

## EXECUTIVE SUMMARY

On December 27, 2013, the Baltimore City MS4 Permit was issued, initiating the development of the Baltimore City Municipal Separate Storm Sewer System (MS4) and Watershed Implementation Plan (WIP). As required by the Permit, the WIP presents strategies to meet the 20% impervious restoration requirement and Total Maximum Daily Load (TMDL) waste load allocations for each receiving water body.

Specifically, the WIP will provide the City basis to:

1. Provide Best Management Practices (BMPs) to restore an equivalent 20% of the existing impervious area where stormwater runoff is currently not managed to the maximum extent practicable (MEP).
2. Meet TMDL Waste load Allocations (WLAs) approved by the Environmental Protection Agency (EPA).
3. Educate and involve residents, businesses, and stakeholder groups in achieving measurable water quality improvements.
4. Establish a reporting framework that will be used for annual reporting as required in the City's National Pollutant Discharge Elimination System (NPDES) MS4 Permit.
5. Identify necessary maintenance, adaptive management, staffing, and financial strategies to implement the WIP.

### **Baltimore: Existing Conditions and Challenges**

The City's MS4 Permit encompasses land within the legal City boundary; the City's properties associated with Back River Wastewater Treatment Plant; and the drinking water reservoirs at Loch Raven, Pretty Boy, and Liberty. For MS4 Permit restoration and TMDL compliance, the WIP focused solely on property within City boundaries, which includes five 8-digit watersheds, as defined by the Department of Natural Resources:

1. Back River
2. Baltimore Harbor
3. Jones Falls
4. Gwynns Falls
5. Lower North Branch of the Patapsco River (LN Branch Patapsco)

The entire City is a part of the Chesapeake Bay watershed and therefore subject to the Chesapeake Bay TMDL, which mandates a significant reduction in nutrients and sediment by 2025. Each of the City watersheds are listed as impaired for nutrients, sediment, bacteria, chlordane and/ or PCBs and have been issued TMDLs associated with the pollutant.

The City is characterized by a high amount of impervious area (over 45%) with large public green space clustered along existing streams. The density of development, coupled with highly compacted clayey soils and a practice of directly connecting roof drains to the street gutter or storm drain collection system, facilitate the conveyance of stormwater, but also limit the potential for intercepting stormwater for treatment. The City was predominantly developed prior to any stormwater regulations. Only 45 BMPs, constructed to meet development requirements, provide qualitative stormwater control.

Many of the City's streams are conveyed through pipes, which, like much of the City's infrastructure, is over 60 years in age and failing. Additionally, the City is unable to manage and fund infrastructure improvements when approximately 14,000 City lots are vacant, and 19% of Baltimore households live below the poverty line.

### **Six Pillars of Practical Watershed Planning**

In developing the WIP, the City used available guidance documents from the U.S. Environmental Protection Agency (EPA) and the Maryland Department of the Environment (MDE), in addition to the following pillars for practical watershed planning:

1. Plan for more projects than necessary: Identification of contingency projects that could be used if the originally planned projects were found to not be practicable. These projects would also be available for potential off-site mitigation of stormwater development requirements.
2. Plan for resources that will affect funding needs: Evaluation of the capacity and limitations of available public lands (and therefore need for land acquisition), in addition to opportunities for use of local and re-purposed materials and local labor forces.
3. Plan to maintain: Evaluation long-term maintenance resources and costs for both projects and programs, plus education / outreach.
4. Plan to be a part of a bigger picture: Consideration of existing environmental, social, and economic development initiatives in the City.
5. Plan for effective public participation: Engagement of various stakeholders to develop, implement and maintain the projects, programs, and partnerships in the WIP.
6. Plan to adapt: Identification of methods for tracking, reporting, and evaluating progress, with allowances for modify the approach due to changes in regulatory compliance accounting practices, legal mandates, and innovative technologies.

### **Meeting our Goals**

To meet the 20% restoration goal, the City will restore over 4,291 acres of impervious surface area by the end of the current permit period, using a diverse approach throughout the City, including the following:

- Installing stormwater management projects, such as traditional/ structural Best Management Practices (BMPs), environmental site design (ESD) practices, and alternative BMPs selected;
- Employing a variety of operational programs, such as mechanical street sweeping, preventive inlet cleaning, and illicit discharge detection and elimination (IDDE); and
- Fostering partnerships to encourage stormwater management implementation on private lands, coupled with an increase in environmental stewardship within the communities.

Project selection built upon previous studies and current City initiatives, including:

1. Priority projects listed in the Watershed Assessments and vacant lot feasibility studies;
2. Neighborhoods adjacent to and/or upland from stream restoration project;
3. Neighborhoods adjacent to and/or upland from flood prone areas;
4. Neighborhoods adjacent to DPW storm drain projects (inlet screens) or other DPW initiatives (Municipal Trash Container Pilot, alley sweeping, etc);
5. Other identified stormwater projects and partnerships (schools, parks, etc);
6. CIP project locations by other agencies. In particular, DPW will coordinate with the Department of Transportation as they develop streetscape and Complete Streets plans, including a Complete Streets plan for the Casino Area Master Plan;
7. Neighborhoods with Year 1 and Year 2 Vacants to Value demolition clusters.

8. Neighborhoods with large numbers of vacant properties AND in or adjacent to Vacants to Value development clusters; and
9. Priority Planting Areas for increasing tree canopy.

The City's proposed approach for meeting the 20% restoration requirements will account for significant reductions of nitrogen, sediment and phosphorus, in compliance with the state's Phase II WIP for the Bay TMDL. However, the majority of the construction work will be completed in the last 18 months of the permit period (July 2017 to December 2018), instead of 2017, which was supposed to be the end of Phase II of the WIP. The delay was due to the issuance of the MS4 permit by MDE. It is still feasible for the City to meet the respective pollutant reductions for the Bay TMDL by 2025. The estimated restoration requirements in subsequent MS4 permits would be significantly less to meet the 2025 goal.

The proposed projects, programs, and partnerships are applicable to the local TMDLs for nutrients and sediment. The WIP forecasts that the City will meet the WLA for the local phosphorus and nitrogen TMDLs based on the estimated pollutant reductions for the proposed projects, programs, and partnerships to be implemented within this current permit period. However, the three local TMDLs for total suspended solids will not be met within this current MS4 permit, based on the current baseline loads for the respective watersheds. Although significant reductions are proposed within this permit period; the City has demonstrated that the compliance with these local TMDLs is not feasible utilizing currently available stormwater BMPs. The City proposes a re-evaluation of the baseline load allocations, in addition to assessments of quantified benefits of suspended solids removal efficiencies for IDDE. Upon the re-evaluation baseline, the schedule for compliance will be established.

Education and enforcement programs focused on illicit discharges, in concert with sanitary sewer infrastructure improvements, will be used to comply with the bacteria TMDLs for four of the five watersheds. Although e.coli concentrations exceed prescribed thresholds for infrequent full body contact recreation, routine stream impact sampling has shown a decrease of geometric mean concentrations since 2009 in the Jones Falls, Back River, and Gwynns Falls watersheds. The final schedule for compliance of the bacteria TMDL will be dependent on the approved schedule, or any changes hereafter, for the consent decree in Civil Action No. JFM-02-1524 regarding unpermitted discharges from the City's wastewater collection system. Although significant reductions are anticipated for human sources, the City does expect an increase in bacteria loadings from wildlife over the next ten years due to habitat restoration, reforestation, stream restoration, and other stormwater BMPs. The City proposes microbial source detection studies in 2019 (following current permit) and at the end of the City's Consent Decree to evaluate the changes in bacteria sources and any resultant WLAs for the impaired waters.

TMDLs were issued for PCBs for Back River and Baltimore Harbor. Compliance with these TMDLs cannot be achieved using the same practices used for nutrient, sediment, and bacteria reduction. Disposal of PCB-contaminated sediment is the only method for pollutant reduction. The City proposes to complete source targeting and decision of monitoring locations by 2020. Monitoring and load reduction is proposed to occur by 2040.

TMDLs were issued for chlordane for Back River and Baltimore Harbor watersheds; however, no WLAs were established for this pollutant because "Maryland states there are no significant point sources or overland runoff sources for chlordane"<sup>1</sup>. Since the MS4 permit requires restoration plans for only for approved WLAs, the WIP did not address chlordane.

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<sup>1</sup> EPA decision letters for TMDLs for Back River and Baltimore Harbor