

**Baltimore City Phase II Watershed Implementation Plan (WIP)**  
**July 2, 2012**

**1. Overview of the Local Team's process**

The WIP Team is compiled of three teams with varying levels of contribution: Core Team, City Agency Team, and Stakeholder Team.

The Core Team was comprised of DPW staff, primarily the Surface Water Management Division (SWMD), whose activities directly support regulated stormwater mandates. The Core Team was responsible for developing the TMDL WIP strategy documents and MAST scenarios, attending TMDL training sessions / work groups hosted by MDE and the Back River / Patapsco River Tributary Teams, identifying resource needs, distributing information to other participants, and submitting all data requested by MDE as part of the TMDL process.

In an effort to improve efficiencies and promote a holistic approach to addressing all of the City's needs, collaboration between City agencies is essential. The City Agency Team was comprised of representatives of many of the major agencies in the City of Baltimore. The City Agency Team attended informational meetings provided by the Core Team and provided data (plans, resources, anticipated outcomes, etc.) about other City programs that would have a secondary benefit of improving water quality. The City Agency Team also provided suggestions for program milestones, outreach /communications, and potential for collaboration for grant funding. During the process, members of the Mayor's Office and the City Council have been briefed on the TMDL process and the City's WIP strategies.

The Stakeholder Team was comprised of community leaders, private sector businesses, non-governmental organizations, large institutions, and state and federal agencies. The Stakeholder Team attended an informational meeting presented by the Core Team and MDE in May 2011 at the Back River Wastewater Treatment Plant. During the meeting, the Stakeholder Team was presented with an overview of the TMDL process by MDE and an outline of the City's strategy for TMDL compliance by the Core Team. Following the presentation, various stakeholders provided information on their programs which could improve water quality and benefit the City's efforts for TMDL compliance. The Stakeholders voiced concerns about environmental justice, impacts to industries, funding strategies, and expected outcomes if waste load allocations are achieved. Members of all three teams signed up for the WIP Task Force which will be responsible for implementing the strategies of the TMDL Phase II WIP.

Members of each of the teams are provided below:

Core Team

Director Head of Department of Water and Wastewater, Al Foxx  
Bureau Head of the Bureau of Water / Wastewater, Rudy Chow  
Division Chief of the Surface Water Management Division (SWMD), Kimberly Burgess  
DPW Staff- Communications, Legislative  
Bureau of Water and Wastewater Staff - W/WW Engineering, Maintenance, Finance

SWMD - Env. Engineering, Storm Drain Engineer, Water Quality Monitoring, Watershed Liaison

City Agency Team

DPW- Bureau of Solid Waste  
Planning Department  
Department of Transportation  
Department of Health  
Department of General Services  
Baltimore City Public Schools  
Parking Authority  
Recreation and Parks

Stakeholder Team

Baltimore Development Corporation  
Baltimore Ecosystem Study  
Baltimore Industrial Group  
Blue Water Baltimore  
Center for Watershed Protection  
Constellation Energy  
Homebuilders Association of Baltimore  
Johns Hopkins University  
Living Classrooms  
Maryland Port Administration  
Maryland Science Center  
Moffatt and Nichol  
National Aquarium  
Parks and People Foundation  
Patapsco/Back River Tributary Team  
Various Engineering Consultants  
Waterfront Partnership

The City has had previous collaborative success working with above team members for water quality projects such as stream restoration along Stony Run and micro-BMPs / retrofit projects within Watershed 263. The collaborative efforts included effective project scheduling, project location selection, outreach and funding (grant opportunities). To comply with the TMDL requirements, continued collaboration will be mandatory beyond the planning stages and through implementation and maintenance.

The scale of project implementation (number of projects within a short time frame) for stormwater quality improvements is much greater than ever attempted within the City of Baltimore. The Environmental Engineering Section of SWMD will be primarily responsible for implementing and tracking TMDL compliance with respect to urban stormwater source sector. Currently, the staff consists of 3 full time employees (FTE), assisted by 6 engineering consulting firms. Funding for capital improvement projects has been provided through Motor Vehicle Revenues and matching grants, when available. The current pace of implementation is

approximately 3 to 6 restoration and retrofit projects per year (averaging 50 impervious acres treated per year), depending on size and complexity of project with an average annual capital improvement expenditures for water quality improvement / environmental restoration projects of less than \$3 million.

## **2. Baltimore City Phase II WIP Strategies**

The City of Baltimore is an ultra-urban area, therefore only two source sectors for nutrient and sediment loadings are applicable: wastewater treatment plants (WWTP) and regulated stormwater. The City is responsible for two regional WWTPs: Back River and Patapsco. Bacteria Nutrient Reduction (BNR) and Enhanced Nutrient Reduction (ENR) upgrades at both facilities are scheduled for completion by 2016. This Phase II WIP will concentrate on the regulated stormwater source sector, specifically focusing efforts to address loadings within the City's NPDES Phase I MS4 permit area. Strategies to address loadings from state and federal facilities are not presented in this document. Additional pollutant loadings from the forest source sector, due to increased urban tree planting and forest conservation efforts, were also not addressed in this document

### Method and Practices

By 2017, per the upcoming MS4 permit, the City will restore 20% of the impervious area within the City's permit area. This restoration goal (equivalent to over 4,700 acres) will theoretically achieve the 2017 Interim goals of the Bay TMDL program. Currently, there are about 350 structural BMPs within the City of Baltimore, with a majority located on private property. Upgrading these existing BMPs to increase treatment capacity and nutrient reduction is not considered a feasible option. Instead, the restoration efforts will be achieved by implementing a combination of new projects as follows:

- About 20% by structural, traditional BMPs like bioretention areas, surface filtration systems, wet ponds and wetland areas.
- About 15% by impervious area removal, reforestation, urban tree planting and the use of alternative surfaces (such as green roofs and permeable pavement).
- About 10% ESD treatment practices such as micro-practices.
- Remaining portion by non-traditional BMPs such as stream restoration, inlet cleaning, street sweeping, and other practices (quantified benefits to be determined).

The City will use a similar approach to achieve the remaining goals for 2025; however, the distribution of methods will change in anticipation of limited opportunities for structural, traditional BMPs and stream restoration projects.

In May 2010, the City adopted a stormwater ordinance that required treatment of runoff for 100% of the impervious area from new developments and only 50% from redevelopment projects. For the purpose of this WIP, the City assumes that less than 2% of the goals will be achieved by private developers meeting the design requirements of this ordinance. The remaining portion of the goal will be achieved by City capital improvement projects, DPW operations, and other restoration projects implemented by private groups.

To meet the above goals, the City will prioritize projects based on the following:

- Cost effectiveness of practice compared to load reduction capability;
- Collaboration opportunity with other environmental and sustainability initiatives within the City (Integrated Planning, Growing Green Initiative, and Urban Waters Partnership);
- Social and economic benefits to areas surrounding the project location;
- Public outreach and stewardship opportunities to modify behaviors (increase secondary activity-based BMPs for pollution prevention) and decrease maintenance needs;
- Equitable distribution of implementation across City watersheds, neighborhoods, and demographics and potential to address environmental justice;
- Sustainable employment, skill-building opportunities; and
- Habitat restoration, beyond simple reductions of identified pollutants.

### Project Locations

Throughout the years, several watershed assessments have been completed, based on the USEPA A through I criteria. Assessments have been completed for Back River, Jones Falls, and Gwynns Falls Watersheds. By 2013, the City will prepare an assessment for the Direct Harbor Watershed, using various assessments previously completed for some of the sub-watersheds. These assessments will identify and prioritize specific project opportunities; however, the opportunities are very limited due to the following:

- Dense, existing developments and infrastructure still in use
- Deep stormwater infrastructure which limits surface discharges of large contributing areas
- Highly compacted soils, primarily hydrologic soil group C and D

In addition to the above limitations, implementation of the above strategy on public land is limited by land ownership. The Mayor and City Council own about 5% of the parcels within City limits, which equates to less than 6% of the impervious area outside of the public-right-of-way. To implement this TMDL Phase II WIP, projects will have to be located within the right-of-way and on private lands.

In order to identify project opportunities for major impervious area reduction projects and stormwater treatment projects, the City will initiate the Growing Green Initiative through the Department of Planning and DPW. The initiative is intended to establish a framework for improving the quality and interconnectedness of Baltimore's existing green spaces and expanding these green spaces through the transformation and reclamation of vacant land for uses including stormwater management, urban forestry, community-managed open space, community gardens, and urban agriculture.

Urban tree plantings and reforestation efforts will coincide with the City's TreeBaltimore Program. The Department of Recreation and Parks manages this program to meet the City's goal of 40 percent tree canopy cover. This effort in turn supports Baltimore's plan for sustainability, surface water quality, stormwater runoff minimization, and other relevant quality of life improvements for all residents.

### Expectations of growth

The City of Baltimore experienced a population and development boom during the 1950's and has since declined. Although occupancy continually fluctuates, the City does not expect to exceed the current development footprint. Essentially, the City has achieved maximum build-out, with expectations of minimal additional impervious area. Furthermore, the previously referenced stormwater ordinance acts as an incentive to redevelop (encouraging smart growth), instead of constructing on undeveloped property.

The City is in the process of updating its zoning code. The current effort to update the City Zoning Code (last updated in 1971) includes requirements aimed to reduce the environmental impact of development and redevelopment, including measures to reduce impervious surface area, encourage the implementation of Smart Growth strategies, and protect environmentally sensitive resources.

The proposed Landscape Manual will be adopted as part of the zoning code, and will establish planting requirements for development projects, in addition to tree protection and mitigation requirements for development projects that are exempt from the Forest Conservation Act. The proposed manual also encourages minimization of impervious surfaces, the use of ESD practices, the use of soil amendments to improve the quality of planting soils, and the minimization of chemical fertilizers, herbicides, and pesticides in landscape maintenance.

### Implementation Rate and Resources

The schedule for the 2017 Interim WIP Goal is compressed to only 5 years for planning, design, and construction. Project implementation rates will have to increase to about 40 CIP projects per year to achieve this TMDL strategy. SWMD will need to increase its engineering staff, engineering consultant support, construction management staff, and contract administration staff. This schedule will be significantly dependent upon the permit review process both on the state and local levels.

Within this same time frame, other CIP projects will be conducted throughout the City, such as roadway improvements, water main replacement, sanitary sewer rehabilitation to meet Consent Decree, and facility improvements. To decrease land disturbance (minimizing potential sediment control problems) and make this effort more efficient, SWMD will collaborate with other City agencies to coordinate project implementation.

### Funding

Preliminary cost estimates to meet the above-reference watershed restoration goals is over \$250 million from Fiscal Year 2013 to 2017. For the past three years, the City has been evaluating sustainable funding sources to meet regulatory stormwater requirements, in addition to operating, maintaining, and rehabilitating over 1,100 miles of storm drain infrastructure. In November 2012, the City will introduce a bill to City Council to implement a stormwater fee, as required by State House Bill 987. The proposed fee structure will be based on impervious area. A credit program will be included to promote on-site stormwater treatment, runoff reduction, and participation in stormwater outreach / education programs by private property owners. In order to protect the stormwater fee revenues, the City plans to establish an stormwater enterprise fund (utility), which will require a referendum to allow a change in the City's charter. The

referendum is scheduled for the November 2012 elections. As a utility, revenue will be leveraged through bonds to decrease anticipated annual costs to implement this TMDL Phase II WIP. The City will continue to pursue funding through state and federal grants, although funding is anticipated to be less than \$1 million / year.

#### Proposed Methods for Load Reductions

The eligible BMPs approved by the Chesapeake Bay Program are very limited and very expensive in their applicability to ultra urban environments like the City of Baltimore. The available BMPs focus on stormwater treatment and runoff reduction, but not pollution prevention. In order to offset some of the significant costs of the City's TMDL Phase II WIP Strategy, the City will participate in research to quantify the nutrient and sediment removal efficiencies of new, non-traditional BMPs, which include but are not limited to:

- Debris collection systems
- Dry Sweep programs
- Education
- Eroded slope stabilization
- Illicit discharge disconnection and elimination (IDDE)
- Infrastructure replacement (inflow / infiltration / cross-migration between utility pipes)
- Leaf collection programs
- Outfall stabilization
- Pet waste management programs
- Soil amendments (subsoiling)
- Vacant lot management
- Vehicle trip reduction

Furthermore, the City will participate in research to support a significant increase in the Bay Program's pollutant reduction efficiencies for non-traditional BMP strategies, including stream restoration and street sweeping.

### **3. Baltimore City 2012- 2013 Milestones**

#### Implementation Milestones by end of FY 2013

- Complete Watershed Assessment report for Direct Harbor Watershed
- Complete WIP for MS4 compliance (greater detail of 20% restoration efforts)
- Initiate Growing Green Initiative
- Participate in research to quantify benefits of proposed methods for load reductions
- Complete investigation / study, initiate design and possibly permitting of the following BMP projects:
  - Stream restoration for 5 miles of restoration
  - 
  - ESD Practices for 5 acres
  - Impervious removal of 10 acres
  - Urban tree plantings to increase tree canopy 1%

### Program Milestones by end of FY 2013

- Receive NPDES Phase I MS4 Permit, issue by MDE.
- Initiate WIP Task Force.
- Increase staff of SWMD- Environmental Engineering Section by 1 FTE to manage CIP projects. Additional engineering consulting contracts will be initiated.
- Increase staff of SWMD – Plans Review Section by 2 FTE to review anticipated CIP projects and stormwater fee credit applications.
- Develop standardize designs and supporting calculations for ESD practices to facilitate project reviews and decrease design costs.
- Finalize and distribute updated Stormwater Management Guidelines for City, which interpret stormwater ordinance and provide design guidance. Provide training sessions to City staff and private developer community.
- Develop Facility Greening expedited review process and guidance documents as incentive for private participation in impervious area removal.
- Develop work plan for implementing a stormwater offset banking system which will allow developers or other third parties to construct stormwater BMPs and earn “credits” that can be sold to developers who cannot meet existing on-site stormwater management requirements; thereby creating a new commodity in land acquisition and development.
- Complete feasibility studies for private participation incentive programs, such the Adopt-the-Green program and STORM centers.
- Complete feasibility study for the use of recycled materials in BMP construction as a sustainable alternative to material disposal.
- Introduce bill to City Council to adopt a stormwater fee to provide sustainable funding for TMDL compliance projects. If adopted, implement the fee.
- Develop Access database and GIS tracking tool for all proposed and constructed BMPs.
- Update Zoning Code to encourage smart growth.
- Approve the City’s Landscape Manual that integrates ESD practices within landscape areas.

#### **4. Baltimore City Area Implementation Tracking, Verification and Reporting**

The City will track all BMPs (both planned and constructed) using an Access database and GIS tracking tool. The tracked data will coincide with MS4 permit reporting requirements. A majority of BMP implementation will be reported through the permitting process for construction activities. The credit program for the proposed stormwater fee will provide an incentive for private property owners to report all practices that are part of this Phase II WIP. SWMD will be responsible for maintaining these databases.

#### **5. Identification of technical discrepancies, such as data concerns, and recommended future steps to address these concerns**

The MAST program shows about 311 acres of combined sewer system (CSS) area. All combined sewers have been addressed/ separated within the City, prior to 2005.