8/5/16

Maryland Department of the Environment (MDE)

Wetlands and Waterways Program

Guidelines for the Permitting of MS4/Chesapeake Bay TMDL-related Restoration Projects

Summary of Maryland Department of the Environment Policies (from September 14, 2015 Grumbles Policy Memo and Subsequent Clarifying Discussions)

- MDE committed to a 90 day turnaround for MS4/Chesapeake Bay TMDL-related restoration project applications for most projects. The exceptions would be for those projects which require public notice, projects which cause an increased risk of flooding on adjacent property, or projects that have significant RTE or MHT concerns.
    - Where projects require public notice, or require consultation with DNR or MHT , the turnaround time for MS4/Chesapeake Bay TMDL-related restoration projects is increased by 60 days (to a total of 150 days), assuming that the comments do not raise significant concerns which require additional data or analyses. Applicants are encouraged to conduct screening for RTE or MHT resources prior to submission of a permit application to facilitate the 90 day turnaround on such applications
    - Where projects are expected to cause an increased risk of flooding (i.e., greater than a 0.1 foot rise) on adjacent properties, applicants must provide all adjacent property owner consent at the time of application in order to ensure a 90 day turnaround. Otherwise, MDE cannot ensure a 90 day turnaround.
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- MDE further agreed that it would accept the results of existing comprehensive assessments of the problems within county jurisdictions in the context of the Chesapeake Bay TMDL as meeting the requirement for an "alternative site analysis". The existing comprehensive assessment needs to be referenced in the application for an approval to conduct an MS4/Chesapeake Bay TMDL-related restoration project, and, the page(s) in the comprehensive assessment which list/ identify the targeted restoration site should be attached.
- **MDE agreed that the need for stream restoration or other aquatic resource enhancement needs to be adequately documented.**
- **MDE agreed that MS4/Chesapeake Bay TMDL-related restoration projects must be designed to provide functional uplift in order for MDE to determine that there is no need for mitigation.**

Guidelines

The MS4/Chesapeake Bay TMDL-related restoration projects are designed to result in a net increase (i.e., environmental benefit) in aquatic resource functions and/or services, as compared to, for example, development projects that typically result in some overall decrease in stream and/or wetland functions and/or services (i.e., environmental detriment) at the development site. MDE acknowledges this important distinction and has factored this distinction into these guidelines for the permitting of MS4/ Chesapeake Bay TMDL-related restoration projects, including the decision to reduce/eliminate mitigation requirements where a restoration project has been determined by MDE to provide functional uplift (i.e., environmental benefit) COMAR 26.23.04.02B(4). MDE's streamlining of "restoration project permitting" should allow MDE to better focus its available and constrained resources on the review of applications for development projects, projects that generally result in some degradation of aquatic resource functions or services.

1. Documenting that the project is a TMDL Project and that there is a Need for Restoration

MDE's September 15, 2015 Policy requires that applicants for MS4/Chesapeake Bay TMDL-related restoration projects document the need for stream restoration or other aquatic resource improvement. Some examples of Chesapeake Bay TMDL-related restoration projects include stream restoration actions such as adding sinuosity to straightened channels, applying natural channel design, providing stream habitat enhancement such as placing large woody debris, and/or reconnecting the stream to its floodplain. An applicant for a permit to implement a Chesapeake Bay TMDL-driven restoration or enhancement project must include information that documents that the restoration project is part of acceptable watershed strategy, such as the Chesapeake Bay TMDL WIP.

Chesapeake Bay TMDL-related **stream** restoration projects

The current conditions of each stream reach where restoration or enhancement projects are proposed must be assessed and meet the following stream degradation criteria for both the existing biological function-based parameter AND the existing geomorphology/hydraulic function-based parameter. Applicants must include documentation (e.g., photographs and data sheets from field assessments) demonstrating that the following stream degradation criteria have been met:

A. **Perennial Streams:**

1. **Biological Function-Based Parameter**: A Benthic Index of Biotic Integrity (BIBI) score of fair or worse (i.e., BIBI score of 50% or less); **AND**

2. **Geomorphology/Hydraulic Function-Based Parameter**: Documentation of existing stream conditions for at least one of the following:

a) **Lateral Stability**: Geomorphic evidence of active, widespread lateral erosion (e.g., Bank Erosion Hazard Index/Near Bank Stress score of Moderate/Moderate or higher or an annual bank erosion); **OR**

b) **Floodplain Connectivity (Vertical Stability)**: Evidence of floodplain disconnection throughout the reach (e.g., bank height ratio, entrenchment ratio, stage/Q relationship, Hydrologic Engineering Center River Analysis System or other hydraulic model); **OR**

c) **Other**: Other appropriate, approved metric that demonstrates water quality impairment and stream stability degradation of the project reach.

B. **Intermittent Streams:**

1. **Biological Function-Based Parameter**: A Modified EPA Rapid Bioassessment Protocol Habitat Assessment score of marginal to poor; **AND**

2. **Geomorphology/Hydraulic Function-Based Parameter**: Documentation of existing stream conditions for at least one of the following:

a) **Lateral Stability**: Geomorphic evidence of active, widespread lateral erosion (e.g., Bank Erosion Hazard Index/Near Bank Stress score of Moderate/Moderate or higher or an annual bank erosion rate of greater than 0.1 foot/year); **OR**

b) **Floodplain Connectivity (Vertical Stability):** Evidence of floodplain disconnection throughout the reach (e.g., bank height ratio, entrenchment ratio, stage/Q relationship, Hydrologic Engineering Center River Analysis System or other hydraulic model); **OR**

c) **Other**: Other appropriate, MDE-acceptable metric that demonstrates water quality impairment and stream stability degradation of the project reach.

Other Bay TMDL-related **aquatic resource** restoration projects (e.g., restoration or enhancement of non tidal wetlands or ponds)

The current conditions of other aquatic resources (e.g., non tidal wetlands) where restoration or enhancement projects are proposed must be assessed and meet a biological function-based indicator of degradation (e.g., changes in plant communities in a forested non tidal wetland that has been cut off from the floodplain) and a geomorphological/hydraulic function-based indicator of degradation. Applicants must include documentation (e.g., photographs and data sheets from field assessments) demonstrating that degradation criteria have been met.

2. Documenting the Overall Functional Uplift or Expected Benefits of the Project to the Aquatic System

MDE agreed in its September 15, 2015 Policy memo that projects must be designed to provide functional uplift (i.e., environmental benefit) to the aquatic system in order for MDE to determine that there is no need for mitigation. MDE defines functional uplift in this context as a "measureable improvement of physical, chemical, and/or biological aquatic resource functions and/or services between existing and proposed conditions as a result of a restoration or enhancement activity at the **project site**."

Applicants should describe and document the proposed actions to be taken to restore or enhance aquatic resource functions and/or services at the project site and document the expected improvement in aquatic resource functions and/or services at the site. MDE recognizes that functional uplift of aquatic resources at a restoration project site may necessarily involve some conversions of wetlands and/or streams to uplands, some conversions of wetland community types, some conversions of streams to open waters or wetlands, some converstion or loss of streamside forest cover and/or some conversions of wetlands to other aquatic habitat type. Applicants must quantify and document, to the extent practicable, the nature and extent of expected conversions associated with the restoration or enhancement project. In the permitting of these restoration or enhancement projects, MDE will operate under the presumption that compensatory mitigation will **not be** required in these circumstances, provided that: (1) the applicant demonstrates (and MDE agrees) that there will be a net increase in aquatic resource functions and/or services at the project site (i.e., environmental benefit), and, (2) any conversions that do occur will **not** exceed the Conversion Thresholds as defined under the Corps of Engineers Bay TMDL RGP (July 1, 2015), and will not result in impacts to non tidal wetlands of special state concern.

For situations where expected conversions associated with a MS4/Chesapeake Bay TMDL-related restoration project exceed the Corps Bay TMDL RGP conversion thresholds, MDE affirms that if the applicant is able to document (and MDE agrees) that there is a functional uplift to the aquatic resource between the existing and proposed conditions at the project site, that such projects will not require mitigation for conversions above the Corps conversion thresholds, PROVIDED that the applicant demonstrates (and MDE agrees) that there is no practicable option that achieves the same or substantially similar degree of functional uplift with a lesser degree of conversions. Absent such a demonstration, MDE may, on a case-by-case basis, require mitigation.

Applicants should quantify to the extent practicable the restoration or enhancement potential and the design objectives and approach, and document the expected environmental gains associated with the proposed restorative actions. It is important for applicants to quantify as much as practicable and to describe as fully as practicable the degree and nature of expected improvements in aquatic resource functions and services between the existing and proposed conditions (i.e., the environmental benefits). This is particularly important where restoration involves the removal of a substantial amount of forest or tree cover and the potential loss of benefits, particularly thermal benefits to streams, such forest cover may provide.

This analysis and the documentation of this analysis is important in order for MDE to support its determination that compensatory mitigation is not required for an MS4/Chesapeake Bay TMDL-related restoration project that results in a net increase in aquatic resource functions and services (i.e., environmental benefit) at a project site.

Case Study #1

Determining Functional Uplift/Net Gain of Resources and/or Functions at the Project Site

Stream restoration projects must have documented functional aquatic resource uplift at the project site in order for MDE to eliminate mitigation.

Brief Characterization of Stream Condition

Stream Z is an intermittent stream surrounded by a narrow wooded floodplain, with narrow fringe nontidal wetlands. This stream has been identified in the Watershed Improvement Plan (WIP) as a stream that is contributing sediment and P to downstream waters. The stream has a BIBI score of 30% and severely incised. There is also evidence of floodplain disconnection in this reach.

Brief Description of Planned Restoration Project and Any Projected Conversions

The applicant is planning to reconnect the stream with its floodplain and to add woody debris and some structural elements to reduce the velocity for 800 linear feet of this stream.

The field functional assessment indicates that raising the channel bed, to reconnect the stream with its floodplain, is expected to result in the temporary loss of 500 square feet of adjacent nontidal wetland. The loss of forested vegetation in the floodplain has been minimized through design and construction techniques.

The applicant has minimized to the extent practicable the removal of mature trees in the project area/at the project site and has included in its project plans benches for planting wetlands that have been disturbed.

Brief Description of Expected Uplift in Aquatic Resource Function(s) at Project Site

This project is expected to reduce sediment loading at this reach by 30% and will therefore, reduce sediment and P loading downstream.

This project is expected to only temporarily impact nontidal wetlands and is expected to improve stream functioning by reduction of erosive flows and creation of more stable community for benthic macroinvertebrates (improved BIBI score).

Accordingly, no mitigation is required since there is no permanent loss of regulated resources.

Case Study #2
Determining Functional Uplift/Net Gain of Resources and/or Functions at the Project Site

Stream restoration projects must have documented functional aquatic resource uplift at the project site in order for MDE to eliminate mitigation.

Brief Characterization of Stream Condition

Stream Z is a perennial stream that runs through a mature forested/shrub/emergent mosaic type wetland that is fed, primarily, by groundwater. This stream has been identified in the Watershed Improvement Plan (WIP) as a stream that is contributing sediment and P to downstream waters. The stream has a BIBI score of 40% and moderate incising of the stream banks in the reach that is the target for restoration. There is also some evidence of floodplain disconnection in this reach.

Brief Description of Planned Restoration Project and Any Projected Conversions

The applicant is planning to reconnect the stream with its floodplain, by raising the stream bed to reduce the incising and provide bedform diversity.

The field functional assessment indicates that raising the stream bed and increasing floodplain connection is expected to result in increased overbank flooding and reduced energy during storm events. Projected amounts of flooding are not expected to significantly change the mosaic of wetlands to other aquatic resource types. A gain in seasonal vernal pool habitat is, however, expected from increased areas of ponding.

The applicant has minimized to the extent practicable the removal of mature trees in the project area/at the project site and has included in its project plans commitment to plant if projections are wrong and there is a permanent conversion of wetland types.

Brief Description of Expected Uplift in Aquatic Resource Function(s) at Project Site

This project is expected to reduce sediment loading at this reach by 30% and will therefore, reduce sediment and P loading downstream.

This project is expected to improve stream functioning by reducing erosive velocities, creating bedform diversity, and additional vernal pool habitat.

The stream will be re-connected to the floodplain, which in turn will restore historic hydrology to existing wetlands. There will be some isolated losses of woody vegetation; however, the overall forest/shrub/emergent wetland mosaic stays largely intact—with only minimal conversions. Accordingly, no mitigation is required.

Case Study #3

Determining Functional Uplift/Net Gain of Resources and/or Functions at the Project Site

Stream restoration projects must have documented functional aquatic resource uplift at the project site in order for MDE to **authorize** the project and eliminate mitigation.

Brief Characterization of Stream Condition

Stream Z is a perennial stream that runs through a mature forested mosaic type wetland that is fed primarily by groundwater. This stream has been identified in the Watershed Improvement Plan (WIP) as a stream that is contributing sediment and P to downstream waters. The stream has a BIBI score of 40% and moderate incising of the stream banks in the reach that is the target for restoration. There is also some evidence of floodplain disconnection in this reach.

Brief Description of Planned Restoration Project and Any Projected Conversions

The applicant is planning to raise the water levels by constructing a berm perpendicular to the channel and extending across the adjacent wetlands and floodplains. The retention of stream and flood flows behind the berm would reduce flow velocity and energy for 300 linear feet of this stream.

The field functional assessment indicates that the increase in water levels is expected to result in 2 acres of adjacent forested wetland receiving higher surface water levels for extended periods of time. This will result in the conversion of approximately 1.5 acres of adjacent forested wetland to open water habitat.

The applicant has failed to minimize to the extent practicable the removal or loss of mature trees in the project area/at the project site by considering other designs with less impact, and has no commitment to replace forested wetlands along the stream corridor.

Brief Description of Expected Uplift and Tradeoffs in Aquatic Resource Function(s) at Project Site

This project is expected to reduce sediment loading at this reach by 30% and will therefore, reduce sediment and P loading downstream.

This project is expected to convert some stream channel to ponds with increased retention of water in the floodplain. Pollution-tolerant aquatic life may increase in ponded areas while there is a decline in habitat for species requiring forested wetlands, seasonally flooded wetlands, or a wetland mosaic. Stream temperature may also increase as a result of loss of riparian vegetated cover. Passage of aquatic life may be blocked by construction of berms across the stream channel.
While the site would benefit from restoration, the design selected does not propose enough uplift to offset the nontidal wetland impacts. Accordingly, mitigation would be required for the wetland loss. An alternative design, however, could result in net benefits and be approvable with no mitigation required.

Case Study #4

Determining Functional Uplift/Net Gain of Resources and/or Functions at the Project Site

Stream restoration projects must have documented functional aquatic resource uplift at the project site in order for MDE to eliminate mitigation.

PROJECT DESCRIPTION:

The applicant is proposing approximately 7,200 linear feet of stream restoration for several tributaries. Proposed restoration goals are: reconnection to the floodplain, bank stabilization and water quality improvement opportunities at the outfalls of multiple SWM facilities.

EXISTING CONDITIONS:

The project is characterized as being an urban drainage system with 48.5% impervious cover. Land use adjacent to the project site is predominantly medium-density residential with private properties adjoining County-owned land and/or community open space. Based on review of historic photographs and knowledge of the area, this system was part of quarry operations until approximately 1970. As such, the overlaying materials are predominately loose sand over a clay/friable bedrock layer. The vast majority of the trees are new growth – all approximately the same age with an average DBH of 18 inches. This information supports that this is a developing ecological system that is out of balance, and not an established, high value stream/wetland complex.

Overall, this system is flashy and confined, and is experiencing a multitude of impairments including severe channel incision with actively migrating head-cuts, over-widening due to significant bank erosion, excessive sediment deposition, degraded habitat and exposed sanitary sewer lines. The majority of the proposed restoration reaches have has forested buffers of varying widths; in a few areas, property owners have mowed or otherwise encroached into the riparian zone. There is a large wetland complex downstream in addition to some wetland pockets adjacent to SWM pond outfalls in the lower portion of the project area. For purposes of the project, the stream system has been divided into two sections: the Upper Main Stem which includes three tributaries, and the Lower Main Stem which includes two tributaries and four outfall channels, for a total of 11 reaches.

PROPOSED RESTORATION TECHNIQUES:

This project presents a unique opportunity for restoration in that although there are some limitations due to the presence/influence of development and infrastructure, there is also ample area to implement a multi-tiered approach in order to achieve optimal results. Because of the size and complexity of this project, permanent impacts to wetlands and streams is significant; 14,391 square feet and 6,948 linear feet, respectively. However, to limit the construction footprint to reduce these impacts shortchanges the ecological uplift potential of this restoration project. The applicant proposes utilizing a variety of

techniques to address the system deficits in terms of physical stability, chemical composition and ecological functionality. The proposed techniques outlined below are all based on natural channel design approach. These will be applied to each of the 11 reaches in varying degrees based on the unique issues affecting stream conditions and adjacent land use practices.

Because of the interrelatedness of these approaches and benefits, it is impossible to have an uplift in ecological function without addressing the system as a whole. Physical stability must be achieved in order to reduce the sediment entering the system through erosive processes, and preserve wetlands and riparian areas. Only then can essential ecological functions such as nutrient attenuation (i.e., vegetative uptake and denitrification within the hyporheic zone), temperature regulation (i.e. ground-/surface water interchange, forest canopy) and improved aquatic habitat (i.e. appropriate bed features for feeding and spawning) occur.

The Upper Main Stem is characterized by moderate to steep slopes, minimal riparian buffer, and encroachment of development/infrastructure. As such, attenuation of erosion will be achieved through bank stabilization, and riparian enhancement and establishment. The anticipated ecological uplift is the result of the reduction of sediment and the preservation of the surrounding upland forest which provides valuable aquatic and terrestrial habitat as well as stormwater runoff attenuation.
The Lower Main Stem demonstrates significant sediment deposition and a low-slope stream/ wetland complex at its upper end. The stream is aggressively head-cutting through this area and the multiple SW outfall channels. The key element of design in this area is to prevent further down-cutting and draining of the wetlands, and reconnect the active channel to its floodplain. Once the stream achieves physical stability with appropriate pool and riffle size and spacing, the applicant anticipates an abundance of ecological benefits including, but not limited to significant pollutant uptake, improvement to water quality, wetland creation and habitat formation. Accordingly, no mitigation is required.