



TECHNICAL MEMORANDUM #3

TO: Applicants and Designers for State and Federal Projects

FROM: Sediment and Stormwater Plan Review Division
Water Management Administration

DATE: October 17, 2016

SUBJECT: **Stormwater Management and Erosion and Sediment Control Review and Approval Process for State/Federal MS4 Restoration Projects**

The Sediment and Stormwater Plan Review Division reviews and approves stormwater management and erosion and sediment control plans for State and federal applicants. In response to stormwater restoration requirements being established in National Pollutant Discharge Elimination System (NPDES), municipal separate storm sewer systems (MS4) permits, State and federal entities are actively undertaking restoration projects throughout Maryland. The objective of this technical memo is to outline in detail the Plan Review Division's expectation for MS4 Restoration Projects and attain consistency between designers and reviewers alike, thereby facilitating an expeditious approval of these projects.

Restoration projects are generally limited to the construction of new best management practices (BMPs) or the retrofit of existing structures and have no associated development or increases in impervious area. Because there is no associated development, there is no stormwater management (SWM) requirement. The management being provided is discretionary. The goal is to treat existing imperviousness for water quality, which is considered to be the first inch of rainfall, and does not include channel protection or recharge. Unless a restoration project is changing the discharge point(s) or being designed to correct an existing erosion or flooding problem, quantity management should not be a concern.

The plan submitted to MDE will be reviewed for sediment control like any other project disturbing more than 5000 square feet or 100 cubic yards. With regard to stormwater management, the BMPs will be reviewed for consistency with MDE's design criteria for structural practices in Chapter 3 of the *2000 Maryland Stormwater Design Manual* and environmental site design (ESD) practices in Chapter 5. Additionally, established design clarifications from the Plan Review Division are expected to be followed, the most notable relating to grass swales, submerged gravel wetlands, and surface storage. The designer needs to calculate how much rainfall (P_E) is treated by each practice based on the characteristics of the drainage area, the size of the facility, and the criteria for the type of practice.

The design calculations, including storage volume, impervious area (A_i) treated, and achieved P_E ,

will be checked by the Plan Review Division. The Plan Review Division will document the amount of treatment (P_E and A_i) being attained by each BMP on the approval letter. When an existing BMP is being retrofitted or replaced, the previous treatment levels will also be recorded on the approval letter. The Plan Review Division does not assess MS4 credits.

It is the applicant's responsibility to submit MS4 permit reporting requirements separately to the Program Review Division in MS4 Annual Reports. The total maximum daily load (TMDL)/MS4 credits are established by the Program Review Division and are based on the Chesapeake Bay Program efficiencies. (Refer to "Accounting for Stormwater Wasteload Allocations and Impervious Areas Treated" on MDE's website). Generally, credit will be given for all impervious area in the drainage area to the BMP where 1 inch of rainfall is adequately treated for water quality. If less than 1 inch rainfall treatment is provided, partial credit for impervious area treated will be given for the drainage area. The maximum credit that can be attributed to a BMP is not limited to 1 inch of rainfall. State and federal applicants may receive TMDL/MS4 credit for treating impervious surfaces that are not owned by the applicant but drain into the applicant's BMP. However, the applicant must have an agreement with the municipality or third party if the applicant will be receiving treatment credit for impervious surface owned by others. The applicant and the municipality or third party cannot both take TMDL/MS4 credit for treatment of the same impervious surface.

Design and Review Notes

MS4 Restoration Projects are required to meet applicable standards set forth by the *Maryland Stormwater Management and Erosion & Sediment Control Guidelines for State and Federal Projects, February 2015*, specifically those contained within Section 4.3 Specific Design Criteria, Section 6.0 Erosion/Sediment Control Criteria, Section 7.0 Plans, Section 8.0 After Plan Approval, Section 9.0 Maintenance, and Section 10.0 Additional Approvals. To facilitate sediment and stormwater review and approval, the expected application of particular standards is outlined below:

1. The applicant may elect to combine concept, site-development, and final submissions into a single submission. However, concept approval is still required for all projects even if only a formality.
2. A brief narrative describing the restoration project and the proposed BMPs must accompany the plan submission. The narrative must state that the water quality attained from the project will be applied toward meeting MS4 restoration conditions. Water Quality Summary Sheets are not necessary for MS4 restoration projects. Waiver applications should not be submitted. Waivers are requested when development occurs without stormwater management, whereas for MS4 restoration projects, management is being provided without development.
3. The SWM report must include drainage area maps delineating the contributory area to the proposed BMP outfalls under both existing and proposed conditions.
4. With the exception of Chapter 5 ESD practices designed off-line, hydraulic and hydrologic calculations are required for the proposed drainage area to the BMP to determine the 10-year water surface elevation, freeboard, and pipe sizing and to evaluate discharges for erosion.
5. The treated (or "achieved") P_E must be calculated for each BMP. The P_E is a function of the storage provided above the media. The voids in the media are not to be considered part of the provided storage. Generally, the required surface storage is 75% of the ESD volume. The use of the "Surface Storage Volume Tables for Bioretention, Bioswales, Rain Gardens,

and Landscape Infiltration” is not encouraged but is acceptable for TMDL/MS4 BMPs when Maryland State Highway Administration (SHA) Bioretention Soil Mix (BSM) is specified.

$$\text{achieved } P_E = (\text{effective } ESD_v)(12\text{in/ft})/(A)(R_v)$$

where the effective ESD_v = either the physical surface storage volume/0.75 or the ESD_v from the surface storage tables

6. For BMPs with filter beds, the filter bed should be provided under the full surface of the BMP, however if, for some justifiable reason, 100% coverage is not possible, the ponding surface area may be increased beyond the filter media surface area to increase the storage volume for a bioretention facility. In these cases, the total provided surface storage should be at least 75% ESD_v with a minimum of 50% ESD_v directly above the filter area, the storage within the media voids should be at least 40% ESD_v , and the surface area at top of the ponding elevation may not be more than twice the size of the surface area of the filter media.
7. A comparative hydrologic analysis between existing discharges and proposed is not required when it is readily apparent that the new BMP will not adversely alter the quantity of flow downgrade of the BMP or create an erosion problem. For example, if a closed storm drain system receives flow from the drainage area to the BMP in both existing and proposed conditions, there is no need to evaluate the impact the BMP will have on the quantity of flow to the system. A hydrologic and hydraulic analysis may be required when a new outfall is being created and will be required for existing and proposed conditions when the BMP is a Code 378 pond.
8. It is recommended that BMPs be designed off-line whenever possible.
9. Pretreatment is encouraged but only required where specified by the Design Manual.
10. Outfalls from the BMPs must be designed to have non-erosive discharges. Additionally, any increases in discharge onto an adjacent property will not be approved without written consent from the owner of that property.
11. The stormwater management plans need to include, at a minimum, a plan view of the BMP, cross sections, full construction details and notes, material specifications, maintenance schedules, as-built tabulations, and an as-built certification.
12. A planting or landscaping plan is required for vegetated BMPs.
13. Soils investigations should be performed to determine depth to groundwater and infiltration suitability as needed.
14. The minimum depth of the soil media for micro-bioretention and bioretention is 24 inches. In extenuating circumstances and on a case by case basis, MDE may allow the media depth to be reduced to 18 inches for TMDL/MS4 BMPs.
15. Proposed BMPs that have a drainage area larger than 0.5 acre and use an embankment for impounding water will be required to meet design and construction criteria for embankments from the Natural Resource Conservation Service (NRCS) Small Pond Code 378 or Chapter 3 of the Design Manual as applicable and illustrated by MDE’s flowchart titled “Applicability of MD Pond Code 378.”
16. When retrofitting an existing BMP with an embankment and a proposed drainage area larger than 0.5 acre, MDE’s April 2015 guidance “Embankment Retrofit Design” needs to be followed. Making water quality enhancements to an existing pond or BMP with an embankment requires structural considerations.
17. Channel protection, recharge, or control of larger storms is not required for TMDL/MS4 restoration projects. However, when retrofitting existing BMPs, peak discharge rates for

- the 1, 2, 10, and 100 year storms should not be increased from existing conditions. Any quality or quantity management being provided by the BMP in existing conditions must be enhanced or, at a minimum, maintained.
18. An erosion and sediment control plan with site specific sediment controls for the proposed limit of disturbance as well as all of the standard items and a sequence of construction needs to be provided. The use of clear water diversions around the work area is often necessary.
 19. For MS4 restoration projects, MDE encourages, but does not require, the applicant to include utility locations on the plans. If, after approval, utilities, whose locations were not shown on the stormwater management plan, are found within the limit of disturbance, plans must be submitted to MDE showing the locations of the utilities. The applicant will need to apprise MDE of the proposed course of action and whether the applicant intends to proceed with the approved design, modify the approved design, or abandon the design. Please note that MDE strongly discourages having any utilities within the footprint of the BMP and will not allow utilities, existing or new, to run through the embankment of a BMP. Any resulting changes to the approved plans will require MDE approval. The MDE plan modification process is outlined in the Guidelines.
 20. After construction, certified as-built drawings must be completed and submitted to MDE for acceptance.

Approval

The concept and final approval letters will include a statement summarizing the proposed management. Approvals for TMDL/MS4 retrofits will be worded accordingly. Examples include:

"The purpose of this project is MS4 Restoration. The proposed bio-retention facility will treat x acres of impervious area for y inch of rainfall."

"The purpose of this project is MS4 Restoration. The proposed rain garden will treat x acres of impervious area for y inch of rainfall. The rain garden replaces a rooftop disconnection that treated z acres of impervious area for w inch of rainfall."

"The purpose of this project is MS4 Restoration. The proposed retrofitted wet pond replaces an existing, [operative/inoperative] infiltration facility that treated 0.6 acres of impervious for ½ inch. The wet pond treats 1.1 acres of impervious for a P_E of 1.2 inches. 0.7 acres is on the applicant's property; the remaining 0.4 acres of the impervious area is located off-site in Baltimore County."

Questions about this information or other items relating to sediment and stormwater plans can be directed to Amanda Malcolm amanda.malcolm@maryland.gov or Matthew Keenan matthew.keenan@maryland.gov.