. Training and outreach:
- Creating a local "Salt Academy" that annually provides City winter weather operator personnel and contractors with the latest training in deicer and anti-icer management, or the participation of City personnel and contractors in a "Salt Academy" administered by another MS4 permittee or State agency; and
- Developing best salt management practices outreach for educating homeowners within the City.

iii. Tracking and reporting:
- Starting with the fourth annual report, during storm events where deicing or anti-icing materials are applied to City roads, track and record the amount of materials used and snowfall in inches per event; and
- Report the deicing or anti-icing application by event or date, and the monthly and annual pounds used per lane mile per inch of snow.

e. The City shall evaluate current litter control problems associated with discharges into, through, or from portions of its MS4 that are not already addressed under the TMDL implementation plan for trash (litter and floatables) (see Appendix A).

f. The City shall report annually on the changes in its Property Management and Maintenance programs and the overall pollutant reductions resulting from implementation of the components of the programs listed in this section.

5. Public Education

The City shall continue to implement a public education and outreach program to reduce stormwater pollution. Education and outreach efforts may be integrated with other aspects of the City's activities. These efforts are to be documented and summarized in each annual report, with details on resources (e.g., personnel and financial) expended and method of delivery for education and outreach. The City shall implement a public outreach and education campaign that includes, but is not limited to:

a. Maintaining a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

b. Providing information to inform the general public about the benefits of:

i. Increasing water conservation;
ii. Residential and community stormwater management implementation and facility maintenance;
iii. Proper erosion and sediment control practices;
iv. Increasing proper disposal of household hazardous waste;
v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal);
vi. Residential car care and washing;

vii. Litter reduction;
viii. Reducing, reusing, and recycling solid waste; and
ix. Proper pet waste management.

E. Stormwater Restoration

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP and such other provisions as the Department determines appropriate for the control of such pollutants. Additionally, by regulation at 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable stormwater WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Appendix A). The impervious acre restoration requirements and associated pollutant reductions described below for Baltimore City are consistent with Maryland's Phase III Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL and 2025 nutrient load targets, and for local TMDL implementation targets.

1. Annual alternative control practices used by Baltimore City to meet its prior MS4 permit's impervious acre restoration requirement shall be:

    a. Continued annually at the same level of implementation (e.g., street lane miles swept, septic systems pumped) under this permit;

    b. Replaced with [acres to be determined] impervious acres using stormwater management BMPs, programmatic initiatives, or alternative control practices in accordance with the 2020 Accounting Guidance; or

    c. A combination of a and b above.

1. The impervious acre restoration requirements described below are in addition to the requirements listed in Part IV.E.1 of this permit.

2. By [Permit expiration date, to be determined], Baltimore City shall commence and complete the restoration of 3,696 impervious acres that have not been treated to the MEP by implementing stormwater BMPs, programmatic initiatives, or alternative control practices in accordance with the 2020 Accounting Guidance.

3. By [end of first year of permit term, date to be determined], Baltimore City shall complete the stormwater BMPs, programmatic initiatives, or alternative control practices listed in the Year 1 BMP Portfolio provided in Appendix B. Baltimore City may replace individual practices listed in Appendix B with others that meet the requirements of the 2020 Accounting Guidance as long as the total restoration at the end of year one meets the implementation milestone schedule in Table 1.

4. Baltimore City may acquire Nutrient Credits for Total Nitrogen (TN), Total Phosphorus (TP), and Total Suspended Solids (TSS) in accordance with COMAR 26.08.11 to meet its impervious acre restoration requirement in Part IV.E.3 of this permit. For acquiring Nutrient Credits in place of impervious acre restoration, an equivalent impervious acre shall be based on reducing 18.08 pounds of TN, 2.23 pounds of TP, and 8,046 pounds of TSS.

5. Any Nutrient Credits acquired by Baltimore City for meeting the restoration requirements of this permit shall be maintained and verified annually in accordance with COMAR 26.08.11 unless they are replaced at a one to one acre ratio by local stormwater management BMPs, programmatic initiatives, or alternative control practices in accordance with the 2020 Accounting Guidance.

6. Baltimore City shall meet its impervious acre implementation requirement according to the annual restoration benchmark schedule provided in Table 1.

Annual Restoration Benchmark Schedule, Table 1

Metric	Year 1	Year 2	Year 3	Year 4	Year 5
Cumulative Percent Impervious Acre Restoration Completed	20%	40%	55%	75%	100%

7. In each year's annual report, Baltimore City shall:

   a. Submit to the Department a list of BMPs, programmatic initiatives, and alternative control practices to be completed in the following year to work toward meeting its impervious acre restoration benchmark:

      i. The list of BMPs, programmatic initiatives, or alternative control practices shall be submitted in the Year 1 BMP Portfolio format provided in Appendix B; and
      ii. Baltimore City may replace individual practices listed in its annual BMP Portfolio as long as the total implementation rate at the end of each year meets the annual restoration benchmark schedule in Table 1.

   b. Update its annual restoration benchmark schedule (Table 1) based upon:

i. Actual BMP implementation rates; and
ii. Anticipated implementation rates and annual restoration benchmark schedule needed in the remaining years of this permit for meeting the final impervious acre restoration requirement by [permit expiration date].

F. Citywide TMDL Stormwater Implementation Plan

1. Where Baltimore City has submitted an implementation plan for a TMDL identified in Appendix A and that plan has yet to be approved, Baltimore City shall, within one year of the effective date of this permit, address all outstanding comments needed for the Department's approval of the plan.

2. Within one year of EPA's approval of a new TMDL, Baltimore City shall submit an implementation plan to the Department for approval. The TMDL implementation plan shall be based on the Department's TMDL analyses, or an equivalent and comparable Baltimore City water quality analyses, that includes:

   a. A list of stormwater BMPs, programmatic initiatives, or alternative control practices that will be implemented to reduce pollutants for the TMDL;

   b. A description of the City's analyses and methods, and how they are comparable with the Department's TMDL analyses; and

   c. Final implementation dates and benchmarks for meeting the TMDL's applicable stormwater wasteload allocation (WLA). Once approved by the Department, any new TMDL implementation plan shall be incorporated in the Citywide TMDL Stormwater Implementation Plan and subject to the annual progress report requirements under Part IV.F.3 of this permit.

3. For all Department approved TMDLs listed in Appendix A, the City shall annually document, in one Citywide Stormwater TMDL Implementation Plan, updated progress toward meeting these TMDLs. This Citywide Stormwater TMDL Implementation Plan shall include:

   a. A summary of all BMPs, programmatic initiatives, alternative control practices, or other actions implemented for each TMDL;

   b. An analysis and table summary of the net pollutant reductions achieved annually and cumulatively for each TMDL;

c. An updated list of proposed BMPs, programmatic initiatives, and alternative control practices, as necessary, to demonstrate adequate progress toward meeting the Department's approved benchmarks and final TMDL implementation dates.

4. Baltimore City shall provide continual outreach to the public and other stakeholders, including other jurisdictions or agencies holding stormwater WLAs in the same watersheds, regarding its TMDL stormwater implementation plans. Baltimore City shall solicit input from the public, collaborate with stakeholders, and incorporate any relevant comments that can aid in achieving local stormwater WLAs. To allow for public participation, Baltimore City shall:

a. Maintain a list of interested parties for notification of TMDL development actions;

b. Provide notice on the City's webpage outlining how the public may obtain information on the development of TMDL stormwater implementation plans and opportunities for comment;

c. Provide copies of TMDL stormwater implementation plans to interested parties upon request;

d. Allow a minimum 30-day comment period before finalizing TMDL stormwater implementation plans; and

e. Document in final TMDL stormwater implementation plans how the City provided public outreach and adequately addressed all relevant comments.

G. Assessment of Controls

Baltimore City shall conduct BMP effectiveness and watershed assessment monitoring for tracking progress toward improving local water quality and restoring the Chesapeake Bay. The 2020 MS4 Monitoring Guidelines shall be referenced for addressing the technical guidelines and requirements outlined below.

1. BMP Effectiveness Monitoring

By [4 months after permit issuance, date to be determined], the City shall notify the Department which option it chooses for BMP effectiveness monitoring. The two options are:

a. The City shall collaborate with the Department in a Pooled Monitoring Advisory Committee administered by the Chesapeake Bay Trust (CBT) for determining monitoring needs and selecting

appropriate monitoring studies. To implement the required monitoring, the City shall pay $100,000 into a pooled monitoring CBT fund by July 1 of each year. Enrollment in the program shall be demonstrated through a memorandum of understanding (MOU) between the City and CBT by [date to be determined]. The terms of the BMP effectiveness MOU are described in the 2020 MS4 Monitoring Guidelines. The City shall remain in the program for the duration of this permit term; or

b. The City shall continue monitoring the Stony Run watershed, or select and submit for the Department's approval a new BMP effectiveness study for monitoring by [4 months after permit issuance, date to be determined]. Monitoring activities shall occur where the cumulative effects of watershed restoration activities, performed in compliance with this permit, can be assessed. The minimum criteria for chemical, biological, and physical monitoring are as follows:

i. Chemical Monitoring:

- Twelve (12) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If exceptional weather patterns (e.g., dry weather periods) or other circumstances (e.g., equipment failures) occur during the reporting year, the City shall provide documentation of such circumstance(s);
- Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods;
- At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136, and event mean concentrations (EMCs) shall be calculated;
- Baseflow sampling shall occur quarterly at the mid-point of each season (e.g., February 15 for the first quarter, June 15 for the second quarter);
- Stormwater flow and baseflow measurements shall be recorded at the outfall and in-stream stations for the following parameters:

Stormwater and Baseflow Representative Samples (Parameters)
Total Suspended Solids (TSS)
Bacteria (*E.coli* or *Enterococcus* spp.)
Chloride
Discharge (flow)
Biochemical Oxygen Demand (BOD_5) or Total Organic Carbon (TOC)
Orthophosphate
Total Nitrogen (TN)
Nitrate + Nitrite
Total Ammonia (sewer signal)
Total Phosphorus (TP)

- Continuous measurements shall be recorded for the parameters listed below at the in-stream monitoring station or other practical location based on the approved study design:

Continuous Measurements (Parameters)
Temperature
pH
Discharge (flow)
Turbidity
Conductivity

- Data collected from stormwater, baseflow, and continuous monitoring shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models;
- In the first year annual report, the City shall submit a revised sampling plan for approval to address the new monitoring parameters provided above. An approved sampling plan under a prior MS4 permit for the City shall continue until the Department approves a new sampling plan proposed under this permit.

ii. Biological Monitoring:

- Benthic macroinvertebrate samples shall be gathered each spring between the outfall and in-stream stations or other practical locations based on a Department approved study design; and

- The City shall use the Maryland Biological Stream Survey (MBSS) sampling protocols for biological and stream habitat assessment.

iii. Physical Monitoring:

- A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on the approved monitoring design. This assessment shall include annual comparison of permanently monumented stream channel cross-sections and the stream profile; and
- A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

iv. Annual Data Submittal: The City shall describe in detail its monitoring activities for the previous year and include the following:

- EMCs submitted on the Department's long-term monitoring MS4 Geodatabase as specified in PART V below;
- Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations;
- Any available analysis of surrogate relationships with the above monitoring parameters; and
- Any requests and accompanying justifications for proposed modifications to the monitoring program.

2. Watershed Assessment Monitoring

By [4 months after permit issuance, date to be determined], the City shall notify the Department which option it chooses for watershed assessment monitoring. The City must implement one of the two options as follows:

a. The City shall collaborate with the Department in a Pooled Monitoring Advisory Committee administered by CBT for determining appropriate watershed assessment monitoring. To implement the required monitoring, the City shall pay [amount to be determined, expected to be between $150,000 and $200,000 based on the number of local TMDL assessments required] annually into a pooled monitoring CBT fund by July 1 of each year. Enrollment in the program shall be demonstrated through an MOU between the City and CBT to be signed by [date to be determined]. The terms of the Watershed Assessment Monitoring MOU are described in the

2020 MS4 Monitoring Guidelines. The City shall remain in the program for the duration of this permit term; or

b. The City shall submit a comprehensive plan for watershed monitoring by [one year and 4 months after permit issuance, date to be determined] related to stream biology and habitat, bacteria, and chlorides and commence monitoring upon the Department's approval. The plan shall follow the 2020 MS4 Monitoring Guidelines and include:

i. Biological and habitat assessment monitoring at randomly selected stream sites using MBSS protocols;
ii. Bacteria (i.e., *E.coli, Enterococcus* spp., or fecal coliform monitoring); and
iii. Chloride assessments at two locations.

H. Program Funding

1. Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted by Baltimore City as required in PART V below.

2. Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. Annual Reporting

1. Annual progress reports, required under 40 CFR §122.42(c), will facilitate the long-term assessment of Baltimore City's NPDES stormwater program. The City shall submit annual reports on or before the anniversary date of this permit and post these reports on the City's website. All information, data, and analyses shall be based on the State's fiscal year and include:

a. An executive summary on the status of implementing the City's MS4 programs that are established as permit conditions including:

i. Permit Administration;
ii. Legal Authority;
iii. Source Identification;
iv. Stormwater Management;
v. Erosion and Sediment Control;

vi. Illicit Discharge Detection and Elimination;
vii. Property Management and Maintenance;
viii. Public Education;
ix. Stormwater Restoration;
x. Citywide Stormwater TMDL Implementation Plan;
xi. Assessment of Controls; and
xii. Program Funding.

b. A narrative summary describing the results and analyses of data, including monitoring data that is accumulated throughout the reporting year;

c. Expenditures for the reporting period and the proposed budget for the upcoming year;

d. A summary describing the number and nature of enforcement actions, inspections, and public education programs;

e. The identification of water quality improvements and documentation of attainment and/or progress toward attainment of schedules, benchmarks, deadlines, and applicable stormwater WLAs developed under EPA approved TMDLs; and

f. The identification of any proposed changes to the City's program when stormwater WLAs are not being met.

2. All annual reporting specified in PARTs IV.C, D, E, F, and G, or required anywhere within this permit shall be made using the MS4 Geodatabase. A corresponding User's Guide provides guidance for data requirements and entry into the MS4 Geodatabase.

3. Because this permit uses an iterative approach to implementation, the City must continuously evaluate the effectiveness of its programs and report any modifications in each annual report.

B. Program Review

In order to assess the effectiveness of Baltimore City's NPDES stormwater program for reducing the discharge of pollutants to the MEP and working toward meeting water quality standards, the permittee will cooperate with the Department during the review of annual reports, field inspections, and periodic requests for additional data to determine permit compliance. Procedures for the review of local erosion and sediment control and stormwater management programs exist in Maryland State law and regulations. The Department may require additional evaluations and field inspections to be conducted for IDDE, property management and maintenance, assessment of controls, and impervious

surface area and Chesapeake Bay restoration to determine compliance with permit conditions.

C. Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than five years from the effective date unless administratively continued by the Department. In order to qualify for an administrative continuation of this permit beyond five years, Baltimore City must reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. Failure to reapply for coverage constitutes a violation of this permit and can lead to a lapse of permit coverage and subject any discharges that occur without permit coverage to enforcement action and penalties. All requirements of this permit must be completed within the five-year permit term. An administrative continuance does not extend or modify any of the completion dates as set forth in the permit; the administrative continuance only provides permit coverage to allow City discharges until a new NPDES permit is issued and effective. Once a new NPDES permit is effective the administrative continuance automatically expires.

As part of this application process, the City shall submit to the Department an executive summary of its NPDES stormwater management program that specifically describes how each City watershed has been thoroughly evaluated, and the status of implementing water quality improvement projects and all schedules, benchmarks, and deadlines toward meeting stormwater WLAs. This application shall be used to gauge the effectiveness of the City's NPDES stormwater program and will provide guidance for developing future permit conditions. The application summary shall include:

1. The City's NPDES stormwater program goals;

2. Program summaries for the permit term regarding:

    a. Illicit discharge detection and elimination results;

    b. Impervious Surface and Chesapeake Bay Restoration status including City totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting stormwater WLAs developed under EPA approved TMDLs;

    c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved; and

    d. Other relevant data and information for describing City programs;

3. Program operation and capital improvement costs for the permit term; and

4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the City's efforts to comply with the conditions of this permit.

PART VI. SPECIAL PROGRAMMATIC CONDITIONS

Maryland's baseline programs, including the 1991 Forest Conservation Act, 1997 Priority Funding Areas Act, 2007 Stormwater Management Act, 2009 Smart, Green & Growing Planning Legislation, 2010 Sustainable Communities Act, 2011 Best Available Technology Regulation, and the 2012 Sustainable Growth & Agricultural Preservation Act effectively mitigate the majority of the impacts from new development. Any additional loads will be offset through Maryland's Aligning for Growth policies and procedures as articulated through Chesapeake Bay milestone achievement. Baltimore City shall reflect these policies, programs, and implementation as part of its net WLA accounting as stipulated in Part IV.E.4.b.ii of this permit.

PART VII. ENFORCEMENT AND PENALTIES

A. Discharge Prohibitions and Receiving Water Limitations

Baltimore City shall prohibit non-stormwater discharges into, through, or from its MS4. NPDES permitted non-stormwater discharges are exempt from this prohibition. Discharges from the following will not be considered a source of pollutants when properly managed: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration to separate storm sewers; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation waters; springs; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; de-chlorinated swimming pool discharges (not including filter backwash); street wash water; and firefighting activities.

Consistent with §402(p)(3)(B)(iii) of the CWA, the City shall take all reasonable steps in compliance with the terms of this permit to minimize or prevent the contamination or other alteration of the physical, chemical, or biological properties of any waters of the State, including a change in temperature, taste, color, turbidity, or odor of the waters or the discharge or deposit of any organic matter, harmful organism, or liquid, gaseous, solid, radioactive, or other substance into any waters of the State, that will render the waters harmful to:

1. Public health, safety, or welfare;

2. Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial use;

3. Livestock, wild animals, domestic animals, or birds; and

4. Fish or other aquatic life.

B. Duty to Mitigate

Baltimore City shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

C. Duty to Comply

Baltimore City shall be responsible for complying with all conditions of this permit. Other entities may be used to meet various permit obligations provided that both the City and the other entity agree contractually, and that no stormwater restoration work for Chesapeake Bay or local TMDL stormwater implementation plans are double-counted. Regardless of any arrangement entered into however, the City remains responsible for permit compliance. In no case may this responsibility or permit compliance liability be transferred to another entity.

Failure to comply with a permit provision constitutes a violation of the CWA and State law and is grounds for enforcement action; permit termination, revocation, or modification; or denial of a permit renewal application. The City shall comply at all times with the provisions of the Environment Article, Title 4, Subtitles 1, 2, and 4; Title 7, Subtitle 2; and Title 9, Subtitle 3 of the Annotated Code of Maryland.

D. Proper Operation and Maintenance

The City shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the City to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the City only when the operation is necessary to achieve compliance with the conditions of the permit.

E. Sanctions

1. Penalties Under the CWA - Civil and Criminal

Section 309(g)(2) of the CWA, 33 USC §1319(g)(2) provides that any person who violates any permit condition is subject to a civil penalty not to exceed $10,000 per day for each violation, not to exceed $125,000. Pursuant to the Civil Monetary Penalty Inflation Adjustment Rule, 40 CFR Part 19, any person who violates any NPDES permit condition or limitation is liable for an administrative penalty not to exceed $16,000 per day for each such violation, up to a total penalty of $177,500. Pursuant to Section 309(c) of the CWA, 33 USC §1319(c), any person who negligently violates any permit condition is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. Any person who knowingly violates any permit condition is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both.

2. Penalties Under the State's Environment Article – Civil and Criminal

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the City from civil or criminal responsibilities and/or penalties for a violation of Title 4, Title 7, and Title 9 of the Environment Article, Annotated Code of Maryland, or any federal, local, or other State law or regulation. Section 9-342 of the Environment Article provides that a person who violates any condition of this permit is liable to a civil penalty of up to $10,000 per violation, to be collected in a civil action brought by the Department, and with each day a violation continues being a separate violation. Section 9-342 further authorizes the Department to impose upon any person who violates a permit condition, administrative civil penalties of up to $5,000 per violation, up to $50,000.

Section 9-343 of the Environment Article provides that any person who violates a permit condition is subject to a criminal penalty not exceeding $25,000 or imprisonment not exceeding 1 year, or both for a first offense. For a second offense, Section 9-343 provides for a fine not exceeding $50,000 and up to 2 years imprisonment.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who knowingly makes any false statement, representation, or certification in any records or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than 2 years per violation, or both.

F. Permit Revocation and Modification

1. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by Baltimore City for a permit modification or a notification of planned changes or anticipated noncompliance does not stay any permit condition. A permit may be modified by the Department upon written request by the City and after notice and opportunity for a public hearing in accordance with and for the reasons set forth in COMAR 26.08.04.10 and 40 CFR §§122.62, 122.63, 122.64, and 124.5.

After notice and opportunity for a hearing and in accordance with COMAR 26.08.04.10, the Department may modify, suspend, or revoke and reissue this permit in whole or in part during its term for causes including, but not limited to the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. A change in any condition that requires either a temporary reduction or elimination of the authorized discharge;

d. A determination that the permitted discharge poses a threat to human health or welfare or to the environment and can only be regulated to acceptable levels by permit modification or termination;

e. To incorporate additional controls that are necessary to ensure that the permit effluent limit requirements are consistent with any applicable TMDL WLA allocated to the discharge of pollutants from the MS4; or

f. As specified in 40 CFR §§122.62, 122.63, 122.64, and 124.5.

2. Duty to Provide Information

The City shall furnish to the Department, within a reasonable time, any information that the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit. The City shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

G. Inspection and Entry

Baltimore City shall allow an authorized representative of the State or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulatory activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and obtain copies at reasonable times of any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times, without prior notice, any construction site, facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

H. Monitoring and Recordkeeping

Unless otherwise specified by this permit, all monitoring and records of monitoring shall be in accordance with 40 CFR §122.41(j).

I. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State or local law or regulations.

J. Severability

The provisions of this permit are severable. If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and

effect. If the application of any provision of this permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

K. Signature of Authorized Administrator and Jurisdiction

Each application, report, or other information required under this permit to be submitted to the Department shall be signed as required by COMAR 16.08.04.01-1. Signatories shall be a principal executive officer, ranking elected official, or other duly authorized employee.

D. Lee Currey,
Director
Water and Science Administration

Date

Appendix A
EPA Approved Total Maximum Daily Loads (TMDLs)
Baltimore City

This NPDES permit requires Baltimore City to submit an annual TMDL assessment report evaluating the effectiveness of the City's restoration plans and progress made in achieving compliance with EPA approved TMDLs. Similarly, by regulation at 40 CFR §122.44, EPA further requires that stormwater controls and programs implemented pursuant to this NPDES permit be consistent with applicable stormwater wasteload allocations (WLAs) developed under any approved TMDLs. The following is a list of approved TMDLs applicable to Baltimore City:

TMDL Report	Location	Impairment	Year
Back River Chlordane	8 Digit WS 02130901 / Back River	Chlordane	1999
Back River Nutrients	8 Digit WS 02130901 / Back River	Nitrogen	2005
	8 Digit WS 02130901 / Back River	Phosphorus	2005
Back River PCBs	Segmentshed BACOH / Back River Oligohaline	PCBs	2012
Back River Sediment	8-Digit WS 02130901 / Back River	TSS	2018
Baltimore Harbor Chlordane	8 Digit WS 02130903 / Baltimore Harbor	Chlordane	2001
Baltimore Harbor PCBs	Subsegment of 8 Digit WS 02130903 / Curtis Creek	PCBs	2012
	Subsegment of 8 Digit WS 02130903 / Baltimore Harbor (including loads from Bear Creek and Curtis Creek)	PCBs	2012
Baltimore Harbor Tidal Nutrients	Multiple 8 Digit WS / Baltimore Harbor	Nitrogen	2007
	Multiple 8 Digit WS / Baltimore Harbor	Phosphorus	2007
Baltimore Harbor Trash	Sub-Segment of 8 Digit WS 02130903 / Baltimore Harbor	Trash	2015
	8 Digit WS 02130904 / Jones Falls	Trash	2015
	8 Digit WS 02130905 / Gwynns Falls	Trash	2015
Gwynns Falls Bacteria	Subsegment of 8 Digit WS 02130905 / Gwynn's Falls	*E.coli*	2007
Gwynns Falls Sediment	8 Digit WS 02130905 / Gwynn's Falls	TSS	2010
Herring Run Bacteria	Subsegment of 8 Digit WS 02130901 / Herring Run	*E.coli*	2007
Jones Falls Bacteria	Subsegment of 8 Digit WS 02130904 / Jones Falls	*E.coli*	2008
Jones Falls Sediment	8 Digit WS 02130904 / Jones Falls	TSS	2011
Lake Roland PCBs	Subsegment of 8 Digit WS 02130904 / Lake Roland	PCBs	2014
Patapsco River Lower North Branch Bacteria	8 Digit WS 02130906 / Patapsco River Lower North Branch	*E.coli*	2009
Patapsco River Lower North Branch Sediment	8 Digit WS 02130906 / Patapsco River Lower North Branch	TSS	2011

TMDL Report	Location	Impairment	Year
The Chesapeake Bay TMDL	Segmentshed BACOH / Back River Oligohaline	Nitrogen	2010
	Segmentshed PATMH / Patapsco River Mesohaline	Nitrogen	2010
	Segmentshed BACOH / Back River Oligohaline	Phosphorus	2010
	Segmentshed PATMH / Patapsco River Mesohaline	Phosphorus	2010
	Segmentshed BACOH / Back River Oligohaline	TSS	2010
	Segmentshed PATMH / Patapsco River Mesohaline	TSS	2010

Appendix B
Year 1 BMP Portfolio

BMP NAME	BMP TYPE[1]	NUMBER of BMPs	IMPERVIOUS ACRES	LENGTH RESTORED (feet)/ LANE MILES (miles)/ MASS LOADING (lbs)[3]
Annual Practices – Obligations from Prior Permit to be Continued				
Street Sweeping	VSS	1	5,475	80,187
Catch Basin Cleaning	CBC	1,128	226	556
Annual Practices – New Restoration				
Street Sweeping	VSS	1	1,247[2]	15,029
Capital Projects				
Impervious Surface Reduction	IMPP	14	3.4	N/A
Stream Restoration	STRE	1	254	12,700
Other				
Elimination of Nutrient Discharges	IDDE	TBD	152	N/A

Notes:

1. BMP types are from the MS4 Geodatabase.
2. Street sweeping is an annual practice that is averaged over the 5-year permit term. This level of effort will need to continue to maintain the restoration reported in Year 1.
3. N/A = not applicable (BMPs with no associated length, lane miles, or mass loading metric).

Column Descriptions

- BMP NAME: Unique ID or name of project.
- BMP TYPE: Type of restoration BMP. BMP types and classes from the MS4 Geodatabase (see table below). Additional BMP types (e.g., IDDE) from the 2020 Accounting Guidance may also be used.
- NUMBER OF BMPS: The number of restoration BMPs present. If a project has multiple types of a single BMP, the amount is identified in the Number of BMPs column. If using septic pumping or denitrification, the number of affected septic systems is reported in this column.
- IMPERVIOUS ACRES: Impervious acres treated, using the 2020 Accounting Guidance for new restoration.
- LENGTH RESTORED (feet)/ LANE MILES (miles)/ MASS LOADING (lbs): Length of stream restoration, outfall stabilized, or shoreline stabilized/ lane miles swept/ pounds of material removed as a part of inlet cleaning.

Appendix C

BMP TYPE Definitions

BMP TYPE CODE	BMP TYPE
Alternative Surfaces (A)	
AGRE	Green Roof – Extensive
AGRI	Green Roof – Intensive
APRP	Permeable Pavements
ARTF	Reinforced Turf
Nonstructural Techniques (N)	
NDRR	Disconnection of Rooftop Runoff
NDNR	Disconnection of Non-Rooftop Runoff
NSCA	Sheetflow to Conservation Areas
Micro-Scale Practices (M)	
MRWH	Rainwater Harvesting
MSGW	Submerged Gravel Wetlands
MILS	Landscape Infiltration
MIBR	Infiltration Berms
MIDW	Dry Wells
MMBR	Micro-Bioretention
MRNG	Rain Gardens
MSWG	Grass Swale
MSWW	Wet Swale
MSWB	Bio-Swale
MENF	Enhanced Filters
Ponds (P)	
PWED	Extended Detention Structure, Wet
PWET	Retention Pond (Wet Pond)
PMPS	Multiple Pond System
PPKT	Pocket Pond
PMED	Micropool Extended Detention Pond
Wetlands (W)	
WSHW	Shallow Marsh
WEDW	ED – Wetland
WPWS	Wet Pond – Wetland
WPKT	Pocket Wetland
Infiltration (I)	
IBAS	Infiltration Basin

ITRN	Infiltration Trench
Filtering Systems (F)	
FBIO	Bioretention
FSND	Sand Filter
FUND	Underground Filter
FPER	Perimeter (Sand) Filter
FORG	Organic Filter (Peat Filter)
FBIO	Bioretention
Open Channels (O)	
ODSW	Dry Swale
OWSW	Wet Swale
Other Practices (X)	
XDPD	Detention Structure (Dry Pond)
XDED	Extended Detention Structure, Dry
XFLD	Flood Management Area
XOGS	Oil Grit Separator
XOTH	Other
Alternative BMPs	
MSS	Mechanical Street Sweeping
VSS	Regenerative/Vacuum Street Sweeping (i.e., Advanced Street Sweeping)
IMPP	Impervious Surface Reduction (i.e., impervious to pervious)
IMPF	Impervious Surface to Forest (i.e., IMPP + FPU)
FPU	Forestation on Pervious Urban (i.e., Forest Planting)
CBC	Catch Basin Cleaning
SDV	Storm Drain Vacuuming
STRE	Stream Restoration
OUT	Outfall Stabilization
SHST	Shoreline Management
SPSC	Step Pool Stormwater Conveyance System
SPSD	Dry Channel Regenerative Step Pool Stormwater Conveyance System
SEPP	Septic Pumping
SEPD	Septic Denitrification
SEPC	Septic Connections to WWTP
XFTW	Floating Treatment Wetland
FCO	Forest Conservation
CLTM	Conservation Landscaping
RCL	Riparian Conservation Landscaping
RFP	Riparian Forest Planting

STCI	Street Tree
USRP	Urban Soil Restoration (Compacted Pervious Surfaces)
USRI	Urban Soil Restoration (Removed Impervious Surfaces)
UTC	Urban Tree Canopy (i.e., Pervious Turf to Tree Canopy over Turf)
IDDE	Elimination of Discovered Nutrient Discharges from Grey Infrastructure
OTH	Other

From: "Karl Berger" <kberger@mwcog.org>
Sent: Tue, 18 Aug 2020 11:48:28 +0000
To: "DeHan, Jeffrey M." <jmdehan@co.pg.md.us>; "Stevens, Amy" <amy.stevens@montgomerycountymd.gov>; "Robert Hirsch" <rhirsch@baltimorecountymd.gov>; "Bennett, Katherine" <kate.bennett@montgomerycountymd.gov>; "Grove, Kimberly (DPW)" <Kimberly.Grove@baltimorecity.gov>; "Erik Michelson (pwmich20@aacounty.org)" <pwmich20@aacounty.org>; "Dawson, Frank" <Frank.Dawson@montgomerycountymd.gov>; "Maldonado, Jerry G." <jgmaldonado@co.pg.md.us>; "Shannon Moore" <SMoore@FrederickCountyMD.gov>; "Christine Buckley" <cmbuckley@harfordcountymd.gov>; "DeMarzo, Lindsay" <LDemarzo@howardcountymd.gov>; "Karen D. Wiggen" <WiggenK@charlescountymd.gov>; "Devilbiss, Thomas S." <tdevilbiss@ccg.carr.org>
Cc: "Janis Markusic" <pwmark02@aacounty.org>; "Alex Butler" <abutler@mdcounties.org>; "White, Joan (DPW)" <Joan.White@baltimorecity.gov>; "Nathan Forand" <nforand@baltimorecountymd.gov>; "William C. Merrey" <wmerrey@baltimorecountymd.gov>; "Don Dorsey" <ddorsey1@frederickcountymd.gov>; "Joiner, Jeremy" <JJoiner@FrederickCountyMD.gov>; "Richmond, Mark S" <msrichmond@howardcountymd.gov>; "Lowe, Christine" <cslowe@howardcountymd.gov>; "Mishra, Sudhanshu" <SPMishra@co.pg.md.us>; "ProctorP@CharlesCountyMD.gov" <ProctorP@CharlesCountyMD.gov>; "Heyn, Chris" <cheyn@carrollcountymd.gov>; "Heidi Bonnaffon" <hbonnaffon@mwcog.org>
Subject: Transmission of letter
Attachments: MACo MS4 Letter to MDE 8-17-20.pdf

MS4 managers,

The attached correspondence was sent via email to Secretary Grumbles yesterday and copied to EPA Region 3 Administrator Cosmo Servidio and Lee Currey.

Thanks to Alex Butler for processing this correspondence in a timely manner.

As far as next steps for the group, we should decide on a meeting schedule and the topics for at least the first meeting – and then communicate those to MDE.

Individual members of the group may also want to emphasize the points in the letter in your discussions with MDE.

Karl Berger
Principal Environmental Planner
Metropolitan Washington Council of Governments
202-962-3350

MARYLAND Association of COUNTIES

August 17, 2020

Benjamin H. Grumbles
Secretary of the Environment
Montgomery Park Business Center
1800 Washington Blvd.
Baltimore, MD 21230

Secretary Grumbles:

The Maryland Association of Counties (MACo) is providing the following comments, based on input from county stormwater technical managers, on the Maryland Department of the Environment's (MDE's) most recent drafts for the five largest Phase I Municipal Separate Storm Sewer System (MS4) permits.

MACo is a nonpartisan organization that represents all 23 of Maryland's counties and Baltimore City. For the past several years, both MACo and Maryland's Phase I MS4 managers have worked in partnership with MDE to address the challenge of drafting the 5th generation of Phase I stormwater permits. These managers have formed a workgroup under the auspices of MACo, with the coordination of staff from the Metropolitan Washington Council of Governments.

Although the draft permits that were sent to EPA in late June directly address Anne Arundel, Baltimore, Montgomery and Prince George's counties and Baltimore City, the group assumes that they represent a template for all 10 of the municipal Phase I permits. Thus, these comments detail the concerns of the entire group.

The group has three major concerns with these June 24 drafts, as detailed below, as well as several other issues. Note that these comments do not represent either every single group concern or all of the concerns of individual group members.

In addition, the group intends to resume a pattern of regular meetings, to which it will invite MDE staff to attend. It also hopes to meet with MDE in September, as recently suggested by Water and Science Administration Director Lee Currey.

Group concerns with the proposed permit conditions

1. Restoration acreage targets under Section Part IV. E (Stormwater Restoration)

   We would like to jointly know how MDE arrived at the impervious acreage restoration (IAR) acreage totals in each permit since these numbers are not uniform across the five permits and

169 Conduit Street, Annapolis, MD 21401
410.269.0043 BALT/ANNAP ◆ 301.261.1140 WASH DC ◆ 410.268.1775 FAX
www.mdcounties.org

impervious acre implementation requirement according to the annual restoration benchmark schedule provided in Table 1." But Part IV.E.8.b allows the permittee to "Update its annual restoration benchmark schedule (Table 1)" annually. We recommend that MDE modify the permit language to allow jurisdictions to both establish and adjust (as needed) their benchmarks.

3. Force majeure or similar language
   As has been noted in previous dialogue between some of the Phase I jurisdictions and MDE, inclusion of a contingency clause in the permit would provide the jurisdictions with some assurance that the uncertain future impacts of the current coronavirus pandemic will not leave them in an untenable situation and facing enforcement from MDE or third parties. The As noted previously, the MEP-based portfolios from which MDE has derived the IAR metric were all developed in September of 2019 and last modified in early March of this year, prior to the knowledge of any impacts caused by the pandemic.

   The jurisdictions understand that per the language in Section IV.H: "Lack of funding does not constitute a justification for noncompliance with the terms of this permit." However, current circumstances are unprecedented in the history of the Phase I stormwater permit program. Uncertainty about local government budgets, including utility fee-based budgets and the ability of ratepayers to pay fees, is extremely high and unlikely to lessen between now and the end of 2020, when these permits are due to be finalized.

   We request that MDE modify the permit language, similar to the following language from Virginia's Phase I permits:

   "In the event the permittee is unable to meet conditions of this state permit due to circumstances beyond the permittee's control, a written explanation of the circumstances that prevented permit compliance shall be submitted to the Department in the annual report. Circumstances beyond the permittee's control may include abnormal climatic conditions; weather conditions that make certain requirements unsafe or impracticable; or unavoidable equipment failures caused by weather conditions or other conditions beyond the reasonable control of the permittee (operator error and failure to properly maintain equipment are not conditions beyond the control of the permittee). The failure to provide adequate program funding, staffing or equipment maintenance shall not be an acceptable explanation for failure to meet permit conditions. The Board will determine, at its sole discretion, whether the reported information will result in an enforcement action. In addition, the permittee must report noncompliance which may adversely affect surface waters or endanger public health in accordance with Part II.I." (The "Board" is the Virginia State Water Control Board.)

4. Limited opportunity for review and feedback on key aspects of the draft permit
   An overarching concern of our group is that the Restoration Section of the draft permits contains significant changes from previous discussions with MDE and an IAR metric that is

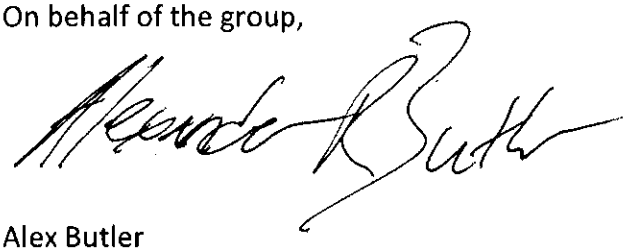
have to continue to do so for the foreseeable future, online group meetings can and should take the place of the prior regular in-person group meetings.

Both individual and group meetings are worthwhile, whether discussing new permit policy or implementation issues with current permits. Policy options, regulatory guidance and examples of how to calculate and report restoration progress are all examples of issues in which all permittees are interested and that would serve MDE's interest to define consistently for the group. The group has questions about the December 2019 version of the Accounting Guidance that have never been addressed, as well as new questions about the new June 2020 version; group meetings to address these concerns were requested by the group, but never held.

We intend to develop a new regular schedule of meetings in which we hope MDE staff can participate. For the foreseeable future, these will be virtual meetings, which recent experience has shown can be just as productive as in-person meetings when organized the right way.

MACo appreciates the opportunity to comment on the draft permits prior to the issuance of tentative determination drafts. We hope you consider these comments in the constructive manner in which they are intended.

On behalf of the group,



Alex Butler
Policy Associate
MACo

Cc: Lee Currey, Director, Water and Science Administration
Cosmo Servidio, Administrator, Environmental Protection Agency Region 3