EPA
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Community Based Public-Private Partnerships (CBP3s)

and Alternative Market-Based Tools for Integrated Green Stormwater Infrastructure

COMMUNITY BASED P3
Public Private Partnerships

A Guide For Local Governments

CHEAPER GREENER FASTER
Green Infrastructure Driven Urban Stormwater Retrofit INITIATIVE

PREPARED BY U.S. EPA REGION 3
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Foreword

The purpose of the Clean Water Act (CWA) is to restore and maintain the chemical, biological, and physical integrity of the nation's waters. Passage of this legislation over 40 years ago led to unprecedented efforts to clean up U.S. waters in order to render them fishable and swimmable. These efforts, largely driven by funding from the federal government, have resulted in substantial reductions in the discharge of pollutants from point sources and yielded significant improvements in water quality throughout the country. These water quality improvements allowed recovery of aquatic ecosystems and greater public uses of the resources.

While most of the traditional point sources have been reasonably addressed, further improvements will require addressing non-traditional point sources and non-point sources of pollution (stormwater) – one of the leading causes of water quality impairment and diminished watershed health. Both of these pollutant sources will have much greater social and economic consequences than we have faced in the past. In addition, many of the engineering fixes which controlled point-source pollution are now reaching the end of their useful life. This will require even greater financial resources than those committed during the first four decades of the CWA. Pollution associated with stormwater runoff has increased in many watersheds across the country, including the Chesapeake Bay watershed. It represents the major challenge to this country's water quality in the twenty-first century. According to EPA's *National Water Quality Inventory: Report to Congress* (U.S. EPA, 2010a), nonpoint source pollution from agriculture and urban runoff is the primary reason that more than 40 percent of surveyed rivers, lakes, and estuaries are not clean enough to meet basic uses such as fishing or swimming.

While agricultural pollution is of significant concern, stormwater runoff is the fastest growing source of pollution to the Chesapeake Bay. This growing source of water pollution ties to the pace of urban and suburbanization. Between 1990 and 2007, impervious surfaces associated with growth in single-family homes are estimated to have increased about 34 percent, while the watershed's population increased by 18 percent. Moreover, one percent (1%) or less of existing impervious land was developed prior to the establishment of stormwater management requirements and currently has very little infrastructure in place to manage against impacts to water quality. Considering this trend, impacts from impervious cover will continue to degrade our nation's waters. This calls for a significant amount of effort to retrofit existing infrastructure systems in urban areas. Regulatory requirements reflecting this need are likely to be incorporated into Total Maximum Daily Load (TMDL) thresholds as well as plans to reduce the frequency of Combined Sewer Overflow (CSO) events.

Rising coastal waters, an increase in the frequency of localized flooding, and the need for resilience due to changing climatic conditions are additional critical considerations that communities must address. During a time of economic constraints at the local level and limited federal funds, many communities must consider alternative ways to finance, construct, operate, and maintain their stormwater management systems in ways that provide multiple versus singular benefits. The management, administrative, and fiscal responsibilities required to operate the extensive amount of construction for regulatory compliance, management of stormwater runoff, and protection of public and private properties from localized flooding is a significant burden for many communities.

The use of a Green Infrastructure (GI) retrofit approach based upon volume control and other Low Impact Development (LID) stormwater best management practices (BMPs) can restore water quality through on-site retention and infiltration and/or rainwater harvesting. GI has many co-benefits beyond water quality improvements such as job creation, economic development /revitalization, public health enhancements through air quality improvement, and reduced energy costs (Kloss, 2008; Wise, 2007; Currie and Bass, 2005; Wise et al. 2010). Many communities have concerns about the costs associated with the operations and maintenance (O&M) of GI systems as well as the long-term treatment performance of these systems. Many traditional stormwater programs do not have the administrative or financial capacity to meet the management and project procurement requirements associated with the integration of GI systems and conventional "grey" stormwater management. Regardless of what approach a community takes, the size and type of urban retrofit needed to meet desired water quality goals will require major capital investments, long-term commitments to O&M, adoption of affordable, higher performing, innovative technologies, and faster procurements; and will likely result in greater administrative burdens for local governments.

Public Private Partnerships (P3s) have the potential to help many communities optimize their limited resources through agreements with private parties to help build and maintain their public infrastructure. P3s have successfully designed, built, and maintained many types of public infrastructure, such as roads, and drinking water/wastewater utilities across the U.S. Until recently, there have been no P3s specifically developed for stormwater management or Clean Water Act requirements. The U.S. Environmental Protection Agency (EPA) Region 3 Water Protection Division (WPD) has been researching, benchmarking, and evaluating P3s for their potential adaptation and use in the Chesapeake Bay region. On December 6, 2012, the EPA Region 3 WPD hosted a P3 Experts Roundtable in Philadelphia, PA (U.S. EPA, 2013a). The goal of the P3 Roundtable was to provide a forum for a targeted group of private sector representatives to discuss in detail the feasibility, practicality, and benefits of using P3s to assist jurisdictions in the finance, design, construction, and O&M of an urban stormwater retrofit program. The results of this Roundtable are the foundation and approach for applying a stormwater P3 model across the Chesapeake Bay watershed.

This guide will provide communities with an opportunity to review the capacity and potential to develop a P3 program to help "close the gap" between current resources and the funding that will be required to meet stormwater regulatory commitments and community stormwater management needs. In addition, this guide and the tools presented are a continuing effort, commitment, and partnership between EPA Region 3 and communities in the Chesapeake Bay region. We believe it will help to raise the bar and further advance the restoration goals and objectives for the Chesapeake Bay.

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For additional information, please contact:
Dominique Lueckenhoff, Deputy Director, Water Protection Division
US Environmental Protection Agency Region III
1650 Arch Street (3WP00)
Philadelphia, PA 19103
Lueckenhoff.dominique@epa.gov

Executive Summary

Communities will need new approaches to funding stormwater management programs in order to protect and restore water quality in accordance with the Clean Water Act while meeting the challenges of climate adaptation and infrastructure redevelopment for the 21st Century…

This document presents a model Community Based Public Private Partnership (CBP3) program, with a variety of emerging market-based tools, that will help municipalities in the Chesapeake Bay region meet their stormwater management regulatory and community development municipal stormwater management program needs. A key foundation of this approach is the establishment of a long-term operating space for shared interests between the local jurisdiction and the private sector partner, whereby partners can share risks and take advantage of what each partner does best in order to achieve desired performance goals and objectives.

The primary audiences for this document are municipal officials; program managers; procurement officials; environmental, legal and financing experts; and decision-makers that are interested in providing their communities with new and innovative ways to implement and finance large-scale stormwater retrofit programs and efforts. A traditional P3 is a performance-based contract between the public sector and the private sector to arrange financing, delivery, and typically long-term operations and maintenance (O&M) of public infrastructure. Communities of all sizes across the country have been using the P3 approach to meet their transportation, solid waste, energy and drinking water/wastewater infrastructure needs. The CBP3 includes many features of the traditional P3 model, but has modifications to meet the unique requirements of stormwater management systems. These modifications include a focused effort to invest in Green Infrastructure (GI) approaches that provide for local economic growth and improved quality of life in urban and underserved communities.

The U.S. Environmental Protection Agency (EPA) Region 3 Water Protection Division (WPD) synthesized the CBP3 approach for sustainable stormwater management through an extensive effort to research, benchmark, and evaluate P3s and determine how they can be adapted to meet the unique requirements of the Clean Water Act (CWA), Watershed Implementation Plans (WIPs), and local water quality needs in the Chesapeake Bay. EPA Region 3 WPD is assisting local communities in developing sustainable approaches to meet stormwater retrofit requirements. Many communities will face significant investments in stormwater infrastructure driven by regulatory requirements, such as meeting goals to retrofit up to twenty percent (20%) of urbanized areas. Beyond regulatory drivers, others are exploring full integration of GI approaches into their stormwater retrofit programs. Fully integrating GI into stormwater programs would allow communities to leverage multiple development and infrastructure benefits, and potentially to use stormwater funding for other community and environmental programs. The use of GI will create a tremendous opportunity for communities to conquer the fiscal, administrative, regulatory, and capacity issues that are associated with retrofit programs. A CBP3 model is ideally suited to meet the programmatic requirements of a GI approach.

*Respecting that the use of CBP3s for GI-driven investments is nascent, this document should be regarded as the '1.0.' version with updated versions expected in the future reflecting the changing nature of this dynamic sector.

On December 6, 2012, EPA Region 3 WPD hosted a P3 Experts Roundtable in Philadelphia, PA. The goal of the P3 Roundtable was to provide a forum for a targeted group of private sector representatives to discuss and make recommendations for the feasibility, practicality, and benefits of P3s to assist jurisdictions in the finance, design, construction, and O&M of urban stormwater retrofit programs using GI. The outcome of the meeting helped provide the foundation, guidance, and motivation for the development of the CBP3 (U.S. EPA, 2013a).

Partnerships between the public and private sectors have created a range of strategies to finance, plan, design, construct, operate and maintain public assets and/or deliver services. Partnering with the private sector has been identified as viable alternative solution that will improve and sustain the ability of local governments to protect and restore our nation's waters by:

- Creating economic feasibility for stormwater retrofits,
- Helping to leverage local government resources,
- Fostering the development of cutting edge LID and GI strategies and technologies, and
- Expediting project delivery.

Using market forces to drive down costs for design, construction, and maintenance accelerates the implementation of long-term LID/GI infrastructure retrofit programs (U.S. EPA, 2013a).The information presented in this document will help decision-makers to determine if a CBP3 is right for their community. The document sections provide background information, examples, checklists, scenarios, case studies, and metrics to determine if investment in a more thorough investigation and evaluation of a CBP3 is appropriate. The document organization includes the following:

- **Section 1: Introduction –** Background on the need for a stormwater-based P3. It includes descriptions of critical stormwater infrastructure program needs and regulatory drivers. The section also presents some of the key reasons why a P3 model is ideal for integrating GI into urban stormwater retrofits, which will be a critical tool to help communities meet their regulatory obligations and stormwater infrastructure needs.
- **Section 2: Traditional P3s in the U.S. and Their Use in the Water Sector –** Examination of key elements of a traditional P3, and its use in the transportation, drinking water and wastewater, and energy sectors. Information on financing, regulatory requirements, procurement and contract issues, and other key considerations and elements that are required to establish a P3.
- **Section 3: Comparing a CBP3 for Urban Retrofits to a Traditional P3 –** Overview of the key infrastructure financing issues that create the need for a stormwater P3. Additionally, this section includes a description of the military's Residential Communities Initiative, which is the basis for many of the CBP3 elements discussed; and this section presents key elements and unique features of a CBP3, including a comparison of the CPB3 to a traditional P3.
- **Section 4**: **CBP3s Highlights for Municipal Leaders** – Summary of the background, key facts, and outcomes related to using a CBP3 approach targeted for municipal program managers and elected officials.
- **Section 5: CBP3 Highlights for Financing Officials –** Highlights and adaptability of a CBP3-driven finance strategy and platform for finance officials, advisors and investors.

- **Section 6: Determining if a CBP3 is Appropriate** – Listing of key questions and requirements that a community can reference to evaluate whether a CBP3 model is appropriate for the community to undertake. It also includes an evaluation of current state regulations and legislation in the Chesapeake Bay region that affect the establishment of P3s. Hypothetical scenarios illustrate applications of the CBP3 in EPA Region 3.
- **Section 7: Partnership Checklist –** A series of critical issues and requirements that should be addressed in the development of a CBP3 to the right focus and success for partners.
- **Section 8: Establishing the Steps for Developing a CBP3 –** A series of checklists, key program elements, and sample activities to help communities further define and shape the foundations of a CBP3. This information helps communities conduct more in-depth investigations and feasibility studies related to using a CBP3 approach.
- **Section 9: Potential Business Structures for GI-Driven Stormwater Management CBP3's** - Multiple options for establishing the long-term contractual, management, governance, and financial relationships between the local government and the CBP3 Partner.
- **Section 10: Examples of GI-Driven P3 Approaches in the Mid-Atlantic –** Highlighting a number of innovative approaches being undertaken by Region 3 communities to facilitate stormwater retrofits in partnership with the private sector, through regulatory, community, and market drivers.
- **Section 11: Integration of Alternative Market-Based Tools into the CBP3 Approach** – Trading and cost-threshold grant funding frameworks layered under a CBP3 program can enhance efficiencies, cost-savings, and overall value as well as helping to operationalize GI implementation at the site level.
- **Section 12: Potential Financing and CBP3 Implementation Scenarios for EPA Region 3 -** The wide-range of financing mechanisms that are currently and potentially available to fund planning, construction, and operations of the partnership activities.

I. Introduction

A Community Based Public Private Partnership (CBP3) is a partnership between a local government and a private entity. The partnership provides flexibility, implements advances in technology, addresses dynamic community development trends and goals, and instills long-term financial and regulatory commitments for integrating Green Infrastructure (GI) into stormwater management programs.

This section discusses why communities in the Chesapeake Bay region, of which a vast majority is located within U.S. EPA Region 3 (see Figure 1), will benefit by taking advantage of this new model to finance and manage stormwater regulatory and infrastructure programs. Included in the discussion are:

- A description of the impacts of stormwater runoff on downstream waters and an overview GI practices, costs, and the benefits associated with these practices;
- A review of the critical regulatory, resource protection, stormwater, and fiscal and capacity programs that communities need to address;
- An explanation of why traditional grey infrastructure stormwater management program approaches will not allow communities to meet requirements; and
- A discussion of the emerging value of GI for urban stormwater management retrofits and why this new financial and stormwater program approach is successful.

The goal of a CBP3 is to create a transparent framework that aligns public, private, and community stakeholders in a long term legal arrangement and governance structrure that is founded on the spirit of stewardship and common objectives. This creates a partnership that allows contractors to act efficiently and achieve the regulatory and community goals more effectively.

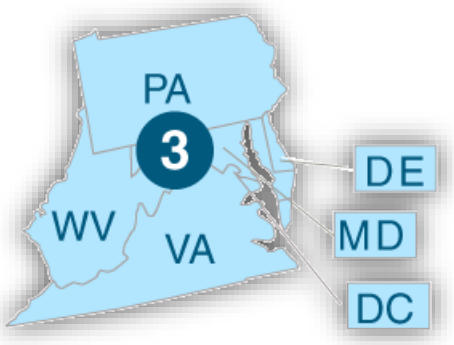

Figure 1 – U.S. EPA Region 3 states
(Source: https://clu-in.org/ecotools/regions/region3.cfm)

Urbanization and the Role of Green Infrastructure

Impacts of Urbanization and Early Stormwater Management Efforts

A landscape comprised primarily of hardscape (impervious surfaces), which is closely associated with typical urban development, leads to increased flooding, reduced air and water quality, loss of aesthetic value, and increased temperatures through the "urban heat island" effect (Konrad, 2003, Vingarzan and Taylor, 2003, Kloss, 2008).

The standard method of practice in the U.S. to address the impacts of urban stormwater

runoff in the 1970's and early 80's focused on reducing peak flows of moderate and low-frequency storms, such as the 10- and 100-year storm events (National Resources Council, 2009). Peak flow management was often addressed through the use of retention or detention basins to capture flows at a regional or a land development project level (National Resources Council, 2009).

Research has shown that the use of retention or detention facilities without regard for other basins or sites can actually exacerbate downstream flooding impacts and channel erosion because volume is not controlled (McCuen, 1979, Ferguson, 1991, Traver and Chadderton, 1992, U.S. EPA, 2005d). Regarding the protection of streams from erosion, MacRae (1996) showed that stream bed and bank erosion occurs more frequently and during smaller streams than those traditionally detained in stormwater detention/retention facilities. Further, Hawley et al. (2013) has documented that the action of detention facilities to increase the duration of erosive flows to receiving waters provides additional stress and destabilization of downstream waters.

A well-known study, known as the National Urban Runoff Program (NURP), was the first large-scale effort to document pollutant loadings associated by land use. A significant result from the NURP study was that runoff generated by storm events between 0.5 and 1.5 inches represented a majority of the total runoff generated on a site (EPA, 1983). An additional finding of the NURP study was that a strong relationship exists between cumulate runoff volume and pollutant loading. Specifically, the conventional wisdom is that a majority of pollutant loading occurs within the first one-inch of runoff generated from a site (National Resources Council, 2009). This spawned this concept of capturing and treating the "first flush" of runoff. Many stormwater programs have targeted this runoff volume as the "water quality volume" to be captured, detained, treated and released. This led to the concept of "extended detention" facilities treat the water quality volume. Further research has shown that the first flush varies more the previously thought (City of Austin, Texas, 1990).

Due to the recognition of the adverse impacts of impacts of detention on receiving waters as well as a desire to meet broad watershed goals in stormwater management efforts, the recent goal in the stormwater management sector has focused on the retention of urban runoff (National Resources Council, 2009). The use of GI in the urban environment provides this retention-based performance. Additionally, GI has been shown to mitigate the effects of urbanization by not only reducing runoff through infiltration, but also reducing airborne particulates, reducing energy costs, lowering ambient air temperatures, and enhancing the social and economic value of urban areas (Miller 2007, Wise 2007, Currie and Bass, 2008, Wise et al. 2010).

Overview of Green Infrastructure Practices

When presenting information on GI, EPA states that this type of infrastructure, "uses vegetation, soils, and natural processes to manage water and create healthier urban environments" (U.S. EPA, 2014a). The universe of GI practices varies between regulated entities, but there are common categories that have emerged. The following is a subset of GI practices listed by U.S. EPA (2014a) along with a brief definition of each. More information on these practices can be found at the following website http://water.epa.gov/infrastructure/greeninfrastructure/.

- Downspout disconnection
- Rainwater

- Rain gardens (bioretention)
- Planter boxes
- Bioswales
- Permeable pavements
- Green roofs

Differing types of GI practices are more suitable for specific situations and landscapes, reflect varying treatment levels, and provide unique benefits. For instance, green roofs are well-suited for high-density urban areas, such as on large industrial or office buildings (U.S. EPA, 2014a), can reduce total annual runoff from a building envelope by 60 to 70 percent (Kohler, 2006), and can reduce temperatures on building rooftops by between 40-60 degrees Fahrenheit (Gaffin, et al. 2005). These practices are generally categorized as being extensive or intensive in profile, with the former being considered "thin" and defined as having a substrate of 5-15 centimeters with the latter having a more robust profile of greater than 15 centimeters (Carter and Butler, 2009). In Germany, where green roof technology is widespread (Pederson, 2001) over 80 percent of green roofs are extensive (Harzmann, 2002). Due to the ubiquitous nature of extensive green roofs, that this will be the default considered when discussing green roofs.

The typical extensive green roof includes four components: a waterproof membrane, a drainage layer, a growing medium, and a vegetative covering layer (see Figures 2 and 3). A study by Li and Babckock (2014) illustrates how green roofs used widely in an area has, "the potential to mitigate flash flood risks, reduce stresses on downstream storm drainage structures, and return to a more natural, pre-development hydrological cycle." More specifically, this study illustrates that stormwater runoff volume can be reduced by 30 to 86 percent and reduce peak flow rate by 22 to 93 percent. Costs for green roofs typically range from $30 to $40 per square foot (U.S. EPA, 2009).

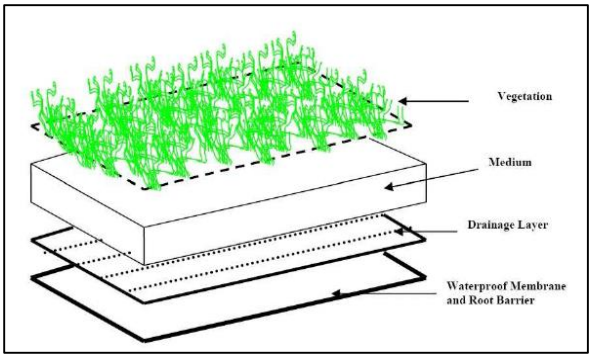

Figure 2 – Typical cross-section of an extensive green roof system (Source: Berghage et al, 2007)

Figure 3 – Typical green roof application (Source: Evan Bindenglass, CBS New York)

In urban areas, it is common practice to hydraulically tie rooftop and building drainage directly to receiving separate or combined collection sewer systems. These systems are commonly referred to as downspouts. Breaking this connection between building and site drainage from downstream receiving collection system infrastructure is referred to as "downspout disconnecting". The purpose of this practice is to eliminate direct connections between impervious areas, which allows for opportunities for on- or near-site retention through rainwater harvesting or infiltration practices. A common configuration is to divert rooftop or building drainage to a bioretention facility or a cistern. See Figure 4

for an illustrative example of a downspout disconnection.

Figure 4 – Typical downspout disconnection configuration (Source: LID Center, 2005)

Studies have shown that disconnecting downspouts can mitigate volumetric-driven dynamics for drainage systems. Salim et al. (2002) showed that a downspout disconnection program in Detroit, Michigan will reduce the directly connected impervious area by between 40 and 44 percent. Additionally, this study showed that approximately 2 billion gallons of combined sewer overflow (CSO) would be avoided annually due to downspout disconnections. The City of Portland, Oregon disconnected over 56,000 downspouts between 1993 and 2011 leading to a reduction of CSO volume of 1.3 billion gallons per year (City of Portland, 2011). Carmen et al. (2014) showed a runoff volume reduction between 59 and 99 percent by coupling downspout disconnections and directing to residential lawns in the Durham, North Carolina area.

Rainwater harvesting (RWH) is the capturing of runoff generated from impervious areas (most commonly rooftops) in a storage facility. The American Rainwater Catchment Systems Association (ARCSA) highlights that although rainwater harvesting systems have been used for thousands of years, there is a renewed interest in this practice. ARCSA notes this interest is due to the concern for access to high quality water, the rising cost of potable water distributed by a central resource, health concerns related to the treatment of potable water, and the cost efficiency associated with rainwater harvesting (ARCSA, 2012).

RWH systems can range from 40-gallon "rain barrels", used most commonly in residential applications, to 10,000-gallon cistern systems. The two most common types of RWH approaches when addressing stormwater management are shared and integrated systems (Reidy, 2010). A shared system holds a harvested amount of rainwater to be used for on-site purposes with a detention volume made available to address runoff generated by precipitation events. The detention volume is used as "buffer" volume for storm events and is drained through a controlled discharge. The harvested volume is used between storm events for on-site purposes. An integrated system combines the two volumes together (detention and harvested) with an automated system to discharge harvested rainwater as needed (Reidy, 2010).

Volume captured for a RWH varies depending upon purpose. For instance, if meeting a regulatory requirement for on-site retention, a system may be sized to meet this volume. Reidy (2010) points out that typical systems accommodate the volume generated from a 2-inch rain event, which can account for most retention standards (if they exist locally) along with a harvested volume. For instance, in Washington, D.C. the on-site retention requirement for new construction is to capture runoff from the 1.2-inch rain event. A system accommodating the 2-inch storm would meet this regulatory requirement with additional storage for non-potable uses. Harvested water associated with RWH systems are most commonly used for non-potable uses (irrigation, toilet flushing, etc.). These non-potable uses comprise approximately 30 percent of potable water

uses for residential properties (Vickers, 2001) and up to 86 percent for office/business properties (Frye, 2009). The cost for a typical RHW ranges between $2 and $5 per gallon captured, which roughly translates to $2 to $5 per square foot of impervious treated (assuming 1.6 inches of runoff is captured per square foot of impervious area treated). Figure 5 illustrates urban and residential RWH applications.

Figure 5 – Typical Rainwater harvesting tank in an urban setting (top) (Source: www.sswm.info) and typical rain barrel application (bottom) (Source: www.rainbarrel.org)

Rain gardens/bioretention facilities capture runoff and provide enhanced water quality treatment while also providing aesthetic value to landscapes. These facilities can be adapted for suburban as well as urban settings, making bioretention facilities a common GSI practice (Hunt and Lord, 2006). Rain gardens generally comprised of small depressed areas capturing small areas of runoff (between 0.25 and 1 acre) that use a mixture of sand and organic filter media to treat pollutants that is aided by woody and herbaceous vegetation (U.S. EPA, 1999a).

These facilities provide relatively high treatment capacity for a variety of pollutants including heavy metals, nutrients, sediment, and oil/grease (Low Impact Development, 2007). Additionally, these facilities can provide significant water quantity treatment through infiltration into surrounding soils (where in situ soils have infiltrative capacity) or underground detention (Low Impact Development, 2007). Costs associated with rain gardens typically range from $3 to $4 per square foot of impervious area treated (Coffman et al., 1999), which is an order of magnitude less than the typical per unit cost for green roofs. See Figure 6 for a typical urban bioretention application.

Figure 6 – Typical bioretention application (Source: Vermont Watershed Management Division, 2013)

Planter boxes, also known as stormwater or infiltration planters, are bioinfiltration-based structures with vertical walls normally located in transportation corridors or parking areas. Planter boxes can be depressed to readily capture and retain urban runoff generated on sidewalks and roadways, or

they can at ground level to capture runoff from downspout disconnection efforts. These practices can exfiltrate directly to underlying soils or can be tied into drainage infrastructure. Due to their linear and compact design, planter boxes are ideal for dense urban areas (Philadelphia Water Department, 2014). The design and function of planter boxes mirrors bioretention facilities. The cost for planter boxes, ranging from $3.80 to $7.70 per square foot of impervious treated (Natlab, 2013), tends to be slightly higher than a rain gardens since they are often located in challenging areas with high amounts of existing infrastructure and other site constraints. See Figure 7 for a typical planter box application.

Figure 7 – Typical planter box (Source: Philadelphia Water Department, 2014)

Bioswales are channels lined with grass or vegetation with a relatively flat longitudinal slope (normally <2%) and flat side-slopes (normally < 1:3) (U.S. EPA, 1999b). While these practices provide runoff conveyance, they are configured to be less hydraulic efficient than traditional drainage swales in order to provide water quality treatment through filtering and infiltration. Check dams are used in some cases to enhance infiltrative capacity, and filtering media can be used under the bioswale for added pollutant removal efficacy (U.S. EPA, 1999b). Bioswales can be used in many settings, but are particularly well-suited for linear applications, such as roadway medians or shoulders and parking lots (U.S. EPA, 1999b). These practices can be used in suburban as well as urban applications, and are relatively inexpensive, as the cost to construct these practices range from $1 to $2 per square foot of impervious area treated (Natlab 2013, King and Hagan, 2011). Figure 8 shows an urban bioswale.

Figure 8 – Typical urban bioswale (Source: American Forests. 2012)

Permeable pavements allow water to soak through paved areas, such as parking lots, roadway shoulders or basketball courts. Pavement types vary from porous asphalt to pervious concrete, which allow runoff to drain through the pavement, and include permeable pavers, which are blocks of solid pavement spaced apart to allow for infiltration to occur. Other pavements include open-matrix pavements constructed with plastic cells filled with crushed stone. A study by Brattebo and Booth (2003) investigated the durability as well as infiltrative capacity and pollutant removal efficacy of four types of permeable pavements (two open-matrix and two paver applications). The investigators found little sign of wear after six years of used in a parking facility. Additionally, almost no surface runoff was generated from these systems and the incidence of heavy metals was lower compared to a traditional

pavement parking stall in the study area. Construction costs for permeable pavements range from $5 to $7 per square foot of impervious area treated (Natlab 2013, King and Hagan, 2011). Figure 9 shows porous asphalt and paver applications (Adapted from Brown, 2014).

Figure 9 – Typical porous asphalt (top) and permeable paver (bottom) applications (Source: Philadelphia Water Department, 2012)

The Need for New Stormwater Solutions

Citizens and municipalities in the U.S. are beginning to realize the large effort necessary to restore and protect water bodies in or adjacent to urban areas. The NRC report previously cited identified key urban stormwater management issues and challenges facing communities across the country (NRC, 2009). These issues and challenges include:

- Thousands of water bodies listed as being impaired under Section 303(d) of the Clean Water Act.
- Increased volume, frequency, and velocity of stormwater discharges cause significant stream bank erosion and loss of habitat.
- More frequent urban flooding at higher elevations, causing significant economic impacts to properties and disrupting transportation services.
- Estimated costs of addressing the impacts of stormwater runoff around the country to meet regulatory and program goals is estimated to be $5 billion per year over the next 20 years, as noted in the 2008 EPA Clean Watershed Needs Survey (U.S. EPA, 2010a).

Meeting Water Quality Goals

Accommodating growth and redevelopment and addressing climate change will require new and innovative solutions. The magnitude of the scale and cost of stormwater requirements preclude the use of the conventional infrastructure financing and implementation approaches.

The anticipated cost of meeting Chesapeake Bay urban retrofit Total Maximum Daily Load (TMDL) goals is perhaps the most important challenge facing communities throughout the Chesapeake Bay region. This issue has been widely recognized by regulated communities, who have compiled Watershed Implementation Plans (WIPs) to address the TMDL requirements and have determined that these mandates will be financially burdensome (Commonwealth of Virginia, 2011; State of Maryland, 2013; Commonwealth of Pennsylvania, 2011).

In addition, communities face challenges to maintain, repair, and reconstruct much of the aging stormwater conveyance systems constructed in the last century and are nearing

or at the end of their effective lifecycle. Reconstructing the storm drain system to accommodate both existing and future urban redevelopment is expensive, intrusive, and disruptive. In communities that have combined sewers the costs and constraints are even greater.

Given the unprecedented scope and magnitude of the requirements associated with the Chesapeake Bay TMDL, many local governments may lack the economic and institutional capacity, technology, and financing models to construct and manage new urban stormwater infrastructure.

Environmental Regulatory Drivers

A variety of regulatory frameworks and trends impact the stormwater and wet weather sector, which expect to drive the demand for GI investment within EPA Region 3 and beyond. A notable regional driver is the Chesapeake Bay TMDL, while nation-wide drivers include combined sewer overflow (CSO) mitigation and integrated planning, the inclusion of municipal separate storm sewer systems (MS4s) into TMDL waste load allocations, and the strengthening of stormwater permits at the state and local level. Appendix A provides a brief overview of the regulatory history associated with urban stormwater runoff. The following section provides a summary of key regulatory drivers in Region 3 impacting stormwater runoff and GI implementation potential.

Chesapeake Bay TMDL

The most significant water quality regulatory driver in EPA Region 3 is the Chesapeake Bay TMDL. The required nutrient and sediment reductions associated with this TMDL are greater and more stringent than any previous regulation, and the timeframe for meeting these requirements is relatively short. Actions to meet WIPs are projected to cost billions of dollars for some jurisdictions, such as Prince George's and Montgomery Counties in Maryland. Other jurisdictions are estimating costs close to one billion dollars, such as Fairfax County, Virginia, which expects to spend $900 million to meet stormwater requirements (Fairfax County, 2014). The ability to meet these fiscal challenges is compounded by the aggressive schedule associated with the WIPs, which requires that all practices to fully restore the Chesapeake Bay be in place by 2025. It is unlikely that using traditional procurement processes to generate the scale of stormwater infrastructure investment to meet this timeframe is realistic. However, the CBP3 approach can enable communities to scale up quickly and meet the Chesapeake Bay TMDL requirements.

CSO Mitigation and Integrated Planning

While a major driver in EPA Region 3 is the Chesapeake Bay TMDL, other significant regulatory drivers exist. A growing trend is the use of GI to reduce CSO events and meet consent orders for wet weather flows. This "integrated planning" approach is: "a process that has the potential to identify a prioritized critical path to achieving the water quality objectives of the CWA by identifying efficiencies in implementing competing requirements that arise from separate wastewater and stormwater projects, including capital investments and operation and maintenance requirements" (U.S. EPA, 2014a).

A memo released in October 2011 from the EPA Office of Enforcement and Compliance Assurance (OECA) promoted the use of integrated planning and stated that this tool can, "facilitate the use of sustainable and comprehensive solutions, including green infrastructure" (U.S. EPA, 2011).

The shift by the regulatory communities towards integrated planning suggests that

comprehensive approaches to control CSOs and address other water quality-related infrastructure needs are becoming accepted and preferred.

Traditional grey infrastructure investments, such as wastewater treatment plants, are becoming economically challenging. Many utilities find a diminished return on investment in pollutant removal technologies or wet weather infrastructure. (DC Water, 2012). Investing in GI is seen as a lower-cost alternative and one that generates many co-benefits not provided by grey infrastructure investments, such as increased public health, enhanced property values, and an economic stimulus for urban redevelopment and renewal (Gaffin, 2010; Lovell and Taylor, 2013; Center for Neighborhood Technology, 2011; Clements and St. Juliana, 2013).

Metropolitan areas in EPA Region 3 (i.e., Washington, DC; Baltimore, MD; Pittsburgh, PA) are considering GI as part of the solution to reducing the frequency and scale of CSO discharges. Other communities, such as Lancaster, PA, have gone further and proposed large-scale implementation of GI to meet their consent decree (Congressional Research Service, 2014). Philadelphia, PA has made the largest commitment and investment in GI. The Green City, Clean Waters program set a goal of replacing ("greening") close to 10,000 acres of impervious cover with GI by 2036 (NRDC, 2012). The goal of this effort is to retain the first inch of rainfall from each storm event, reducing the volume of runoff entering the traditional stormwater system and lessening the burden on utilities. The Green City, Clean Waters program is estimated to cost more than $1 billion over its 25-year implementation period, with predicted savings of over $8 billion in traditional, gray infrastructure. Philadelphia's CSO mitigation program (City of Philadelphia, 2011) has similar goals to the Chesapeake Bay WIP, requiring large-scale stormwater infrastructure investment at low cost on an accelerated schedule.

MS4 Inclusion in Waste Load Allocation

The components of a TMDL program in the Chesapeake Bay include Load Allocations (LAs) from unregulated sources and Waste Load allocations (WLAs) from regulated sources. The LAs and WLAs collectively represent the total daily load of a pollutant that can be delivered to a water body while still maintaining the water quality criteria for the designated water body. The WLA component of a TMDL has historical ties to traditional point discharge sources, such as industrial and wastewater discharges due to the convenience of identifying and monitoring loads from point discharge sources. Advances in treatment and monitoring technology for discharges from point *and* non-point sources are shifting this historical trend. This is most notably highlighted in an EPA memo that suggested past policy regarding the aggregation of stormwater discharges should be revised due to "better data…and more experience" acquired in the stormwater sector, and that stormwater discharges should be "disaggregated into specific categories …separate WLAs for MS4 discharges" (EPA, 2010b).

Strengthening Existing Stormwater Programs

In 2010, EPA began a significant effort to update and strengthen the national stormwater program, including the development of a national performance standard for regulated communities and entities. This effort was officially deferred in March 2014, EPA noted that efforts would now be focused upon strengthening existing programs (U.S. EPA, 2014b).

Presently, a quarter of Phase I communities and nearly half of all Phase II communities

are operating under expired permits (U.S. EPA, 2014c). While the federal rulemaking process was in progress, a number of states moved forward to update their stormwater permitting programs. Others put off updating their programs to review the results of the rulemaking. Communities that waited may have created a build-up of demand for program updates, and the deferment on the rule now provides an opportunity for those communities to move forward to update their programs. Anticipating an increase in the number of updates to stormwater programs in the near future may provide an opportunity for communities in EPA Region 3 and across the country to integrate GI into their stormwater management programs.

Traditional Stormwater Program Approaches Cannot Meet Community Needs

Considering the growing funding gap in the stormwater sector, the traditional program management and financing approaches that have been used to develop and maintain stormwater systems appear to be insufficient in providing the capital and administrative capacity necessary to achieve successful water quality protection and stormwater infrastructure goals (U.S. EPA, 2010a). For example, multiple studies have shown that the cost of asset management and maintenance throughout the lifecycle of most long-term infrastructure is roughly equal to construction costs (EPA, 2012b). In addition, many local governments may assume that current asset management and maintenance resources will hold steady over time. This assumption may lead staff to spend more to adopt traditional infrastructure maintenance programs without considering a more proactive stormwater management program.

Potential Economic and Water Quality Benefits of Green Infrastructure and Innovative Designs and Technologies

Many communities are beginning to incorporate a GI approach to meet their program and regulatory needs (Congressional Research Service, 2014). The use of GI is allowing communities to accelerate their stormwater management programs through the retrofitting of targeted and priority areas within a watershed in an incremental fashion (New York City Department of Environmental Protection, 2010). These efforts often occur through the engagement of multiple public sector programs with limited initial capital outlays as well as through private sector development.

The standard procurement method used by many local governments is to evaluate design, construction and maintenance needs for individual projects. This piecemeal approach is sensible for small programs that have a limited number of projects to maintain. However, for larger and more demanding programs, such as a GI urban retrofit effort, individually based procurement may not be the most efficient process. As the number of capital improvement projects associated with retrofit programs increases, communities should decide on the most efficient and least costly procurement approach. The consideration and integration of GI into stormwater management programs and the use of P3s by communities in the transportation and drinking water and wastewater utility financing sectors has created the foundation and potential for CBP3 programs at the local level.

The most cost-effective large-scale implementation of GI will require a non-traditional approach to project delivery such as a P3 in which multiple entities are constructing projects through multiple

municipal programs or private sector development projects.

Watershed planning and design based on GI has created an integrated and multi-objective approach to managing stormwater infrastructure systems. Some of the key components of the GI approach include the following:

- Promoting and recognizing technology innovation and flexibility in the regulatory process.
- Creating community development value for the incorporation of green technologies for infrastructure projects and private developments.
- Creating opportunities for the new green economy, including job creation for construction, maintenance, and work-force development.
- Leveraging stormwater dollars for other environmental programs, such as air quality and energy.
- Creating opportunities for integration with and capacity enhancements for traditional grey infrastructure.

The following chapters will expand on the details of these aspects.

Advantages to Public Agencies Entering Into CBP3s for Green Infrastructure Retrofits

Long-term, large-scale projects with multiple benefits and numerous scenarios for implementation, management, and financing will require the flexible and adaptive management approach provided by a CBP3. Some of the key advantages to local governments entering into a CBP3 arrangement for GI retrofits include:

- Increasing the ability to leverage public funds while minimizing impacts to a municipality's debt capacity.
- Accessing advanced (possibly proprietary) technologies not available through standard procurement approaches.
- Improving asset management and the scientific application of lifecycle cost practices.
- Drawing on private sector expertise and the widest range of private sector financial resources, including new sources of private capital, thereby eliminating the need to wait for future budget cycles to pay for needed infrastructure projects.
- Benefiting local economic development by creating a marketplace where small, minority, and disadvantaged businesses can grow and thrive.
- Relieving pressure on internal local government resources, using the private sector as a force multiplier.

II. Traditional P3s in the U.S. and Their Use in the Water Sector

A P3 is a performance-based contract between the public sector (any level of government) and the private sector (usually a consortium of private companies working together) to arrange financing, delivery, and typically long-term operations and maintenance (O&M) of public infrastructure.

This section presents an introduction to the key procurement elements of a conventional P3, reviews some of the legislative policies that allow for the implementation of P3, explains how P3s are typically used for large infrastructure projects, and provides a brief description of some case studies.

P3 Contract Structure

P3 contracts, referred to as project agreements, are typically awarded through a competitive bidding process. The private partner is contractually obligated to fulfill the project agreement (at the risk of losing its investment).

P3s differ from conventional procurements where the public sponsor controls each phase of the infrastructure development process—design, construction, finance, and O&M. In the P3 approach, a single private entity or a consortium of private entities assumes responsibility for more than one of these development phases.

Public partnerships with the private sector have the potential to reduce costs, improve quality control, and expedite delivery of services (Brookings Institution, 2011). Benefits identified for local governments are listed as follows:

- Allocating responsibilities to the party that is best positioned to control the activity is more likely to produce a desired result.
- Producing economic value through private sector participation; injecting business ingenuity, energy, efficiencies, and capital into infrastructure; and applying a "funding multiplier" to leverage local government investment.
- Solving a complex, costly public problem critical to watershed protection with more efficient and cost effective outcomes compared to conventional programs and procurement methods.
- Substituting private resources and personnel for constrained public resources.

Traditional P3s and the Water Sector

The P3 model is not a one-size fits all approach, but a range of potential structures. The right structure selected for a P3 depends on many factors, such as project complexity, public policy goals, private sector interest, and the potential P3's "value for the money," also known as a cost advantage. The desire and ability to transfer various risks from the public sector to the private sector is also a key consideration for determining the most appropriate structure. P3 structures include the following options (arranged from least risk transfer to most risk transfer):

- ***Design-Build-Finance (DBF)*** combines the innovations of design-build with some amount of private sector capital (debt or equity). Often, this model will combine private sector funds with existing public sources, allowing private capital to fill any gaps in funding and enabling projects to be built faster.

- ***Design-Build-Operate-Maintain (DBOM)*** is similar to the DBF approach, but also includes a short- to medium-term operational and maintenance responsibility for the private partner.
- ***Design-Build-Finance-Maintain (DBFM)*** is similar to the DBF approach, but also includes a short- to medium-term financial and maintenance responsibility for the private partner. Unlike DBOM the public sector retains the responsibility for operations.
- ***Design-Build-Finance-Operate-Maintain-Availability Payment P3 (DBFOM-AP)*** is similar to the DBOM approach, but the private partner is also responsible for financing. In this approach, operations and maintenance are covered by the private partner for the long-term while the public sector maintains control over fees and revenue collection (if applicable) and makes periodic, pre-established payments to the private entity in return for project delivery and performance commitments.
- ***Design-Build-Finance-Operate-Maintain-Revenue Concession (DBFOM-RC)*** is a DBFOM model where the private partner assumes revenue risk or the risk that project revenues will be sufficient to cover project costs. Under a revenue concession model, the private partner develops the asset (for example, a toll road) and enters into a long-term lease with the public sector that allows it to collect some or all project revenues over the contract term.

  Monetization transfers substantial risk and control to the private partner, normally occurring in relation to an existing tolled asset and typically involving a long-term lease of the asset. In addition to the opportunity to generate proceeds from a competitive procurement process, assets are often monetized in order to reduce the burden of long-term operating, maintenance, and major capital maintenance costs on the public sector.
- ***Build-Own-Operate (BOO)*** is a model that represents the greatest transfer of responsibilities to the private partner. In this instance, the private partner develops and operates a new asset on land that it owns or controls.

Value and Risk Assessment

P3s are complex transactions. Demonstrating that a P3 will provide a better result than a conventional approach is not a simple process. There are many factors that must be considered when determining the best procurement approach for a given project, including long-term costs, uncertainty, short and long-term risk, complex funding, and Value for Money (VfM).

Value for Money Analysis

A VfM analysis compares the total estimated lifecycle costs of traditional public procurement to the total estimated lifecycle costs of a P3 procurement system. The estimated lifecycle cost for traditional procurement becomes a "public sector comparator" (PSC) against which to compare the total lifecycle cost of a P3 procurement. If the estimated costs of the P3 procurement are less than the estimated costs of the traditional public sector procurement system, then there may be positive value for money, and the potential P3 project would warrant further consideration.

Risk Analysis and Assessment

Management of risks requires a public agency to proactively address potential obstacles that may hinder project success, as well as take advantage of opportunities to enhance success or save costs. P3s are considered to be a form of risk management

as the public sector and private sector parties seek to achieve optimal risk allocation for each party.

Project risk management is an iterative process that begins in the early phases of a project and repeats throughout the project's lifecycle. It involves systematically considering possible outcomes before they happen and defining procedures to accept, avoid, or minimize the impact of risk on the project. Under a P3 transaction, risk allocation tends to be "by exception," so the concession agreement contains a finite list of "relief events" and "compensation events" that are tightly drafted and highly constrained. Everything else is allocated to the concessionaire. Conversely, under a conventional delivery approach, if a circumstance or situation not contemplated up-front arises, that risk (whether or not anticipated) is owned by the public sector. Risk management follows a clearly identified process, which includes:

- Risk identification;
- Risk analysis;
- Risk response planning (including transfer of risks to the private sector); and
- Risk monitoring, controlling, and reporting.

Risk analysis is used in the development of a P3 project for a number of reasons:

- To develop agreement provisions that optimize value for money;
- To calculate risk adjustments as part of value for money assessments;
- To help determine project contingency amounts; and
- To identify and monitor mitigation actions (i.e., risk management).

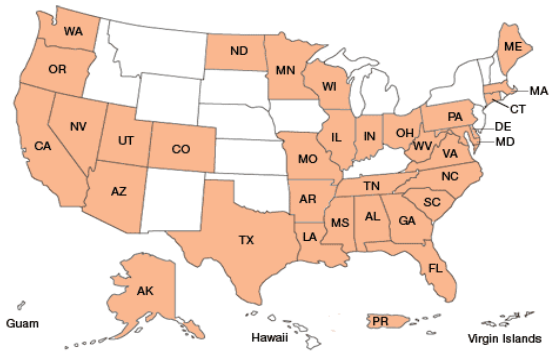

Figure 10: States with P3 Enabling Legislation

Federal, State, and Local Regulatory Policies Supporting P3s

Many states specify the type of projects that can be part of a P3 framework. Most of these specifications focus on transportation projects, facilities, construction, and management of educational institutions. Boards or authorities that will enter into the P3 agreement often govern these projects. Some new classes of projects eligible under a P3 agreement include public water supply and wastewater. The appropriate state board or authority or the local government may also oversee these classes.

State Enabling Legislation

Statutory authority ties to policies potentially affecting the feasibility and success of a P3 in a community. One of the barriers to using a P3 approach is the lack of enabling legislation at the state level (Geddes, 2013). Currently, 33 states have enabling legislation for the creation of P3s. Several other states are either considering or have pending legislation to enable the formation of, or expand the applicability of P3s. Figure 10 is a map of states that currently have legislation enabling P3s.

There are still legislative challenges for the adoption of a P3 approach for stormwater. Not all adopted legislation clearly designates a path to adopt P3s at the local government

level due to lack of direct guidance in the enabling language, include the following:

- Procurement processes and methods;
- Agreement provisions;
- Review and approval processes for proposed P3 arrangements;
- Project eligibility;
- Use of private consultants;
- Length of concession;
- Bid selection, and
- Authority to enter into P3 arrangements.

Procurement Methods

An organized procurement process for the P3 prime contractor and its subcontractors to follow is critical to the success of a P3. Transparency in the bidding, award of subcontracts, and reporting processes are also necessary. A recent trend in P3 legislation is the inclusion of provisions to allow unsolicited bids, which can help to drive innovation; however, this may encourage the private sector to select projects that produce high profitability rather than focusing on those with strong social benefits (ACEC, 2014).

Evaluating bids by "best value" or any other metric that captures the quality of the proposal, rather than simply most cost effective, will help to drive the success of P3 projects. The facilitation of innovation through sole source contracts, particularly those implementing new and emerging stormwater technologies, is critical in order to enhance system performance.

Agreement Provisions

There is often significant risk associated with the uncertainty of obtaining environmental permits. Most often, this uncertainty can affect the amount of funding, time, and resources available to accomplish a stormwater management project. Agreement provisions, which spell out the conditions of an agreement, often shape a P3 arrangement and can vary depending on the infrastructure sector and level of prescriptiveness in enabling legislation (ACEC, 2014). Legislation may specify the allocation of risk, especially whether the public sector is able to transfer risks for items such as, but not limited to, cultural, historical, or environmental impacts, or requirements of the Americans with Disabilities Act (ADA).

Payment /Revenues

Some states specify the manner in which revenues are generated and how payments are made to the private party. While traditional P3 transportation projects focus on revenues from tolls, there have been instances where inaccurate demand forecasting has affected the projected revenue stream from tolls. This has resulted in renegotiation of many contracts in order to close the gap in funding for operation and maintenance of the toll facility (ACEC, 2014). An "availability payment" can be used to address this deficiency. This is a regular payment to the private partner based upon the condition that the facility meets the defined performance specification. This structure reduces or eliminates the "revenue risk" to concessionaires and specifies the minimum public costs (and private revenues) as well as potentially spurring innovation since efficiencies in delivering performance may help drive profitability and/or overall revenue and product output. Performance monitoring is a key factor in an availability payment framework, especially as it can be used to evaluate the project goals and deliverables and the regulatory requirements. This arrangement can easily be used for stormwater P3 contracts.

Financial Instruments

Financial instruments for infrastructure can include, but are not limited to, revenue bond and Transportation Infrastructure Finance and Innovation Act (TIFIA) loans. TIFIA loans are limited to transportation projects.

There are recent adaptations of the TIFIA model for infrastructure in the water sector (AWWA, 2014), referred to as the Water Infrastructure Financing Innovation Authority (WIFIA). This program seeks to leverage Federal dollars based upon the low default-rate in the water sector for overall increased infrastructure spending. Private activity bonds are often used in the water sector and may be a model for the financing of a stormwater P3.

Public financing for stormwater is likely to be associated with dedicated public funding sources, such as water utility fees for stormwater management or a pay in-lieu of fund. Dedicated amounts of general funding may augment these sources. Having various options for generating funding will provide assurance to the private sector that there is reduced risk associated with the project, resulting in lower-interest loans for the private sector partner. More information related to financing is covered in Chapter 5 (CBP3 Highlights for Financing Officials and Advisors).

Non-Compete Clauses

A P3 project may be subject to competition from other similar projects. This may affect available revenue. For example, a toll road based upon a projected travel demand may see diminished toll revenue if other roads are built or improved by a public or private entity to relieve congestion within the service area. Proposals for new projects contain non-compete clauses to prevent reduced revenue to current projects. However, many partnerships are moving away from these clauses or are incorporating other avenues to similar projects. This may affect available revenue. For example, a toll road based upon adequate revenue streams (ACEC, 2014). Development of a stormwater P3 should address the construction of projects through the Capital Improvement Program (CIP) or by private developers.

Authority to Enter into Arrangements

In many states, transportation agencies are the only entities allowed to enter into P3 arrangements, which reflects the high priority for funding and management of the transportation network across local county and municipal governments in order to meet the state transportation needs. States are increasingly allowing municipalities to enter into P3 arrangements that are not limited to transportation projects (The Surety and Fidelity Association of America, 2013). This may be recognition of the role local governments play in P3 projects. As Istrate and Puentes (2011) note that, “while states have the capacity to develop PPP projects, these projects happen in the jurisdiction of cities and counties,” and further that, “states need to better connect with the lower levels of government to ensure a broader understanding of the benefits and drawbacks of P3 projects.”

One avenue for empowerment for local governments is through “home rule” status. Home rule “refers to the ability of a local government to manage local affairs without oversight from the state legislature” (Richardson et al., 2003). A 2009 study by Allen and Overy finds that one of the benefits of home rule is that municipalities, “can ‘control their own destiny’ when negotiating a P3 and therefore avoid the delays and legislative complexities that arise in jurisdictions where state-level approval of a P3 is necessary.” This report goes on to note that 27 states have authorized “meaningful levels of home rule,” and highlight the numerous P3 transactions that the City of

Chicago has executed without state-enabling P3 legislation by relying on its home rule powers. Further, the authors point out P3 investors can increase their yield by investing in home rule municipalities as they provide for more flexible arrangements. This flexibility is of particular importance for GI stormwater projects due to the variability of needs related to these investments.

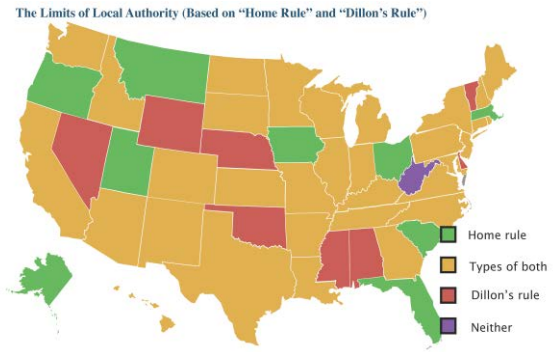

Figure 11: Limits of Self-Governance at Local Level

Contrasting with home rule is "Dillon's rule," a "rule of 'strict' construction" where the state legislature grants as little power to local governments as is reasonable (Richardson, 2003; Owens, 2000). There are a small number of states following a pure home rule or Dillon's rule governance structure, while most states apply aspects of each. Richardson et al. (2003) points out "the literature provides wildly varying estimates of the number of states that adhere to Dillon's Rule," which illustrates the complexity of the role of self-governance by local governments. Figure 11 is a map of the different types of local authority in the continental United States.

In the U.S., P3 arrangements are often made at the state level, and considering the complexity of local self-governance, the ability to enact a P3 at the local level may be challenging (or not feasible) without clarifying legislative language in some states or a strong home rule authority. The ability of local governments to enter into P3 agreements is critical and appropriate in the context of stormwater infrastructure investments because the funding and management of stormwater programs reside at the municipal level.

Review /Approval of Arrangements

Some states require a board or other governing body to review and approve P3 arrangements. This is done to ensure that public interest is protected and contracts and conditions are consistent with provisions set forth in the enabling legislation (ACEC, 2014). This process may impede the interest of private investments. Identification of an increased number of issues for review lengthens the amount of time before a P3 arrangement is approved. However, studies have shown that these potential impediments have not been significant barriers for developing and implementing P3 programs (ACEC, 2014).

Use of Private Consultants

Legislation may specify whether public sponsors can retain experts or consultants in the development of a P3 arrangement. Due to the specialized nature of the P3 industry, there is concern that conflicts of interest with consultants may arise; however, existing state statutes may provide adequate conflict avoidance assurance (ACEC, 2014).

Length of Concession

Some states specify the length of concession, or maximum timeframe for a P3 arrangement. Timeframes are often incorporated into the contract language to protect both parties from long-term uncertainties, such as urban development and changing environmental conditions, or to reduce the potential for change orders or contract renegotiations (ACEC, 2014).

For example, in Florida, there is a 50-year limitation for P3 projects, requiring approvals by a legislative body for projects

beyond this timeframe. Generally, a concession length of 30 to 50 years should be used (ACEC, 2014). This timeframe is adequate for a stormwater-focused CBP3 as it is consistent with the design life of a well-maintained stormwater/green infrastructure system.

Changes to stormwater regulations over time may require modifications to the objectives of a P3. Advances in BMP technology impacting the durability of a GI practice or product as well as the evolution of monitoring technology may also affect the treatment of concession arrangements. These considerations should also be reflected in the concession length.

Environmental Streamlining

A significant requirement for many infrastructure projects, especially stormwater infrastructure projects, is environmental permitting. This process can take many years and is often expensive and unpredictable because of the wide-range of environmental impacts and issues. Stormwater project mitigation requirements can be defined and benchmarked using many different metrics and goals. These include, but are not limited to, acres of impervious surfaces treated and percent of pollutants removed. Meeting these mitigation requirements may not always ensure that the watershed is adequately protected because of the unique characteristics of each watershed.

Regulations are beginning to require more sophisticated monitoring and performance requirements for mitigation. This results in a potentially more complex, costly, and lengthened timeframe to obtain construction permits. Many construction contracts also have limits on the number of modifications to the mitigation plan just after construction.

Long-term P3 arrangements between state regulators and local stormwater officials could help reduce the number of environmental reviews, oversight, and approval processes by the use of approved standard designs, well-developed metrics of performance, and a well thought-out monitoring plan. The costs and requirements to adjust the mitigation plan throughout the contract performance period would be greatly reduced; and the mitigation could be more effective through this adaptive management approach.

Value for Money Analysis

Some legislation specifically requires a VfM for P3 arrangements. Although VfM analysis is used widely outside the U.S., only a handful of states (e.g., Virginia, Florida, Texas, and Oregon) are using this approach. As previously described, the purpose of VfM is to compare the P3 framework to the PSC in order to illustrate the relative advantage of the P3 arrangement over traditional procurement and project delivery approaches. Parameters such as discount rate, discounted cash flow, and net present values are used in an effort to provide an "apples-to-apples" comparison. In the U.K., six categories for VfM are considered including risk transfer, long-term nature of contract (including whole lifecycle costs), use of an output specification, competition, performance measurements and incentives, and private sector management skills (ACEC, 2014). Considering that P3s in stormwater are novel and not well understood, the use of VfM may help to illustrate advantages over traditional procurement and project delivery approaches regardless of statutory requirements.

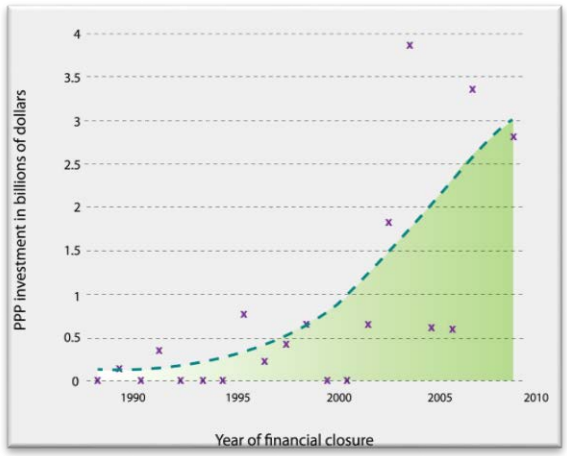

Figure 12: P3 Investments in the U.S. Transportation Sector
(Source: Public Works Financing, 2010, Brookings Institution, 2011)

Transportation, Water Sector, and Energy P3s

All levels of government have employed P3 approaches extensively for other infrastructure needs. The most prevalent types of infrastructure P3s have been in the transportation sector, while other partnerships include investments in drinking water/wastewater infrastructure, energy, educational facilities, public safety, and public parks (NCPPP, 2013). Described in the following sections are some key characteristics that are unique to each sector.

Transportation

State and local governments have long employed P3s to achieve transportation infrastructure investment goals. Figure 12 illustrates the growth of P3s in the transportation sector. Transportation P3s use two basic structures or types:

1) New build facilities add capacity to the system by building something new; and,
2) Existing facilities improve capacity or performance of the current system through a P3 arrangement.

- ***Hudson-Bergen Line, New Jersey*** – $ 2.2 billion total cost. 21st Century Rail Corporation was responsible for the entire Hudson/Bergen Light Rail project under a design, build, operate, and maintenance arrangement (ACEC, 2014).
- ***JFK Air Train, New York*** – $1.9 billion total cost. Air Train JFK is an 8.1-mile rail system in New York City that connects John F. Kennedy International Airport (JFK) to the city's subway, commuter trains and airport parking lots (ACEC, 2014).

Drinking Water and Wastewater

Infrastructure that provides user-fee based services, such as drinking water and wastewater utilities, are well suited to a P3 approach.

Partnerships between the public and private sectors in the drinking water and wastewater industry range from providing basic services and supplies to the design, construction, operation, and ownership of public utilities (U.S. EPA, 2014d). Private entities can often build and operate systems at lower cost and can also provide capital for system upgrades when public funds may not be available. Private groups also often have quick access to personnel trained in the latest drinking water and wastewater technologies and environmental compliance rules. These capabilities can make compliance with environmental standards possible, while minimizing rate increases for essential services (American Legislative Exchange Council, 2013). Examples of these partnerships include the following:

- ***Carlsbad Desalination, California:*** $1 billion total cost. This investment is based upon a 30-year purchase agreement between the San Diego County Water Authority and a private entity to construct, operate, and maintain a desalination plant to deliver approximately 50,000 acre-feet of potable

drinking water to the community per year (Carlsbad Desalination Project, 2014).

- ***Santa Paula Wastewater Treatment Plant, California***: $62 million total cost. The City of Santa Paula was facing $8 million of non-compliance fines requiring swift action to meet regulatory needs. Plant upgrades and expansions include membrane bioreactors, aerobic sludge digestion and ultraviolet disinfection.
- ***Multiple Municipal/Utility Investments, Virginia***: varying total cost. Several examples of private investment have occurred in Virginia associated with the Public-Private Educational Facilities and Infrastructure Act (PPEA legislation, including investments in water and wastewater infrastructure in the cities of Chesapeake, Fredericksburg and Petersburg as well as the counties of Caroline, Southampton, and Bedford (Bryant, 2014).
- ***Cranston, RI Wastewater Lease Program:*** on March 7, 1997, the City of Cranston, RI entered into a long-term lease arrangement designed to provide an innovative solution to meet the city's intermediate and future wastewater needs (Water & Waste Digest, 2000). Cranston was a cash-strapped city carrying a sizable debt and its wastewater system was out of compliance with the Clean Water Act. It appeared that an outright sale of the system with a major rate increase would be necessary, and a new facility or a facility upgrade had the potential to become a political football. Cranston chose another option: a public/private partnership (P3) with Triton Ocean State, a subsidiary of Poseidon Resources Corp. Triton agreed to modify a 23 million gallon per day treatment plant, 21 pump stations, 190 miles of sewer pipeline and provide advanced wastewater treatment to meet effluent standards, operating and maintaining the system under a 25-year operating lease. This partnership was one of the first of its kind under new federal guidelines. The arrangement also included a front-end concession payment of about $48 million that Cranston used to decease (retire) outstanding bonds and pay back sewer system loans from other city funds (Forman, 1997).

Energy

In recent years, P3s have been used increasingly and with great success to attract private financing for energy efficiency investments (International Energy Agency, 2011). Governments in most countries face challenges with respect to the sustainable development of their energy systems. An important goal in meeting these challenges is transitioning to an energy efficiency economy that is moving from a fossil-fuels-based economy to a less carbon-energy-intensive economy (International Energy Agency, 2011). Many recent studies have identified financing barriers as a major impediment to large-scale implementation of energy efficiency programs. Financing barriers arise because energy users are generally unwilling to invest their own funds in energy efficiency projects (International Energy Agency, 2011). As a result, policymakers have become more aware of the potential and flexibility that P3s can provide, especially when applied to energy efficiency financing.

There are many different structures for P3s in the energy sector, which are used mainly for generation and transmission. The methodology used varies, depending on the place, the government, and the specifics of the operation; therefore, each P3 is tailored to the energy needs and circumstances present at the time when the partnership is created (World Bank, 2014).

P3 Investments

The total value of P3 investments in the U.S. (excluding design-build projects) between 1985 and 2011 is $68.4 billion (Public Works Financing, 2012). Dollar amounts have been accelerating over this timeframe, as evidenced by the fivefold increase in P3 infrastructure investments in the U.S. between 1998 and 2010 (Brookings Institution, 2011). However, this is a relatively low investment value, considering that the total P3 investments between 1985 and 2011 in the U.S. is only 50 percent (50%) greater than P3 investments in Canada, which has an economy ten times smaller than the U.S. (Brookings Institution, 2011). Nevertheless, this increase illustrates the upwards trajectory of P3 investments and tremendous need for infrastructure investment in the U.S.; these are reasons to conclude that the potential for P3 investment in the U.S. market is significant.

P3s come in many forms and structures. The architecture of a P3 may vary based on the sector as well as the project. The amount of risk and reward potential varies as well based upon the nature of the agreement and the goals of the parties involved. These variations reflect the complex structure that P3 arrangements can take. Tools, such as risk assessment and VfM analyses, can help to provide clarity on the performance and potential advantage of a P3 arrangement over traditional public sector investments.

The specific architecture used in a P3 arrangement is often dictated by statutory demands. Legislation at the state level often dictates aspects of a P3 framework, such as concession length, ability to include non-compete clauses, and option to submit an unsolicited proposal. The number of states that have adopted P3 enabling legislation has increased in recent years. This diffusion of statutory authority to promote P3 investments has played a significant role in the rise in P3 investments in the U.S. over the last two decades. A similar trend is expanding the scope of investments beyond the transportation sector, which will likely lead to a greater potential for P3 investment in other sectors, including the water, wastewater and stormwater sectors as well.

III. Comparing a CBP3 for Urban Retrofits to a Traditional P3

A CBP3 program uses many of the same financial and procurement arrangements as a traditional P3; however, there are differences as well. The long-term nature of the contract, the wide-range of retrofit opportunities, the flux in economic and community development conditions over time, and the need for flexibility are the key differences between a CBP3 and a typical infrastructure P3. In a CBP3 the conditions must be appropriate for the community and the contractor so that both receive equitable benefits for all actions and that both partners gain from the efficiencies and reduced costs of adaptive management and advances in technology. Because of the need to negotiate multiple subcontract agreements, evaluate and make rapid implementation decisions, and coordinate with multiple stakeholders, the community must have a significant amount of trust that the contractor will act as an agent for the community throughout the long-term partnership.

Evolution of the CBP3 Model and Use to Address Urban Retrofit Challenges

In 2012, EPA Region 3 Water Protection Division (WPD) hosted a national roundtable of experts on financing, stormwater programs, green infrastructure, stormwater retrofit planning and design, and developing recommendations for approaches to reduce the cost of urban stormwater retrofit programs through the use of more efficient LID/GI techniques and privately financed P3s (U.S. EPA, 2013a).

Communities should consider the use of a P3 structure for:

- *Technically complex projects and infrastructure requirements, where scale and maintenance are equally important.*
- *Projects that are part of a codified capital plan.*
- *Situations where expedited delivery is essential.*
- *Situations where cost mitigation and reduction are essential for project completion and financing.*
- *Areas where local jobs and wealth building are highly desired.*

The roundtable process identified many regulatory, technological, programmatic, and financial strategies that local governments can employ to drive down costs and accelerate attainment of the Chesapeake Bay TMDL pollutant reduction goals. Some of the key results and conclusions of the roundtable include the following:

- Nationally, the use of LID/GI technologies has been shown to be the most cost effective approach for urban retrofits in most instances. This is primarily due to the multiple "triple bottom line" benefits (i.e., environmental, economic, and social) derived from LID/GI.
- The Chesapeake Bay Program should focus its efforts on advancing LID/GI technologies and benefits to help accelerate the implementation of the WIPs.
- Crucial to the implementation of WIPs is the removal of regulatory roadblocks that are disincentives to the development and

use of innovative advanced LID/GI technologies.

The current approved practice designs are out of date and not current with the latest and most advanced designs and research. Urban runoff volume reduction should be the primary strategy to achieve the Chesapeake Bay TMDL. Volume reduction is a much more effective, reliable, and simpler way to account for reducing annual pollutant loads, stream erosion reduction, and restoration of ecological services.

Improvement to all current technologies can reduce construction costs, increase value, reduce long-term costs, and improve efficiency. These improvements are achievable through a number measures including:

- Use of more robust design, construction, and maintenance standards;
- Use of more robust Quality Assurance/Quality Control (QA/QC) practices;
- Use of best available research and technology from both the public and private sectors;
- Optimization of market forces (competition) to drive innovation through performance based contracting; and
- Optimization of LID/GI values and benefits to improve the triple bottom line.

Furthermore, there must be a much greater effort in training, certification, and ongoing education of industry professionals (e.g., consultants, contractors, inspectors, and permit reviewers) to eliminate costly failures and improve the effectiveness of retrofit practices.

The Roundtable panel recommended that the Chesapeake Bay Program partners develop new design guidance that specifically addresses the unique engineering, economic, social, and site constraint challenges of an urban environment. Some of the recommendations on standards and regulations for best management practices (BMPs) include:

- Development of more flexible design standards, or a shift towards performance-based standards;
- Improvement, consolidation and streamlining of the state and local technology verification processes to accelerate and encourage innovation; and
- Development of special "work around" regulations for urban retrofits.

Private Sector Participation

The private sectors (e.g., manufacturers, developers, property owners) are overlooked and underutilized in the sharing of expertise and economic resources with regard to research and development, alternative financing, assessment management, program administration, and outreach. The private sectors need to be engaged in a more collaborative manner to more cost effectively implement urban retrofit programs.

The Roundtable recommended that alternative financing programs need to be implemented to encourage greater investment by the private sector to better leverage public funds. This could include use of P3s, trading and banking programs, alternative private financing (e.g., modeled after energy and water audit businesses), developer participation, refinancing opportunities to get the best rates, state revolving loans, and the development of service fees.

Local, State, and Federal Governments

In order to meet Chesapeake Bay TMDL targets and other regulatory drivers, local governments should consider working to streamline and improve current retrofit

program planning, design, procurement, contracting, and asset management policies and practices to reduce cost and time delays. Use of P3s can achieve the desired results by financing, planning, constructing and maintaining the urban retrofit infrastructure. Adequate dedicated funding sources are critical to the success of any ongoing urban retrofit program and must cover the cost of financing, planning, design, construction and long-term asset management. Costs associated with asset management and financing will generally double the original construction costs over the life of a practice. It is essential that revenue sources cover all program costs, not just construction.

State and federal grant programs should shift their focus from demonstrating pilot practices to developing comprehensive urban retrofit pilot programs that encourage technological innovation, seek more private partnerships, and develop model performance contracting. In other words, programs should encourage the development and advancement of more economically and environmentally sustainable programmatic changes.

Conclusions of the Panel

Finally, it is clear there are many technological, programmatic, and financial options and solutions to driving down urban retrofit costs. However, there are many challenges to widespread dissemination and implementation of new solutions. The biggest challenge is the typically slow process of changing institutionalized thinking and approaches, which are codified and memorialized by rigid regulatory requirements and/or programmatic processes.

CBP3 for Urban Retrofits

The common theme discovered at the P3 roundtable is that very few communities have mastered the art of designing successful partnerships between the public and private sectors, as the complexities involved cause businesses and government leaders to avoid them while critical community needs remain unmet. The key to designing a partnership between the public and private sector is to create a long-term shared stake in solving the public problem. The partnership should also provide a fair and equitable financial return to the private sector versus designing the project to maximize the private sector's return while allowing the private sector to minimize their risk.

To design a CBP3 for urban retrofits, public and private partners must create a transparent framework that aligns public, private, and community stakeholders into a long-term legal arrangement with an outlined governance structure founded in the spirit of stewardship and common purpose. Partnerships should avoid an adversarial, contract-oriented management structure. This requires a change in mind-set from government contractor to business partner.

A Model for the CBP3

A successful program used as a model for the CBP3 is the military's Residential Communities Initiative (RCI). The RCI program, created in 1996, helped address challenges in military housing for the U.S. Army. This program has helped to reduce costs for the construction of housing as well as improve overall housing quality and drive innovation in sustainability (Apgar, 2011).

The RCI program used a qualification-based procurement process to select a private sector partner to share the investment, risk, and reward for improving quality and quantity of military housing. This initiative proposed the formation of a private organization that invested both public and private dollars to oversee the construction and enhancement of residential development projects on a number of military bases.

An important element of the RCI program has been the use of long-term, low-risk

incoming revenues (i.e., military housing stipends) to gain highly favorable interest rates from the private investment community (Ellis, 2009). Economies of scale along with innovative construction practices effectively drove down costs while meeting the desires of military families to a much higher degree than past programs.

Another hallmark of the RCI has been the investment made in the community served. An example of this investment is the use of surveys by Corvias to identify the aspects of military housing of greatest need and interest. This helped make the most meaningful investments possible in terms of well-being and satisfaction. Use of on-going surveys ensures that systems are maintained properly and provide feedback to improve future investments in housing.

CBP3s Support an Affordable Green Infrastructure Retrofit Approach

CBP3s are ideally suited for implementation of a GI approach to stormwater or wet weather management; and for combining grey infrastructure with GI.

The use of GI for stormwater retrofits will require flexibility in management because of the multiple objectives, reporting requirements, and array of options for LID techniques available for selection. The program structure must factor in flux in economic conditions and community development needs. In order to be successful, the GI approach requires a consistent long-term adaptive management approach that can incorporate advances in technology and changes in conditions within the watershed and the community.

Recent advances in modeling and monitoring are now allowing communities and regulatory agencies the ability to recognize and quantify the stormwater management benefits of GI at the site and watershed scale. This includes more accurate projections and demonstrated results for the reduction of pollutant load concentrations and volume reductions from proprietary LID technologies or techniques. These advances can be seen as a "currency" or commodity that can be used to develop a market. It is projected that demand to quantify pollutant loads will drive advancement in monitoring technology, decrease the costs of reporting, and allow for development of better designs and construction.

Benefits and Potential Cost Savings of CBP3s for Green Infrastructure Stormwater Retrofits

The impetus for the development of stormwater-based CBP3s is that they will allow local governments to regulate and competitively bid urban stormwater retrofit performance contracts to private consortiums so that they will oversee implementation of the capital improvement and asset management portion. A major benefit of CBP3 structures is that through greater private involvement and use of market forces (e.g., competition, efficiencies, flexibility, economy of scales), urban retrofits can be made more affordable, technology can improve, and overall costs can be reduced. In many respects, existing government business models are too expensive, time consuming and generally lack incentives to drive down costs.

The CBP3 model for GI stormwater retrofits has a number of distinct benefits and advantages when compared to traditional infrastructure financing structures, including opportunities for:

- Economies of scale in the provision of critical services or activities;
- To promote, develop, and reflect advances in reporting, verification, and cost effectiveness; and

- For mutual learning and implementation between partners on procurement, job development, management, outreach, and reporting activities.

Costs and Benefits

CBP3s are specifically designed to result in long-term project efficiencies that ultimately reduce project costs to local governments and communities. This is, however, in direct contrast to many of the perceptions associated with private sector financing.

A commonly stated belief among local officials is that P3s will be more expensive than traditional procurement. This belief is often reinforced by misperceptions related to P3 costs, including:

- The perceived loss of public control;
- The assumption that private financing is more expensive than using public debt; and
- The belief that contract negotiations for P3s are too difficult and costly to yield a positive outcome.

However, each of these perceptions is often false, especially as they relate to CBP3 structures (NCPPP, 2012). Although there are added costs associated with utilizing private funds for public projects, savings are often derived from P3-based projects in the long-term. For example, the public sector can share the risks and responsibilities of the project with the private sector. In addition, long-term planning measures utilized as a part of the P3 development process can lead to cost savings (NCPPP, 2012).

There are several short- and long-term cost savings opportunities that can be realized through the use of a CBP3. The costs of stormwater management programs can be organized into five program categories. Each of these costs has unique requirements and savings opportunities including:

- Capital investment and financing (including engineering, design, and planning);
- Operations and maintenance;
- Permit compliance (including regulation and enforcement);
- Administration (including billing and finance); and
- Education and outreach.

Flexibility in Financing

Large-scale stormwater retrofit programs will need an alignment of dedicated public and private funds that are consistently available for projects.

GI retrofits will require flexible project financing and delivery methods, as communities are constrained in their approach to procuring infrastructure. P3 approaches can provide this flexibility to local governments. In addition, infrastructure can be financed without the need for local bonding authority or the use of capital bonds.

A key motivation for governments considering CBP3s is the possibility of bringing in new sources of financing for funding public infrastructure and service needs. In effect, there are three key infrastructure-financing options available to local governments: 1) self-financing through government funding, 2) corporate or "on-balance sheet" financing, and 3) project financing. Determination of the most appropriate financing options depends on the unique dynamics within each community, including the maturity of their stormwater program, the status of existing capital and operations budgets, and the long-term cost evaluation associated with the stormwater program.

Government Funding

The most basic or traditional financing approach is self-financing through government funding. In this case, a government may choose to fund some or all of the capital investment in a project and look to the private sector to bring expertise and efficiency. This is generally the case in a Design Build Operate project where the operator is paid a lump sum for each completed stage of construction and then receives a fee to cover operation and maintenance of the project. Another example includes the government choosing to source the civil works for a project through traditional procurement and then bring in a private operator to operate and maintain the facilities or provide the service. Even where government jurisdictions prefer that financing is raised by the private sector, increasingly these jurisdictions are recognizing that there are some aspects or risks with projects that may make more sense for the government to finance (ACEC, 2014).

Corporate or On-Balance Sheet Finance

An alternative approach to government funded or financed projects is corporate or on-balance sheet financing. In this case, the private operator may accept to finance some of the capital investment for the project and decide to fund the project through corporate financing, which would involve getting finance for the project based on the balance sheet of the private operator rather than the project itself. This is the mechanism used in lower value projects, specifically, where the cost of the financing is not significant enough to warrant a project financing mechanism or where the operator is so large that it chooses to fund the project from its own balance sheet. (It should be noted that on-balance sheet financing from the corporate perspective is the equivalent of off-balance sheet financing from the public agency perspective.)

The benefit is that the cost of funding will be the cost of funding for the private operator, which is typically lower than the cost of funding to finance the project. It is also probably less complicated than project finance. However, there is an opportunity cost attached to corporate financing, because the company will only be able to raise a limited level of finance against its equity (debt to equity ratio,) and the more it invests in one project, the less there will be available to fund or invest in other projects.

Privately financed P3s are commonly used to build a wide array of vital components of urban infrastructure such as water supply, wastewater treatment, solid waste management, highways, mass transit, bridges, electricity, waste-to-energy facilities, recycling facilities, light rail systems, and more. P3s can be community based such as a small wastewater facility, or regionally based such as an electric or water utility. They can be fully private, semi-private, or government chartered publically owned. In whatever form a P3 may take, it will encourage private investment for a reasonable return on that investment and can build infrastructure more quickly and more affordably than governments can on their own (U.S. DOT, 2008).

Project Finance

One of the most common, and often most efficient, financing arrangements for P3 projects is “project financing,” also known as “limited recourse” or “non-recourse” financing. Project financing normally takes the form of limited recourse lending to a specially created project vehicle (Special Purpose Vehicle or “SPV”), which has the right to carry out the construction and operation of the project. Typically, it is used in a new build or extensive refurbishment situation and so the SPV has no existing business. The SPV will be dependent on revenue streams from the contractual arrangements and/or from tariffs

from end users, which will only commence once construction has been completed and the project is in operation. It is therefore a risky enterprise and before they agree to provide financing to the project the lenders will want to carry out extensive due diligence on the potential viability of the project and a detailed review of whether project risk allocation protects the project company sufficiently. This is known commonly as verifying the project's "bankability" (ACEC, 2014).

Effective Risk Mitigation

Stormwater management is an increasingly complex local government-financing obligation, and the financing implementation risk can be significant. Appropriately structured P3 arrangements effectively transfer much (though not all) of the program risk, including financial risk, to the private sector. Risk mitigation examples include:

- ***Increased project performance:*** Collaborative partnerships between local government and the private sector have a demonstrated success in improving the delivery of vital services to the community. This will be especially important in regards to stormwater investments that will be significant, varied, and highly technical in nature.
- ***Expedited delivery of services:*** P3 structures offer the potential for faster project completion and reduced implementation delays.
- ***Higher return on investment:*** Innovative design and financing approaches result in a higher return on investment, both financial and environmental.

Funding Sources

There are other funding sources besides private sector funding that can play an important role in urban retrofit. These sources include grants, banking and trading, SRF, user fees, service credit fees, multi-jurisdictional funding, and cost sharing with other public programs. A more comprehensive discussion of funding and financing is provided in Chapter 5.

Key Components of the CBP3

The CBP3 utilizes or adapts many of the conventional P3 approaches for financing, procurement, contract, and program management. The significant difference is that a CBP3 is a "relational contract" built on long-term trust and confidence that both parties will act as partners. A conventional P3 approach uses a "transactional" contract approach with discrete and static metrics for reimbursement that cannot address the flexibility and complexity required for stormwater retrofit programs. Though CBP3s are based on the traditional P3 model, there are some distinct differences between the two structures, including:

- ***Alignment of goals:*** Common goals among the private and public partners create shared results.
- ***Accountability:*** Partners share responsibility for project governance and major decisions, but the primary partner is responsible for performance-based implementation.
- ***Transparency:*** Private sector partners operate under a fixed performance fee. The partnership is managed through adaptive management by regular partner-ship meetings where major decisions necessary to ensure the project meets its intended goals are governed.
- ***Sustainability:*** Programmatic long-term focus aligns the initial design and build with O&M. All excess cash flow from savings or efficiencies is reinvested into the project or returned to the local government.

- ***Efficient use of funds:*** Use of private capital, expertise, and efficiencies leverages public investment with efficient long-term operational cost savings that are reinvested back into the project.
- ***Commitment:*** The private partner will commit to the local community through community stewardship and economic development of small and disadvantaged businesses.
- ***Value driven:*** The public partner bases its selection of a private partner on qualifications and long-term value versus price.

The CBP3 model provides benefits for the public and private sector partners through opportunities including:

- Economies of scale (and perhaps critical mass) in the provision of critical services or activities;
- To promote and develop, and reflect advances in reporting, verification, and cost effectiveness; and
- Mutual learning and implementation between partners on procurement, job development, management, outreach, and reporting.

CBP3 GI Retrofit Alternative Financing Model Works to Utilize Drivers and Overcome Barriers

The long-term financial advantages and benefits to both parties of a CBP3 are perhaps the most compelling reason for consideration. A major premise and basic assumption in the development of the financial model is that cost efficiencies and ancillary benefits are best optimized through market-based forces. This has been the experience in other industries such as recycling and waste management where both have transitioned from government run initiatives to privately run businesses. The focus is on the national lessons learned in urban stormwater management and how successful technologies and business models from other industries (e.g., such as transportation, waste management, energy, wastewater and water supply) are directly applicable.

Growing Local Jobs and Community Development through a GI-Driven CBP3

The role of community is central to the CBP3 approach, as exemplified by its name. From economic revitalization to local jobs creation, to enhanced social well-being, the community benefits of this framework, designed to accelerate large-scale implementation of GI are clear. Unlike other forms of infrastructure, such as that of a toll road or a power plant, green infrastructure is also intimately tied to the social aspects of a community. A GI practice or system may be an amenity used in a community to recreate, for instance. Additionally, numerous studies show that social well-being increase for urban dwellers located near vegetated or otherwise "green" infrastructure, such as parks, street trees or vegetative practices. Another significant social benefit are the public health enhancements, such as reduced occurrence of

asthma rates for children as well as a reduction in heat-related deaths in peak summer months in urban area. Moreover, stormwater management practices built around natural hydrologic functions and increased use of vegetation can dramatically reduce energy consumption. Green roofs, street trees, and increased urban green spaces have the effect of making individual buildings more energy efficient by reducing heating and cooling demands. On a neighborhood or community level, the shading and insulation provided by these techniques cools urban heat islands, again reducing the energy required to cool indoor spaces during summer months. Additionally, by re-using harvested rainwater, some green infrastructure approaches decrease the need to use potable water for landscaping, toilet flushing, or other industrial uses. In turn, this reduces municipal and utility expenditures to transport, treat, and deliver potable water. (Banking on Green, 2012).

However, the dimension of "community" goes beyond these types of benefits to local residents, as it also includes commercial and business health and sustainability that, in turn, helps to create more local jobs. A hallmark of the CBP3 approach is the long-term commitment between the public and private partners, as well as the partnership's relationship with community stakeholders, such as religious and educational institutions and non-profit groups, such as watershed-related stakeholder groups. This long-term commitment allows the private partner to cultivate and develop local businesses and industries supporting the GI sector through stewardship and economic development of small and disadvantaged businesses, for example. Work anticipated within a GI-driven CBP3 framework that helps to ensure compliance with Clean Water laws, includes not only design and construction skills, but operations and maintenance (O&M), as well. The focus on O&M in stormwater programs has historically been lacking; however, as more research is done in this area, it is evident that maintenance is necessary for the overall health of GI practices and systems, and ensures for successful performance. The O&M service sector is also uniquely suited to match up with disadvantaged communities who may have access to the local available labor force. As a GI-driven CBP3 program matures, the effect of greened streets and parking lots will help to enhance property values through hedonic effects. Regression analyses performed on real estate sales have shown that the increase in land values for properties adjacent to open space more than offsets the property tax revenue loss associated with acquiring open space for preservation. (Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs, USEPA, 2013)

This dynamic may help to drive increase of green infrastructure and related jobs in the land development sector, as well as overall interest in the topic long-term stormwater management.

IV. CBP3 Highlights for Municipal Leaders

A successful CBP3 program can help a community realize many important environmental, financial, and community development goals. It is important for municipalities to understand that there are distinct and potentially significant limitations to this program model, which need to be addressed in the earliest stages of development or consideration of the approach.

Key Considerations

This section presents an overview of the key considerations before deciding to take on a private business "partner" and engaging in a relationship that falls within the spectrum of the P3. A balanced partnership between the public and private sectors can:

- Allocate the responsibility to the party best positioned to control the activity and manage the risks;
- Produce local economic value through private sector participation;
- Solve a costly, complex public problem with faster, less expensive solutions and better outcomes
- Substitute private resources for limited public resources;
- Employ private industry to drive innovation and operational efficiencies, ultimately lowering future costs; and
- Enhance the community's involvement and participation in municipal functions.

One-off Project Partner versus Long-Term Programmatic Partner

The most critical issues a public entity needs to consider are the purpose, goals, and objectives of the partnership. The municipality needs to identify whether the private partner is engaged in a specific individual program, such as WIP compliance, or for a more holistic long-term and comprehensive stormwater program that is also concerned with the implementation and management of all public assets and responsibilities. Examples include flood control, system capacity, and drainage system maintenance and repair. The private partner engages primarily as a one-time source of capital for implementation and operations in the case of a specific program. If a more comprehensive program, the private partner engages primarily as a means of sharing or completely transferring construction and operating risk for a related group of municipal assets and responsibilities. This distinction is important and dictates the appropriate legal structure, length of term, ownership of revenue stream, and public entity oversight and control.

Request for Proposal versus Request for Qualifications

The Request for Qualifications (RFQ) approach is appropriate for many communities that do not have significant experience or expertise with a P3. This approach will allow the community to evaluate a range of options and suggestions for contract structure, procurement, financing, and operations. It will also allow the community to develop a contract that reflects the requirements and potential benefit for the community as well as the private partner so that it is truly a collaborative effort where both parties equally share in the risk and rewards.

Improved Access to Capital

Defining the municipalities return on investment is critical to ensuring the judicious use of public funds. A P3, if done correctly, maximizes the return on investment for the community through creative goals that spur economic investment and development in local jobs and resources. A P3 provides a municipality with access to capital, particularly startup capital for new projects that is not otherwise available. In this current climate of diminishing public resources, operating dollars for municipalities are becoming increasingly scarce. Many local governments are running up against public debt ceilings and taxing limitations. Capital Investment Program (CIP) funds are even scarcer. Private capital in CBP3 programs can be used for upfront costs such as feasibility studies, predevelopment activities, and design services that are needed to take a proposal from concept to a distinct project with finite cost and time parameters. The CBP3 will also create a revenue stream that is directly generated from the creation of the capital asset or municipal service. This revenue stream provides a stable and long-term source of funding for future operations, repairs and maintenance, and without the burden of uncertainty and changing priorities of annual public appropriations. CBP3 projects provide tremendous benefit to the public participant by freeing the public entity from a long-term financial commitment; and at the same time assuring to the public sector a viable operation over its useful life and a predictable return on its investment.

Access to Highly Specialized Expertise

The municipal staff at local governments, especially smaller ones, have had limited exposure and experience with P3 projects. Staff training, availability, and capacity may be significant impediments to evaluating and then eventually managing and overseeing P3 projects. The involvement of experienced private partners is an absolute necessity to assist the municipality's staff on the implementation of the program. A long-term training program where the municipal staff have direct access and exposure to the activities associated with the CBP3 program is essential to the success of the program.

Accelerated Project Development

Traditional CIP approaches to infrastructure take years to determine the feasibility to program, plan, finance and construct. There is often unpredictability on performance issues because of uncertainty on O&M and different phases are often funded under different programs.

The private development process is streamlined because of the emphasis on expedited project delivery times, value engineering, cost control, and efficiencies in staffing and management. In addition, the private development process treats each project as an investment, rather than a requirement that must be funded. The costs and the need to implement and successfully operate as many projects as possible is critical to the financial success of the partnership.

Access to Private Development Incentives

Many large-scale development projects include some form of public financial assistance in order to provide an incentive for the developer to select the project site and reduce the competition for the development by other jurisdictions. These can take many forms, including outright grants or payments, full or partial real property tax exemptions, low-interest loans, payments in lieu of taxes, infrastructure subsidies, and state and federal tax credits. Publicly funded programs do not usually qualify for these types of development incentives.

Many CBP3 projects will most likely involve development and ownership of the storm-water capital assets through a separate entity. This can be a for-profit or not-for-profit entity. Municipalities can use this separate ownership structure to their advantage by accessing government incentive programs not otherwise available or allowed for public construction. This option can make funds available to other programs through the cost savings.

Pooling and Leveraging of Resources through Entities with Common Objectives

CBP3 programs can be structured to address a wide range of public challenges and can take on many shapes and sizes with various private industry partners. In discussing the concept, there is a tendency to think of the prototypical CBP3 as a development project between a public entity and a private real estate developer. The reality is much more benign, and much more complicated. The CBP3 approach starts with a development project, but often includes community outreach and economic development components and usually involves long-term collaborations between public entities and a wide range of private industry partners such as hospitals, research institutions, and non-profit entities. These collaborative efforts allow municipalities to partner with organizational entities and pool limited resources toward a common objective. Properly structured as a true partnership, a CBP3 program can achieve traditional project-based objectives, such as cost savings and expedited construction, and more importantly at the same time, it can maximize community-based objectives.

Project Delivery Flexibility

Municipal entities are often limited by law to use design-bid-build delivery models or through turnkey or bids on construction documents with fixed items and prices. The CBP3 model provides alternative delivery models such as design-build, construction manager at risk, and provisions for long-term operational sustainability. These alternative delivery models offer the public sector participants greater flexibility, the ability to transfer some or all of the construction and operating risks associated with programs to private partners and the possibility of significant cost and time savings when compared to design-bid-build projects. A key benefit, besides flexibility and adaptable management, is that the municipality can still maintain control over the construction and operation of the facilities.

Participation in Operations and Performance Decisions

It is often difficult for a municipality to have sufficient funding and resources to operate and maintain a facility or system once it is commissioned and turned over by the contractor. A CBP3 arrangement will allow the municipality to participate in the long-term ownership through a separate for-profit or non-profit entity. This includes input and involvement in decisions for maintenance, funding, and return on investments over the long term.

Ability to Obtain Conventional Bank Financing

Projects associated with a CBP3 program may be used as a revenue stream or as collateral for project financing. CBP3 projects are constructed on either privately owned land or publicly owned land and is leased or otherwise made available to the CBP3 project on a long-term basis. This may allow the CBP3 project owner to grant a mortgage on the capital asset and pledge the revenue stream generated by the asset to the program and financial institution. This enables CBP3 projects to utilize construction

and permanent bank financing, which has typically excluded municipal sectors.

Eligibility for Off-Balance-Sheet Treatment

The public entity may be able to treat investment and liabilities of the partnership on an off-balance sheet basis. This will enable the municipality to exclude CBP3 projects from its financial statements and financial covenant calculations. Public credit markets and credit rating agencies may include these projects in their analysis of municipal debt and obligations. In addition, they may consider the revenue generating aspects of the assets.

Potential Exemptions from Real Property Taxes and Local Land-Use Approvals

CBP3 may provide significant tax benefits to the private partner. The facility constructed on private property through the venture may be exempt from real estate taxes due to the relationship with the local government. If a CBP3 project is undertaken on municipally controlled land, the project may also be exempt from taxes. Many municipal codes are exempt or have special "lenient" provisions in the land development process or the zoning codes for municipal projects. This may help to expedite projects, relieving them from many difficult zoning and land development requirements that are prevalent in redevelopment and retrofit projects.

Ability to Transfer Risk to Private Partner

Most CBP3 structures involve some degree of risk transfer to the private participant. This includes risks related to construction cost overruns, construction delays, operating deficiencies and future capital repairs, and replacements that are required for the long-term sustainability and operations of the facilities. The public sector participant can mitigate and in some cases completely insulate itself from these program related liabilities. The private sector partner benefits because they receive more revenue through the reduction of risks and for the efficient operation of the system.

Ability to Address Critical Water Quality Issues

The challenges in water quality within EPA Region 3 have been previously described, and it is clear that the needs in this area are great. An advantage of the CBP3 approach is the ability to adapt a program to meet the needs of the community. Regarding the Chesapeake Bay TMDL requirements that represent the major water quality issue for many MS4 communities, the CBP3 approach brings the ability to greatly accelerate the implementation of GI to meet WIP goals.

An additional advantage of the CBP3 approach exists for those MS4s with a retrofit requirement, as the CBP3 approach seeks to replace the project-driven mindset in stormwater programs today with an outcome or output-focused view. Currently, the status quo method of meeting MS4 permit requirements is by identifying specific stormwater projects that can help attain regulatory goals. The CBP3 approach looks beyond the project level and seeks to address the ultimate outcome needed to meet permitting goals, such as total impervious acreage retrofitted or total pounds of phosphorus reduced. By focusing on the end goal, the CBP3 approach can identify ways to gain cost-efficiencies in this context, such as economies of scale, BMP standardization, and reduced transaction costs associated with a cumbersome procurement system.

Beyond the MS4 needs, many communities face the added challenge of reducing CSO discharges. Most CSO consent decrees have a 20 to 25-year window in which a long-term control plan (LTCP) can be enacted. More

recently, there has been a push for 30-year timeframes for consent decrees, especially for those communities who may be considering an integrated approach to addressing wastewater and stormwater investment needs. These timeframes align very well with the typical 30-year window envisioned for CBP3s. A hallmark of the CBP3 approach is the long-term nature of the relationship between the private and public entities. The ability to enter into a long-term contract to implement a GI-driven CBP3 program to address CSOs fits hand-and-glove with the nature and intent of the timeframe of an LTCP associated with a consent decree.

The tie between CBP3 and IP reaches beyond timeframes, as a basis of IP is cost efficiency. EPA defines IP as a process that "has the potential to identify a prioritized critical path to achieving the water quality objectives of the Clean Water Act by identifying efficiencies in implementing competing requirements that arise from separate wastewater and stormwater projects, including capital investments and operation and maintenance requirements." In short, IP is about achieving outcomes in a more cost-effective manner, which is consistent with the spirit of the CBP3 approach. Additionally, the IP framework lends itself well to GI. In a memo released in 2011, EPA states that "Integrated planning…can lead to the identification of sustainable and comprehensive solutions, such as green infrastructure, that improves water quality as well as support other quality of life attributes and enhance the vitality of communities." EPA goes further in this memo by stating that they "strongly encourage the use of green infrastructure and related innovative technologies," and they cite that employing GI not only protects water quality, but also has an influence on, "improving property values, saving energy and creating green jobs." While the IP approach is new and evolving, the fact that it is a long-term and outcome-oriented framework that strongly encourages the use of GI to cost-effectively address water quality issues creates a strong linkage to the CBP3 philosophy.

Potential CBP3 Pitfalls and Limitations

The complexity and nuances of a CBP3 arrangement can create many administrative and procurement challenges for the first venture for a community. Described below are some potential challenges and areas of concern that may be encountered in the development and delivery of the program.

Potential for Void Contracts

Perhaps the biggest potential problem with all CBP3 arrangements is the fact that one of the participants in the venture is a public entity. This means the foundation of the arrangement contains one or more contracts with a municipality. Therefore, at the inception of any CBP3 project, attention must be paid to whether or not the municipality has the requisite legal authority to make the contract or contracts required for the venture. It is also important to confirm the venture complies with state law public procurement requirements. Generally, if the public entity lacks municipal power to enter into the contract or they have not complied with state law-contracting requirements, under the law of most jurisdictions, the contract is void or voidable. This puts the municipality, the CBP3 partner, and any entity lending or providing capital to the partner or the venture, at tremendous risk.

Potential Need for Special Legislation

CBP3 arrangements can be structured through a combination of leases, operating agreements, affiliation agreements, occupancy agreements, or other contractual arrangements between the public entity and a private partner. This can be done in the form of a limited liability company, or a constructed partnership through a contract depending on the basic powers of the municipality. It is still not a traditional partnership (or "limited liability corporation") because of the unique requirements of stormwater programs. Special enabling legislation may be necessary to meet the requirements of the partnership. This may take a significant amount of time and effort to go through the state and the local approval process.

Public Contract Oversight

Local requirements for construction of public facilities may have to be modified to prevent restriction of the types of contractual arrangements available for the CBP3. These requirements vary widely across state and local governments. They can include measures such as prevailing wage laws; multiple prime contractor requirements; work hour restrictions; mandatory public bonding; mandatory project labor agreements; public officer conflict of interest provisions; freedom of information obligations; small, local, and disadvantaged business requirements; and dispute resolution limitations. These requirements may reduce or restrict many of the CBP3 financial benefits and may require significant resources for reporting and compliance.

Restrictions on Public Officer Involvement

Local governments need to make sure that state law allows its officers to engage in partnerships with private entities. Some states expressly prohibit municipal officials from becoming officers or directors of private entities. This may restrict the ability of the municipal program managers to participate directly in critical decisions.

Public Perception and Labor Force

Stakeholder, business, property owners, and citizen perception and their understanding of the process are critical to the success of the program. Collective bargaining agreements with labor forces within the local government, union participation with contractors, and impacts on consultant contracts are important factors when determining participation requirements.

Legal Challenges and Insights

Legal issues related to the CBP3 approach reflect the unique nature of this innovative framework. Traditional P3s have well-understood statutory and legal aspects, and some of these are applicable to the CBP3 approach while others do not fit as easily in this context. For instance, both traditional P3s and CBP3s are impacted by issues related to procurement methods, environmental streamlining/permitting, and agreement provisions. However, a CBP3 in the context of green infrastructure investments are uniquely linked to aspects of the Clean Water Act (CWA), specifically the NPDES and TMDL programs. Considerations should be made to ensure that legal teams supporting CBP3 efforts are well-grounded in CWA issues as well as land development, environmental permitting/planning, and local stormwater regulations/ordinances.

V. CBP3 Highlights for Financing Officials and Advisors

The goal of the CBP3 approach is to provide a framework that results in a low-cost, low-risk, private financing partnership with the municipality or local jurisdiction's long-term goals and objectives as the driver versus private sector investors' priorities. It is critical to take an independent view of each jurisdiction's challenge, evaluating all possible public and private financing options, assessing the associated risks and constraints, and then customizing an approach based on communities' goals and objectives that balance the regulatory, financial, and community objectives desired by any one local jurisdiction.

Finance Strategy & Approach

Counties and municipalities are not required to follow a specific model to meet their regulatory guidelines—the intent of the CBP3 approach is to develop a customized financial model that will evolve through a P3 process that is tailored to meet the municipality's needs for the long-term. In this way, local jurisdictions can maximize their funds when and where they are needed through evaluation of financing strategies and transfer the risk from the local government to the private sector partner.

Development of a Long-term Financial Sustainability Strategy

In addition to funding all O&M over the life of the program (assumed to be 30 years in this chapter), the capital structure also provides for all residual cash flow to either be returned to the municipality or deposited into a Residual Return Reserve (RRR) to provide a significant source of funds for future projects rather than be returned to the private partner as in other P3 structures. These elements ensure that at the end of the 30-year program, the infrastructure aligns with future 30-year standards and is not just well-maintained 30-year old infrastructure.

CBP3 GI Retrofit Financing Model

- ✓ Flexible & Adaptable to Meet Needs of the Partnership Structure
- ✓ Attractive Platform for Lenders
- ✓ It is important to recognize that the financing doesn't influence the structure of the CBP3. Rather, CBP3 financing programs are intended to be flexible and tailored to meet the particular construction demands and needs of the partnership structure.
- ✓ In other words, CBP3 financing programs are reactive to the unique needs of each development project and partnership requirements. Bonds can be issued to provide both construction inancing and long-term fixed rate financing.
- ✓ The financing can also include interest-only periods during construction to leverage the amount of funds available for construction and amortization terms of 30 years and up to 40 years to minimize annual debt service expenditures. All the funds needed to complete the project can be issued at closing or periodically throughout the development period.
- ✓ The partnership can also elect to conduct a public offering or private placement of the bonds to finance the project.
- ✓ To further lower the cost of funding for the partnership, the use of public funds such as federal State Revolving Loan (SRF) funds and or WIFIA enhances investor participation and the cost of funding by replacing higher cost private equity dollars and demonstrating public sector commitment to the project.
- ✓ SRF and WIFIA dollars also lower the amount of debt the project needs to raise creating improved cash flow and lower leverage.
- ✓ These dollars will also be a positive consideration if the partnership chooses to

obtain ratings from the rating agencies to attract private capital.

Partnership Structure - Creating Financially Accountability for Stormwater Retrofits

The use of P3s to support water infrastructure is not new to EPA, as P3s have been used for both drinking water and wastewater treatment facilities. EPA is generally supportive of an organization structure in the form of a partnership between a county or municipality and the private sector for the purpose of achieving affordable and effective water quality compliance through long-term stormwater management, including proper operation and maintenance, for a period of 30 years or more. This ensures the local jurisdiction is an active partner in all governance and decision-making since it is not separated from the managing entity. This type of partnership construct would act as a separate entity with independent financial accountability and rights of access to implement the actual work for contract and project performance. It would ensure a bankruptcy-remote construct that protects the local jurisdiction from potential financial challenges or failure by the private sector.

The structure allows for access to low-cost, private financing, which will provide debt to the project at very low interest rates and, more importantly, does not impact the local jurisdiction's debt rating or debt ceiling, leaving the local jurisdiction free to pursue other challenges that may require public debt financing. It also transfers financial risk while still allowing the local jurisdiction, as Designated Member (DM), to retain influence and control over the program funding through lender-appointed, third-party lockboxes setup on behalf of the partnership and managed according to a mutually agreed to Servicing and Lockbox Agreement (SLA). This agreement governs the use of all project funds and ensures funds are used for their designated purpose of meeting regulatory stormwater requirements.

Whether utilizing a dedicated local jurisdiction revenue stream, or general obligation revenue, the partnership entity consisting of both the local jurisdiction and a private partner will leverage the funds and raise the debt required to implement the program with no recourse back to the local jurisdiction. Similar constructs have historically raised capital at 10-to-1 leverage ratios. It is critical to reinforce that within this P3 construct loan proceeds and equity proceeds, along with all cash flows, are retained in lockbox accounts within the partnership controlled by the local jurisdiction. This gives the local jurisdiction the needed oversight and control of funds as well as regulators the confidence that the necessary funding needed to ensure execution and long-term maintenance of the stormwater infrastructure is protected from potential competitive uses and needs within the local jurisdiction for the long term.

In this finance structure, construction payments are made according to an Availability Payment Structure (APS). Payments are made from funds within the partnership lockbox structure and paid out only after inspection and acceptance of work put in place to the satisfaction of the lender and partnership. This is in contrast to a traditional construction contract where the local jurisdiction would be required to directly fund construction, but replicates the typical construction invoicing process in which the local jurisdiction retains oversight and assurance that payment is only made for work completed and accepted by the public partner. Eliminates any concerns of private sector overbilling and or finding out about cost overruns after they have occurred.

The private partner acts as a managing member of the partnership, versus a contractor at an arm's length reach only accessible through contract clauses, that is responsible for management, coordinating and implementation of the stormwater infrastructure program from construction through operations and maintenance over a 30-year program and is responsible to report back to the local jurisdiction and any stakeholders, including the local community via regular monthly or quarterly meetings. Performance-Based Incentive Fees (PBIF) can be incorporated that give approval rights by the local jurisdiction based on the achievement of Key Performance Indicators (KPI) determined in advance by the partnership and will only be paid if the private partner performs. Unpaid fees that the private sector loses based on nonperformance is invested back into the program to be used as a source for construction or for future infrastructure upgrades at the discretion of the local jurisdiction. Such a payment structure ensures all interests are aligned with the municipalities' goals.

Strategy and Approach for Financing on a Long-term Basis

Private capital can easily be raised, but raising it in the best interests of a local jurisdiction is the focus of this approach. It is critical to take an independent view of each and every program as no two are alike. It is critical to understand the specific goals and objectives of a P3 program, identify and address potential risks, assess challenges, and provide a customized financing solution based on the needs of the local jurisdiction to meet both regulatory, financial, and community goals for the long-term.

An approach that will aid a municipality in meet these objectives starts with the private partner forming a formal partnership with the local jurisdiction to invest in infrastructure using the design-build-finance-operate-maintain (DBFOM) model. In this arrangement, the private partner will be responsible for implementing this long-term program with oversight and approvals from the local jurisdiction. It is the uniqueness of the partnership structure proposed by private partner that allows the local jurisdiction to separate itself from the financial risk of the program while still maintaining an appropriate amount of control and oversight.

Financially Structuring a Long-Term Government Partnership

Based on the goals and objectives of the local jurisdiction, a long-term debt financing structure that allows upfront private capital to be supplied immediately to fund construction costs, eliminates the need for a large contribution or investment by the local jurisdiction during the initial construction phase. This initial phase is normally when a majority of execution risk is realized. Instead, payment is repaid over the life the program including the maintenance term though a long-term fixed revenue stream (based on size of the program) that not only repays the long-term financing, but also funds long-term O&M. This ensures the long-term commitment to the regulatory community that a goal is to maximize the life cycle benefits of GI/LID practices installed and constructed. The long-term fixed payments are the only financial commitment to be made by the local jurisdiction under the proposed partnership structure.

This fixed annual payment from the local jurisdiction is leveraged in such a way as to maximize funds available to the partnership in the short-term for construction to address the stormwater backlog while also ensuring funding for the long-term sustainability of the program through the creation of reserves, the funding of long-term O&M, and at the local jurisdiction's option, returning all savings in the form of residual cash flow back to the

local jurisdiction or reinvesting it into the program.

Under this structure, the local jurisdiction has the financial flexibility to utilize savings to invest towards potential changes in environmental regulations and investment in new technologies versus contractor profits.

Municipality's Participation is Key

Input from the local jurisdiction is crucial to establishing the most appropriate financing structure. The options outlined below exhibit the range and number of terms open for discussion and evaluation in order to ensure that the long-term interests of the local jurisdiction are met.

For example, the debt raised must be determined only after taking into consideration O&M costs and the level of service desired by the local jurisdiction. Further, these costs also must consider investments in upgrades based upon expected improvements in stormwater technology to ensure the highest quality infrastructure is retained by the local jurisdiction over the 30 years. Simply meeting minimum O&M is likely not in the best interest of the municipality, and thus it is critical to determine and solidify the expected maintenance costs during the negotiation period and ensure they are fully funded for 30 years.

It is critical to size and scale the financing to ensure that the required level of funding to complete the 30-year scope of work is met. This helps to ensure the transfer of risk away from the local jurisdiction and provides surety of funding and execution by having all funds available for construction at the start of the program. Aspects of this approach include:

- ✓ 30 year-fixed rate debt that has no recourse back to the local jurisdiction or impact to debt capacity
    - o No equity – due to very high cost of equity, any equity contributions increases the cost of private capital considerably.
- ✓ Capital and revenue sizing
    - o Fund both initial construction and all O&M for 30 years
- ✓ Residual Cash Flow (RCF) to the local jurisdiction
    - o Capture savings from private sector efficiencies to be reinvested for capital improvements versus being returned to private equity providers and investors.

The private markets will underwrite the debt raise to ensure the P3 partnership has access to the widest range of sources for the program. To ensure the lowest interest rate, thus the lowest cost of capital, resulting in maximum funds for the program, the debt will be sized to keep coverage levels in line with "Investment Grade Financing" (a credit rating that indicates that a bond has a lower risk of default) and utilize the private sector's experience with P3 programs to work with rating agencies to obtain that high credit rating. Note that coverage levels are normally based upon ratio of income to debt payments where the higher the coverage, the larger the buffer between cash available for O&M and debt payments.

As the private partner only receives a fixed, incentive-based fee for their role in the partnership, any and all RCF is returned to the local jurisdiction or the program throughout the life of the project. This is very different from other P3 structures where the majority of residual cash flow goes back to the private partner through shared cash flow agreements or additional returns to equity providers. The flexible financial structure allows for RCF after initial construction to be reinvested back into the infrastructure

through a controlled RRR. Under a reinvestment scenario, the local jurisdiction can direct funds into capital improvement, new green technologies, BMP upgrades, or performance testing for TMDL loads as they see fit. This approach ensures that at the end of the 30-year program, the infrastructure aligns with future 30-year standards and does not simply reflect 30-year old infrastructure. These reserves further serve as a contingency in the event there are gaps in financing due to unforeseen circumstances or the timing of expense.

Further Financing Strategies

Additionally, it is important to protect against interest-rate risk through a long-term fixed-rate debt structure. Bonds have a call feature that allows the partnership to refund bonds after 10 years at its option. This could be desirable if interest rates in the market decrease, allowing the partnership to refinance the debt at a lower rate, allowing more savings to be reinvested into the P3 program.

Furthermore, debt payments can be interest only for the initial construction phase of the program, helping to reduce the amount needed to be contributed to the capitalized interest account, which helps to fund initial debt payments during the construction phase, thus lowering the required debt raise and the revenue stream required. A cash-funded Debt Service Reserve Fund (DSRF) can be put in place to ensure the ability to meet short-term principal and interest obligations on the debt. This has the effect of lowering the program's risk profile, further protecting against downgrades in rating on the debt, and securing the lowest cost of capital.

Relative Cost of Financing

In the financing sector, the phrase, "the cost of money" is used to describe the overall costs (including interest payments) for varying financing approaches. The "cheaper" the money, the lower the interest rate is that is associated with the funding source, which leads to an overall lower cost of financing.

As has been previously noted, an advantage of the CBP3 approach is the ability to tailor the financing strategy to the needs and constraints of the municipal partner. For instance, it has been noted that public financing options, such municipal bonds and the SRF program, have lower interest rates when compared to private financing options. However, a community may not have bonding capacity or the ability to generate bonds at all. In these instances, a mixture of public and private financing may be "stacked" in order to drive down the cost of financing relative to a private-only financing option.

Another way the SRF program can lower the cost of financing is by lowering rates for projects not considered to be high-grade investments. A report from the EPA's Environmental Financial Advisory Board (EFAB) titled, "Utilizing SRF Funding for Green Infrastructure Projects," provides a scenario where a 20-year GI project that is considered to be "minimum investment grade quality (triple-B)" that has an estimated financing interest rate of 5.75 percent can lower this interest rate through the "benefit of SRF financial assistance" to 3.50 percent, which represents a 2.25 percent saving (USEPA, 2014e). This difference represents an annual savings associated with financing of 39 percent. The EFAB report goes on to note that lower rated investments would realize an even greater amount of savings. Additionally, this report goes into great detail on how the SRF program can not only reduce financing costs, but greatly expand the pool of capital available through leveraging of funds associated with the program that are estimated to range from a minimum of 3:1 all the way up to 14:1. While GI and stormwater projects represented less than one percent of all SRF dollars prior to 2008, there has been

an increase in funding in this area more recently. This increase coupled with a rarely-used leveraging approach illustrates the great potential that the SRF program has to accelerate the implementation of GI projects across the country.

It should be noted that other bond options have arisen recently. Qualified Green Building Sustainable Design Project Bonds ("Green Bonds") have been created to generate increased investment in LEED rated building projects and redevelopment of brownfield sites. The White House announced in January, 2015 the creation of a new type of bond vehicle, the Qualified Public Infrastructure Bond (QPIB), which has been tailored to enhance P3 investments. Specifically, QPIBs are similar to Private Activity Bonds; however, they will have no expiration dates, no issuance caps and the interest on these bonds will not be subject to the alternative minimum tax with the overall effect of lowering financing costs for private participation in public infrastructure investments (U.S. EPA, 2015). More detailed information is expected from the White House in the near future. Concurrent with the announcement of QPIBs, the White House outlined the creation of an EPA-led Water Infrastructure and Resiliency Finance Center (U.S. EPA, 2015). It is expected that this entity will be the focus of continued innovation in the effort to aid communities in their efforts to fund and finance water-sector projects.

Another innovative financing approach in the water sector is the Green Century Bond. DC Water announced the issuance of $350M in taxable, Green Century Bonds in July, 2014, which expand the usual maturity length of 30 or 35 years for municipal bonds in the water sector to 100 years. The benefits of this approach for DC Water is that it aligns financing goals with the long-lived nature of water infrastructure, respects the multi-generational benefits of water infrastructure benefits, and locks in historically-low interest rates.

DC Water innovativeness in infrastructure funding and financing goes beyond that of the Green Century Bond. In March of 2015, DC Water announced it had received one of five grants from Harvard University to develop an innovative financing model for GI through the use of Social Impact Bonds (SIBs). The DC Water approach will be to use a "Pay For Success" (PFS) model that will allow "governments to partner with private sector investors who provide up-front funding to promising service providers," with the investor being repaid only after the implemented GI has been shown to be "measurably successful" (DC Water, 2015). The DC water utility states that their goal in pursuing this approach is to, "reduce the scope, scale and cost of the mandated grey infrastructure tunnel system," through an approach that, "promotes accountability and smart programming" (DC Water, 2015). While the SIB approach has been more commonly used in the prison and other social welfare sectors to tie investment returns to the ability of the private sector party to reduce re-incarceration rates and similar metrics, the principle of tying a return on investment to performance has clear applications in the GI sector. One concern stemming from wastewater utility rate payers who are involved in a CSO consent decree is the uncertainty of long-term performance associated with GI; however, as the DC Water General Manager points out the SIB model is "measureable, so our investors and public stakeholders can objectively quantify results, which promotes accountability and smart programming" (DC Water, 2015).

Ranges for typical interest rates associated with these various are listed in Table 1. The range of interest rates illustrates the opportunity in engaging in capital stacking to optimize the mix of public and private

financing options for a least-cost solution for the municipal partner.

Collaboration with a Private Partner to Establish the Right Financing Structure

As summarized in Table 2, there are several alternate financing options that may be evaluated by the partnership. There are many options to consider when developing a financing strategy with the private sector.

Table 1: Financing Interest Rates for Various Options

Municipal Bonds	Typical interest rate = 3-4%
CWSRF (Federal Loans and Grants)	Typical interest rate = 1-3%
Private Bonds/Equity	Typical rates = 5-15%
Green Bonds	Typical rates = 2-4%
Green Century Bond (DC Water)	Rate = 4.814%

Table 2: Impacts of Alternate Financing Structures

Potential Financing Structure or Term	Impact to Program
Fixed versus Variable Revenue Stream	If the revenue stream committed by the municipality were to be in a fixed amount on an annual basis (versus variable amounts), such a structure could receive a credit rating one notch below the municipality's current rating, as a result of lower perceived risk.
Gross versus Net Revenue Pledge	If the revenue stream committed by the municipality is determined *before* operating expenses, it is likely to be perceived as a lower risk to investors ultimately resulting in better financing for the program.
Investment of Loan Proceeds	Unutilized loan proceeds could be invested into high-quality/low-risk investments to preserve capital while at the same time receiving a small return. This provides another potential source of funds for the project while putting unutilized loan proceeds to work. One investment vehicle used successfully under the Military Housing Privatization Initiative (MHPI) is Guaranteed Investment Contracts (GICs). GICs can be provided by investment. These pay out a specified rate on the principal for a predetermined period of time and can be structured to be flexible in the timing of draws, so the project is never penalized.
Equity Contribution	If required by the lender, or requested by the municipality, a private partner can also contribute cash equity. Depending on the needs, contributions can be made at the start of the program, at the end of construction, or no equity contribution at all. This equity will earn a fixed market-rate return paid only after all initial construction is completed. All payments are subordinate to all operational expenses.

Potential Financing Structure or Term	Impact to Program
Construction-to-Permanent Financing	Debt is paid out in stages, rather than up-front as modeled, charging an administrative fee to do so, and only on an as-needed basis during construction. At the end of construction period, a permanent loan must be obtained to finance the remainder of the program. This adds interest-rate risk to the project as the construction loan is subject to variable rates and the permanent loan will be closed based on the market in several years unless the project pays for a rate lock, which could be costly. In additional, by not having all funds available at the start of the program, this puts the project at risk to obtain funding and ultimately, execution.
Use of Grant Funds	Using grant monies to fund all or a portion of the program could result in a loss of control by the partnership due to the influence of third parties that govern how grant funds will be used. Grant funds may not materialize if payment is dependent on the achievement of certain measures or milestones.
100% Equity Financing	Investors or equity providers can either take a share of the profits or a high, fixed preferred return (9%-15%) or some combination, thus requiring partner to act in favor of the investor(s). This structure leaves fewer funds available for project scope. Under a 9% preferred return equity scenario, the municipality would need to pledge 30% more in funds versus the debt structure proposed by Private Partner to meet the same scope. A 15% scenario would require a pledge that is 60% higher.

Risks and Benefits of the CBP3 Structure

The CBP3 approach provides assurance to municipalities that revenue will be used solely for the purpose of stormwater management and will be maximized to meet the size of the backlog. The financial and credit risk associated with a long-term contract of this magnitude is also transferred to the partnership relieving a municipality from this burden. Additional risks of the CBP3 structure are outlined in Table 3.

Advantages of this Finance Strategy to a Government Entity

This strategy is advantageous because it offers:

Surety of Funds

- Minimized funding risk by having all debt proceeds available for construction use by the partnership at the start of the program to be drawn upon over time from a lockbox account.
- Maximized funds available to the project through:
  - Surety of funding from private debt financing,
  - Option for interest only debt payments during construction, and
  - A fixed, performance-based fee model that reverts all savings as RCF to the local jurisdiction control for reinvestment versus profit.
- Having all private funds deposited into lender-appointed, third-party lockboxes that are managed according to a mutually agreed to SLA with governance by the municipality.

Table 3: Local Jurisdiction Benefits and Risk Mitigation Associated with CBP3 Aspects

Transfer of Risk
Financial risk is transferred to the private sector through the new partnership which will bear the burden of debt and default. The municipality's only financial contribution to the program is a committed revenue stream. Because of this separation of financial risk, no impact to the municipality's credit rating is to be expected. The municipality gets oversight and ultimate control of spending inside a private vehicle that is bankruptcy remote and has no recourse to the municipality. Additionally the framework and project debt remains intact if the private partner is removed.
Surety of Funding
Private capital that creates a firm commitment of 100% of debt proceeds are available for construction at the start of the program. In addition to O&M requirements being fully funded through the life of the program, the private partner model returns Residual Cash Flow (Savings) to the municipality or to the program through deposits into a RRR which can be used for additional investment in the program, to address unforeseen conditions, and/or meet additional regulatory requirements.
Surety of Execution
Private partner is a partner industry experience, efficiencies, and best practices executing P3s on every level, including: • Financing • Designing • Developing • Managing • Maintaining The proposed structure protects the municipality and taxpayers by ensuring all funds will be used solely for long-term stormwater management. The structure includes a third-party lockbox agent to oversee the distribution of funds per a servicing agreement.
Long-Term Viability
Unlike traditional construction contracts with a fixed investment and effort toward creating additional profit from cost savings, this approach focuses on the goals, objectives, and best interests of the stormwater program. The proposed financing structure provides for maximum funding for construction the start of the program, stable O&M cash flow for the full 30-years, and savings in the form of residual cash flow to be returned to the municipality or reinvested at the discretion of the municipality. This allows for the local jurisdiction to control the level of capital investment throughout the life of the program, ensuring a current and modern infrastructure at the end of 30 years rather than infrastructure that reflects outdated and aged GI.
Financial Transparency
Private partner only earns a fixed, incentive-based fee, based upon KPIs as agreed to by the partners. In addition to approving fees, the municipality also has approval rights on annual budgets, and will receive regular progress reports and updates from the partnership.
Flexibility of Partnership
In the CBP3 partnership structure, the municipality remains an active participant in the program in all aspects of the project through the 30-year term. Despite the transfer of risk to the partnership, the municipality retains the ownership of the infrastructure and also is responsible for directing the use of RCF (Savings).

Surety of Execution

- The transferring of financial risk from the local jurisdiction to a private, bankruptcy remote and non-recourse to the municipality, LLC without having to give up control, allowing the local jurisdiction to own the infrastructure, and also influence and enforce standards on the long-term development and management project within the community.
- Keeping the infrastructure sustainable and modernized throughout the 30-year program through the continual funding of O&M, and at the municipality's option: the reinvestment of residual net cash flow into future infrastructure projects.
- Aligning interests of all contractors to that of the municipality through utilizing a fixed-fee model that is heavily performance based with incentives awarded by the achievement of certain KPIs to be determined by the municipality.

Separation of Financial Risk and Program Control

Under the proposed Partnership structure, all of the financial risk is transferred to the partnership. It is the partnership that bears the burden of debt, while the only financial contribution by the municipality is the committed revenue stream. Even in the unlikely event of default, the funds remain available to the program within the partnership. The municipality will continue to retain the right to manage and maintain the stormwater infrastructure and direct use of RCF.

Cost Accountability Standards including Recording and Budget Requirements

The approach is to create a P3 structure that meets all cost accountability standards with built-in checks-and-balances to ensure compliance with financial reporting and funds management. A third-party Lockbox Agent (LA) will be appointed by the lender to oversee the management of funds and will work with the Managing Member (MM) and DM of the partnership as part of an approval process for timely and accurate recording, budgeting, and cost accounting. The approval process involves both members of the partnership. In addition, periodic meetings will be held between the private and public sector members to monitor progress and implementation of the program.

Reporting requirements include construction costs, progress reports, and Financial Statements. The partnership will also produce audited Financial Statements in compliance with Generally Accepted Accounting Principles (GAAP) and will be made available to the public. Approvals by the public sector partner for the forecasted construction budget, as well as a long-term O&M budget, will be made for the P3 structure prior to implementation. Annually, the municipality, as a DM, will review and approve these submitted budgets. This annual budget process ensures that the municipality has visibility and can revisit the level of maintenance and the amount of planned improvements for each year based on the evaluation of the Stormwater Management Plan's (SWMP) effectiveness to ensure compliance with water-quality standards.

The overall structure is intended to be one of redundancy, providing security and assurance in the event of unforeseen conditions or overages. All funds will be deposited into a lockbox account to be managed by a lender-appointed third-party LA in accordance with the SLA ensuring that all municipality revenue and partnership funds are spent as directed and approved by the partnership.

Private Sectors Financial Return and Approach to Ensuring that the Assets are Preserved and High Service Levels are Maintained

The proposed P3 payment structure provides the municipality and its residents with the comfort of knowing that the private sector's return is capped and performance -based. Private partner only receives incentive fees if the parties perform according to established KPIs. Limiting and incentivizing return, as opposed to sharing in the overall profitability of the project, accomplishes several important goals: aligned interests rather than competition for cash flow, maximized project funds to be reinvested, a sustainable financing structure, and a flexible approach—all combine to offer a powerful, long-term solution to the municipality's stormwater management needs.

Procedure for raising private debt once a financial structure for the partnership has been determined

The timeline for private debt financing is dependent on when the partnership structure and terms are finalized and how the payment from the municipality to the program will be setup. Once that is completed, the private partner and selected financial underwriter will work with the rating agencies to receive a credit rating on the proposed debt. Following that, the private partner will work on placing the debt through the previously described debt competition. Once the structure with the municipality is documented and finalized, it securing the debt financing should not take longer than 60 days. At close, 100 percent of the loan proceeds are available to the program to be drawn upon over time from the LA via approvals of annual budgets and monthly construction draw requisitions.

Program Reserves that Create Surety of Execution

This program does not require additional funding from the municipality. It also protects against change orders.

All debt will be deposited into project lockboxes at the start of the program thereby ensuring that 100 percent of the funds are available to be drawn from the very beginning of the project with no additional requests for funding required from the lender. The program as part of the debt raise projected cost savings from private sector implementation establishes reserves accounts (controlled by the municipality through the partnership) for shortfalls or issues that stem from unforeseeable or force majeure events. This creates surety that the project does not skip a beat or stall due to extreme social, environmental, or weather related events.

The program carries reserves that could be tapped if needed and agreed to by both the private and public partners for unforeseeable and force majeure events. These reserves include the debt service reserve, which can be drawn upon to make any debt payments if there is a shortfall in available cash, and the operating reserve, which can be drawn upon to cover any shortfall in operations or O&M thus keeping cash flow stable. In addition, construction estimates include construction contingencies, which are there to protect the program against construction cost overages. The overall structure is intended to be redundant, providing security and assurance in the event of unforeseen conditions or cost overages. Additional reserve accounts can be added depending on the risk exposure the partnership deems necessary taking into consideration the type of work being implemented.

Transparency of Financial Fee Model

The fee structure is envisioned to maximize funds available to the program, while properly incentivizing the private partner to deliver the project concept in alignment with

the partnership goals. The fees are negotiated and agreed with the municipality, but the APS proposed will be based upon industry standards, includes a majority of Incentive-Based Fee components, and provides quantifiable KPIs to determine the award of fees. The fee structure is more heavily weighted toward the performance incentives. The result is a structure that places the private partner's fee income at risk if it does not perform to the level agreed to by the partnership. The incentive portion of Fees is based on objective and specific criteria such as: performance, delivery, safety, quality, economic development, and behavior. These incentive-based fees ensure that the interests of both the public and private sector are aligned. Any unearned incentive fees will flow directly into the RRR Account, providing an additional source of funds for the out-years if any fees are not earned.

Performance Based Incentive Fees to Ensure Good Service and High-Quality Maintenance

As discussed above, the proposed incentive fee is designed to ensure that the interests of public and private sector are aligned. The performance measure criteria can be modified prior to closing and throughout the life of the program to align with changing goals and objectives of the public sector. Performance based incentive program ensures private partner's commitment to the long-term success of the program and the sustainability of the infrastructure.

VI. Determining if a CBP3 is Appropriate

This section presents information on some of the key considerations and conditions that make the use of a CBP3 appropriate. It includes information on program management, financing, and the status of enabling legislation in each of the Chesapeake Bay states.

Implementation Challenges and Barriers for Local Governments

The flexibility, adaptability, advancement of technology, economic benefits, and leveraging resources across different economic, environmental, and community development programs of GI creates tremendous opportunities as well as challenges. Though P3s hold great promise for improving and enabling greener stormwater management performance and efficiency, there are limitations and important considerations when establishing new private sector collaborations. It is important while determining the suitability for P3 structures to look at both the public sector's goals and the private sector interests in achieving those goals. Potential limitations to P3 structures include:

- P3s have risks involved and local government will pay a premium to transfer those risks to the private sector. As a result, it is essential to do a full cost evaluation to determine the validity and value of a P3 arrangement.
- P3s are not a financing panacea, nor are they suitable for all infrastructure projects.
- P3s that are effectively designed need to be managed by highly skilled personnel and contracting experts within the public sector.

The CBP3 is based on establishing a relationship based on trust that all the decisions the local government and the contractor will make are equitable and promote the overall economic, community development, and environmental health of the community. This is required to make the long-term commitment and evolving conditions of the partnership successful.

The goal is to design a transparent framework for a CBP3 that aligns the public, private, and community stakeholders into a long-term legal arrangement that outlines a governance structure founded in the spirit of stewardship and common purpose versus an adversarial, contract-oriented management structure. This requires a change in mind-set from government "contractor" to business "partner." Moreover, a program must be developed based upon a fair and equitable financial return to the private sector versus designing the project around a goal of maximizing the private sector's return while allowing the private sector to minimize their risk.

Partnerships with the private sector represent a dramatic and comprehensive departure in philosophy, administration, and contracting practices from the traditional stormwater industry business model. With such dramatic changes and level of effort needed to affect change, the adoption of long-term programmatic partnerships with the private sector will not happen rapidly without considerable collaboration and support from the public and private sectors to demonstrate their effectiveness.

Traditionally, private sector participation has been limited to separate planning, design, or construction contracts on a fee for service

basis—based on the public agency's specification. Expanding the private sector role allows the public agencies to tap private sector technical, management, and financial resources in new ways to achieve certain public agency objectives such as greater cost and schedule certainty, supplementing in-house staff, innovative technology applications, specialized expertise or access to private capital, and long-term program sustainability.

The private partner can expand its business opportunities in return for assuming the new or expanded responsibilities and risks. Various arrangements categorized as privatization, P3s, or a combination of both have all been utilized to create a relationship between a public agency and private sector entity to allow for greater private sector participation in the delivery of public sector projects that neither can solve independently.

There is also a concern that while there may be multiple ways to set up a productive public-private relationship, there are key elements that need to be set up correctly and not all partnership models will be equal, nor should they be, but rather dependent upon the needs and interests of the partners. As in other sectors, P3s take on many different variations, such as services provided by the private sector, and levels of financing, risks, and governance that is shared. The following are some examples of public-private arrangements the public sector has used to build and operate needed social infrastructure such as, housing, highways, drinking water, and wastewater facilities. In each case, the level of risk/responsibility transferred to the private partner varies. Not all true partnerships are transparent contractual relationships, and have the potential to confuse establishing long-term successful stormwater programs. Care should be taken to ensure that local governments and stakeholders are provided with proven successful models of established P3's as well as, pitfalls.

The foundation for the CBP3 model is based on a long-term commitment by the municipality and the CBP3 contractor, with each side having equity, or benefit, for all decisions. This requires confidence that both sides will act as partners sharing in the risk and rewards of both short- and long-term decisions and actions. It would not be feasible, or practical for the municipality or local government to manage, scrutinize, and be involved in all the numerous implementation options, including construction, maintenance, verification, job creation, and reporting activities for which the P3 contractor will be responsible. It would also be impractical to require that the P3 contractor wait for approval on all decisions, when incentives for the contractor include the efficient construction and verification of hundreds of BMPs in the watershed.

A conventional P3 model would not be able to meet these demands because they have primarily been used for large single objective and well defined project steps.

CBP3 Community Considerations

P3 tools provide governments at all levels with a variety of benefits over traditional procurement and contracting systems, including:

- Access to financing for municipalities that have difficulty using traditional financing sources, such as municipal bond markets;
- Increased project and program efficiency as a result of inherent economies of scale; and
- Ability to bring new infrastructure online faster than traditional public procurements because private companies have more flexibility (GAO, 2010).

The use of a P3 system is most appropriate in those situations where traditional contract arrangements are complex and the costs of designing, letting, monitoring and enforcing those contracts are high. In these situations, government agencies might well be better off developing and executing a more "relational contract" such as a CBP3 (Bovaird, 2004). Given the increasingly complex nature of stormwater management requirements and the associated costs of achieving regulatory compliance, it is clear that CBP3 arrangements will have tremendous utility in many urban communities. However, to ensure that a CBP3 is an appropriate structure, two key questions must be addressed:

1) Will a CBP3 reduce costs?
2) Will a CBP3 effectively mitigate the risk associated with private sector contracting and financing?

The Role of Public and Private Partners

The specific roles of the public and private partners are what distinguish P3 structures from traditional financing structures. In addition, the specific role of each partner is dependent on the unique needs of each community and project. There are four project functions associated with stormwater financing projects that are the basis of P3 arrangements:

1) fee collection and revenue generation;
2) project financing;
3) design and build services; and
4) O&M

Fee collection and revenue generation: The need for more aggressive and effective stormwater management programs at the local level has led to the development of fee-based stormwater programs. There are now more than 1,500 stormwater utilities or enterprise programs across the country supporting a variety of stormwater management activities and functions. The existence of these fees and the long-term sustainable revenue flows they represent create the rather unique opportunities to leverage the private sector through P3 structures. The role of a P3 agreement private partner in collecting fees varies from direct involvement (e.g., operations of a toll road or a water system) to more passive involvement role (e.g., those in renewable energy programs). The role of private partners in generating stormwater fees will depend on state and local laws, which govern enterprise programs. In many if not most communities, the local government will be responsible for assessing and collecting stormwater fees.

Project financing: One of the most fundamentally important roles of any infrastructure development effort is project financing. In addition, there are a variety of potential relationships and partnerships available to the project partners.

Design and build: The most basic infrastructure function, and the most common role for the private sector, is providing design and build services. In fact, most local governments and communities have been relying on the private sector to design and build infrastructure projects for years. As stormwater management programs grow in the coming years, the need for private firms to construct new infrastructure will grow significantly. P3 structures will expand and codify those relationships.

Operations and Maintenance

An increasingly important role and function in stormwater management programs is the O&M of existing and future infrastructure.

Traditional procurement involves the planning and design of a project, appointment of advisors to issue public debt, and, after

securing funds, selection of a contractor to complete the project. Once the construction phase is complete, assets are turned over to the public for continued O&M. The costs of O&M then become subject to annual appropriations debates, opening up the potential for budget cuts, deferred maintenance and repairs, and politicized concerns about the use of adequate user rates or tax increases to cover continuing costs. All of this usually occurs in sequence, with O&M often financed only after construction is complete. There are significant costs associated with deferred maintenance, repair, and replacement. Studies demonstrate that deferring timely maintenance to the point of a breakdown event can increase the total cost of repair by a factor of at least 15-to-1 and at times as high as 40-to-1 (NCPPP, 2012).

One reason for expanding the role of the private partner in a P3 is the guarantee of continued maintenance, repair, and replacement of the public asset. As noted previously, deferring maintenance can cause the total cost of improvements, once finally made, to be 15 to 40 times the original cost. Thus, decision makers must consider future maintenance when determining whether to proceed with new projects. Because future maintenance costs are accounted for within P3 contracts, they are removed from the general budget debate. This means the project O&M costs are guaranteed and continued maintenance is not in jeopardy with each budget cycle (NCPPP, 2012).

Role of a Stormwater Fee Program

Under a stormwater fee program, a rebate program is typically provided, allowing property owners to get reductions in their fees, creating economic incentives for property owners to retrofit their properties. Thurston (2012) illustrated that for a typical stormwater utility and fee/rebate program, the fee (and corresponding rebate) is rarely large enough to compensate for the cost of on-site retrofitting. While this lack of incentive may limit the potential for activity in a rebate program, there may still be a number of property owners who will take advantage of the opportunity to retrofit their properties, especially in specific situations where retrofit costs are extremely low or the environmental or social ethic of the property owners is particularly strong (or both).

However, there are other opportunities to take advantage of a fee/rebate program. For instance, a CBP3 entity could provide the capital investment to retrofit a property with the incentive of payment based upon completion of the project while the property owner can realize a cost savings through the rebate associated with the retrofit on their property. Those with relatively high fees would have a strong incentive to engage in this type of arrangement. This "win-win" situation may provide a strong basis for a CBP3 to engage in robust outreach to those property owners who may signify the biggest "bang for the buck" in terms of retrofit investment.

P3 Legislative Climate in the Chesapeake Bay- Mid-Atlantic Region

P3 Legislation in EPA Region 3

With the recent passage of Pennsylvania House Bill 3, authorizing Public Private Partnerships for transportation projects, all states within EPA Region 3 now have enabling legislation for P3s. This final commitment by states within EPA Region 3 to implement P3s further strengthens the ability of local governments to implement successful stormwater programs integrating GI. While this signals to the P3 investment community that the Mid-Atlantic may be a fertile market for investment, the statutory variability between Region 3 states (i.e., Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia) illustrates that some states may be better

suited to the CBP3 model for urban retrofits than others. For instance, some states have recently adopted P3 legislation that limits arrangements to the transportation sector. In other instances, the limitation of home rule may stifle P3 arrangements with local governments. Characterizations of key aspects of state legislation related to P3 investments are summarized below.

Virginia

The current P3 enabling legislation in Virginia is the Public-Private Educational Facilities and Infrastructure Act (PPEA), which was modeled after the Virginia Public-Private Transportation Act (PPTA) of 1995. PPEA is the "social" counterpart to the PPTA (Bryant, 2014). The law authorizes a private entity to develop and/or operate a qualifying transportation facility, subject to approval from and a comprehensive agreement with the responsible public entity. The law also authorizes government agencies to use P3s for education facilities, technology infra-structure, and other public facilities. Qualifying public projects include, "any building or facility that meets a public purpose and is developed or operated by or for any public entity," and "any improvements necessary or desirable to any unimproved locally- or state-owned real estate" (Commonwealth of Virginia, 2014).

A legal challenge regarding this legislation has arisen. The Virginia Department of Transportation (VDOT) entered into a P3 arrangement with Elizabeth River Crossing Op Co, LLC for a 58-year agreement to build and operate the Midtown Tunnel and Martin Luther King Freeway Extension. A private citizen sued VDOT and the Elizabeth River Crossing Op CO, LLC claiming the toll was an unconstitutional tax. The circuit court found for the private citizen, but the Virginia Supreme Court overturned the ruling in November 2013 stating that the toll revenue collected is a fee and not a tax (Babst and Calland, 2014).

Approximately 200 projects have been funded through PPEA since 2003, including at least seven water/wastewater projects. (Bryant, 2014). The legislation allows for solicited and unsolicited proposals, and it should be noted that the PPEA law has been adopted in whole or in part in the following states: Florida, Texas, Utah, Maryland, Arizona, California, and Michigan (Bryant, 2014).

Considering that PPEA has been used to finance projects in the water sector, and that the Chesapeake Bay TMDL and is driving needs for stormwater retrofits in several large regulated communities in the state, Virginia may be a prime market for P3 investments in stormwater infrastructure. A presentation was made by a former high-ranking official in Virginia state government at a March 2014 event focusing on innovative stormwater financing that highlighted PPEA as a strong funding opportunity for storm-water investments.

Maryland

House Bill 560 was passed and signed into law in July, 2013, which amends 2010 legislation that represents the state's first attempt at enabling P3s for both transportation and non-transportation infrastructure investments. The updated law authorizes state agencies to enter into a P3 for various public infrastructure projects (Maryland Reporter, 2014).

The term "public infrastructure asset" is defined as "a capital facility or structure, including systems and equipment related to the facility or structure intended for public use," which reflects the expanded coverage beyond transportation (State of Maryland, 2014a). While the bill explicitly states that "only reporting agencies in the bill may establish a P3," and that "reporting agencies

include the Department of General Services, MDOT [Maryland Department of Transportation], MDTA [Maryland Transportation Authority], and State higher education institutions," partial home rule allows local governments, such as Prince George's County to form a P3.

A review by a Board of Public Works (BPW) is required whether a bid is solicited or unsolicited, both are accepted (State of Maryland, 2014a). Concession length is limited to 50 years, but can be extended upon review and approval of BPW. The law also relaxes the definition of a "public notice of solicitation" by allowing for the development of Requests for Qualifications (RFQs) as well as Expressions of Interest (EOIs) and Requests for Proposals (RFPs) (State of Maryland, 2014a).

One important piece of legislation indirectly related to P3 adoption for stormwater infrastructure investment is House Bill 987, which was passed and signed into law in 2012. This legislation, referred to as "Stormwater Management – Watershed Protection and Restoration Program," requires National Pollution Discharge Elimination System (NPDES) MS4 Phase I communities (there are ten such "large" MS4 communities in Maryland) to "adopt and implement local laws or ordinances necessary to establish a watershed protection and restoration program." In the context of this legislation, this is a requirement that Phase I communities develop a stormwater utility (State of Maryland, 2014b). The significance of this statutory requirement is based upon the ability for a potential P3 investor to leverage private dollars at a low interest rate due to a dedicated public funding source, which should act as an attractor for P3 investment opportunities. The surety provided to the private sector through House Bill (HB) 987 is that public dollars will be available in major stormwater markets in Maryland, which could act as a catalyst for P3 investments in stormwater beyond Prince George's County.

It should be noted that at the time of publication of this document, the Maryland State House overwhelmingly passed and the Senate unanimously passed Senate Bill (SB) 863, which calls for the repeal of HB 987 (Maryland Reporter, 2015a). While this may seem like a setback to stormwater funding, the details of SB 863 reveal the opposite (State of Maryland, 2015). The major differences between HB 987 and SB 863 is the lack of a requirement to establish a stormwater fee at the local level; however, unlike HB 987, the new bill requires each local jurisdiction to establish a fund to invest in infrastructure needed to meet Chesapeake Bay TMDL goals and lists out significant penalties for failing to do so (Maryland Reporter, 2015a). Based upon recent remarks by the Maryland Governor, it is expected that SB 863 will be signed into law.

It may also be significant to note the political challenge to pass and implement a storm-water utility, even when it is statutorily required. Some Phase I communities in Maryland have either actively pushed back against the development and implementation of a stormwater utility or have passively done so by developing a utility that charges absurdly low rates. Similar political and public challenges are seen across the country from St. Louis to Los Angeles to Jackson County, Michigan (WEF, 2014). A strategy that could help overcome these challenges is to couple the use of a proposed stormwater utility with a P3 program for stormwater investment by highlighting that a utility may be a strong attractor for private investment through a P3 framework. This could disarm opponents by highlighting that a P3 would reduce public investment costs and risks while generating local jobs and private investment, all while helping to restore and protect local waters.

Delaware

Enabling legislation in the State of Delaware has been in place since 1995 and has gone through a number of updates. The current legislation is referred to as the "Public Private Initiatives Program in Transportation" act (State of Delaware, 2014). The focus of Delaware statutes has been in the transportation sector. Current law authorizes the Secretary of Transportation to enter into agreements with private entities to study, plan, design, construct, lease, finance, operate, maintain, repair, and/or expand transportation systems. While current statutes focus on transportation infrastructure/ facilities, a Clean Water Advisory Council (CWAC) has been established to authorize P3s for water infrastructure (Strategic Partners, Inc., 2014). This group is associated with the Clean Water State Revolving Fund (SRF) program, and therefore focuses on wastewater infrastructure.

The maturity of P3s in Delaware is unclear. For instance, a 2011 peer-reviewed publication by Papajohn et al. (2011) that employed a survey questionnaire of states and P3 programs concludes that, "Delaware is not considered experienced or currently practicing because of its variation in response to the questionnaire. The response from the state of Delaware indicates that they were disappointed with their PPP projects and could not find real value in most of the proposals for a variety of reasons." To contrast, a 2009 report by the California Partners for Advanced Transit and Highways (PATH) group refers to Delaware as a state with "more extensive PPP experience" (California PATH, 2009).

Similar to Maryland, the Delaware program limits concessions to 50 years and has a review and approval process (State of Delaware, 2014). Unlike Maryland, the review and approval process is directed by the state legislature (State of Delaware, 2014), which may be more of an impediment for investments in the stormwater sector than in other states in the region, especially when considering the additional review required by the CWAC. Additionally, local communities have an ability to veto P3 projects approved by state officials and legislatures (State of Delaware, 2014).

Pennsylvania

As previously described, Pennsylvania is the most recent adopter of enabling P3 legislation. This legislation (HB 3) passed into law in November 2013. Unlike Virginia and Maryland legislation, the Pennsylvania program is limited exclusively to the transportation sector, which is reflected in the legislative text that defines P3s as "public-private transportation partnerships (PPTPs)" (Pennsylvania General Assembly, 2014a). Similar to most other states, a body (the Public-Private Transportation Partnership Board) must review and approve arrangements. Solicited and unsolicited bids are allowed and concession lengths may be up to 99 years (Toll Road News, 2012).

While the current law is limited to transportation projects, legislation (HB 1838) was introduced in the current 2013-2014 session to expand eligible projects to include educational facilities, a building to be used by a government agency, and "a building or facility used for public water supply or treatment, stormwater disposal or waste treatment or used for public parking facilities." (Pennsylvania General Assembly, 2014b). This legislation was not passed into law during the 2014 session; however, a similar version of this bill has been introduced in the current (2015) session. House Bill 382, referred to as, "Local Agency Public-Private Partnerships for Water and Sewer Projects," was introduced and referred to the Committee on State Government on February 9, 2105 (Pennsylvania General Assembly, 2015). Specifically, this

legislation allows for both solicited and unsolicited proposals for P3 agreements; however, proposals are limited to RFPs (as opposed to RFQs), but the legislation states that selection should be done to provide "the best value for and the best interest of the local agency and the general public." Revenue can be generated through "service payments", which may take the form of availability payments, potentially. Most significantly, this legislation expands the current P3 project eligibility in Commonwealth from transportation to include other projects, and like the new enabling legislation in the District of Columbia, stormwater is specifically spelled as an eligible project.

If HB 382 is successfully passed and signed into law, Pennsylvania will be a good candidate for P3 investments for stormwater infrastructure, especially considering progressive communities, such as Philadelphia and Lancaster, who are studying the feasibility of a P3-like program for stormwater. Also, there are a high number of regulated communities (MS4s) in Pennsylvania, which furthers the potential for meaningful P3 investments in stormwater.

District of Columbia

Until recently, the status of P3 statutes in the District of Columbia was unclear. Legislation known as "Public Private Partnership Act of 2013" (B20-0595) was introduced. The bill's findings indicate the District does not have "clear enabling legislation" regarding P3s; however, the bill goes on to note that even without enabling legislation, the District has entered into P3 arrangements previously, including a performance-based road maintenance contract (District of Columbia City Council, 2013b). A December 3, 2013 (District of Columbia City Council, 2013a) press release specifically cites $2.4B of needs for sewers among other non-transportation infrastructure needs (e.g., schools, Metro improvements), which indicated the allowance for non-transportation projects in anticipated in enacted legislation. After being introduced, the bill was referred to the Committees of Whole for review.

There is a recent history of "public private development construction projects" (PPDCPs) to not meet CBE requirements. For instance, an auditor's report found that of the 247 PPDCPs in the District, only 25 had successfully met the 35 percent (35%) CBE threshold (Office of the District of Columbia Auditor, 2013). Legislation (DC Act 20-76) was passed in May 2013 requiring non-compliant PPDCPs to submit new CBE plans in an effort to illustrate good will and intent to comply (District of Columbia City Council, 2013c).

The most recent chapter of P3s in the District was launched in early December, 2014, when the D.C. Council unanimously passed the Public-Private Partnership Act of 2014 (District of Columbia, 2014). The Mayor approved the bill on December, 29, 2014, with a 30-day congressional review period required under the D.C. Home Rule Act (Ballard Spar, 2015). Provisions in the bill includes streamline the procurement process for P3 projects and establishing an Office of Public-Private Partnerships (OP3), which is to be led by an Executive Director who reports to the Mayor (District of Columbia City Council, 2013a; Ballard Spar, 2015). P3 projects are specifically exempted from the Procurement Practices Reform Act of 2010, as that act is "ill-suited to the P3 model" (District of Columbia City Council, 2013a). P3 projects must still comply with First Source, Fair Wage, CBE (Certified Business Enterprise)-hiring, and environ-mental laws. Transparency will be provided by thorough oversight. The OP3 has 90 days to develop rules, policies and procedures and submit to the Council for a 45-day review period. Funding will be generated through fees and revenues collected on the review, processing and evaluating P3 project proposals.

P3 project proposals can be either solicited or unsolicited, and the OP3 may gather input or proposals through either Requests for Information (RFIs), RFPs or RFQs, when the project is deemed necessary to require prequalified proposals with criteria for prequalification including financial resources, capacity and expertise and ability to conduct business in the District. Projects less than $50M or 10 years in length require a 10-day review by Council while projects greater than $50M and more than 10 years in length require 45-day review period. The OP3 must prepare a report on the selection of any P3 proposal for Council review that includes information such as the identity of the private partner, the terms of the P3 agreement, the total cost of the project, and a Value-for-Money and Public-Sector Comparator analysis. The legislation also allows the District to enter into agreements up to 99 years in length and to enter into regional P3 agreements with other local and state agencies.

Regarding stormwater, one of the most significant aspects of the newly-enacted legislation is that stormwater is specifically spelled out as an acceptable infrastructure project. Considering the recently adopted MS4 permit requiring new development/redevelopment sites to retain 1.2 inches of rainfall events on-site as well as the growing emphasis on GI in DC Water's vision of CSO mitigation, the District is likely to be a target for a GI-driven CBP3 in the near future. Additionally, the Stormwater Retention Credit (SRC) trading program recently created by the District Department of the Environment may be a strong incentive-based driver for storm-water retrofits on its own merit; however, the new legislation could help to augment the cost-effectiveness of the CBP3 approach through aggregated stormwater retrofit projects in an effort to reduce transaction costs when engaging in the SRC program, as described in greater detail in Chapter 11. Considering the many drivers and tools to encourage stormwater retrofits, the District may be a strong market for future P3 investments in stormwater.

West Virginia

P3 enabling legislation titled, "Relating to Public–Private Transportation Projects Funding," was passed in March 2014. This law, otherwise known as the "Public-Private Transportation Facilities Act," (HB 4156 – SB 190), authorizes the DOT to use P3s for the construction of any transportation facility, which includes any public inland waterway port facility, road, bridge, tunnel, overpass, or existing airport used for the transportation of persons or goods, and the structures, equipment, facilities or improvements to such facilities (West Virginia Legislature, 2014). This legislation builds upon prior legislation that established the general enabling of P3s; however, this legislation was more general in nature. A report by the Appalachian Transportation Institute (2012) on the potential for P3s in highway infrastructure in West Virginia conclude that, "creating or modifying new legislation to encourage P3s will take time and should be considered a long-term goal," which further indicates the need for more advanced legislation related to P3s in West Virginia.

The newly passed law clarifies that approval of P3 arrangements are required from the Department of Highways, which reflects that this legislation is limited to transportation projects. Another limitation is the allowance of solicited bids only in project development. Considering these limitations, the ability to utilize a P3 approach for stormwater infrastructure in West Virginia may be limiting; however, the passage of legislation that provides additional clarity and openness on issues such as concession length and unsolicited bids as well as addressing the

needs of non-transportation sectors will provide a more inviting environment for P3 investments in stormwater in the state.

Table 4: Stormwater CBP3-Centric Characteristics of P3 Legislation in EPA Region 3 (Adapted from "Moving Forward on Public Private Partnerships: U.S. and International Experiences with PPP Units" by Emilia Istrate and Robert Puentes, Brookings-Rockefeller Institution – Dec 8, 2011). Pertaining to P3 legislation.*

State	Availability Payments Allowed?*	Local Authority Provided?*	Home Rule State?	Allows for Non-Transportation Projects?*
Delaware	No	Yes	No	Yes
District of Columbia	No (but "performance-based" described)	Yes	N/A	Yes
Maryland	No (but "performance-based" described)	No	Yes	Yes
Pennsylvania	Yes	Unclear	Yes	No
Virginia	No	Yes	Yes	Yes
West Virginia	No	No	No	No

VII. Partnership Checklist

This section presents a series of issues that communities may be required to address in the development of a CBP3. Each issue includes a brief description and a checklist that describes the key elements or requirements that should be considered or satisfied for the CBP3 effort to move forward. The following topics are included in the checklist:

- Sustainable and Predictable Revenue Streams
- Measurement and Verification
- Other Community Benefits
- Job Creation
- Outreach
- Stormwater and Local Building Permits
- Procurement and Contracts
- Policy and Regulations

Sustainable and Predictable Revenue Streams

Unless a dedicated and reliable revenue stream is available, it will not be possible for local governments to sustainably fund construction, operations, reporting, and maintenance. A community should have access to one or more of the following sources to maintain any significant retrofit program:

- ✓ Can funding streams be generated from property taxes, utility fees, or fee-in-lieu of programs?
- ✓ Are there significant grants, state revolving loan funds, banking and offset programs, trading programs, and user fees?
- ✓ Are there opportunities for multi-sector grants and loans (e.g., stormwater and energy)?

Measurement and Verification

A goal of the contractor will be to develop cost effective and efficient implementation strategies and BMPs that achieve the required reduction in pollutant loads. This will require innovation and adaptive management for planning and design of the BMPs. There must be a system in place to evaluate, verify, and report on the progress of the effort that can quantify the results and satisfy the requirements of regulatory agencies.

- ✓ Are there stormwater credit programs that can be used to recognize the reduction in loads for innovative practices?
- ✓ Are there established monitoring programs that can be used to accurately determine load reduction benefits for innovative and conventional BMPs at the site and watershed level?
- ✓ Is it possible to make distinctions between new sources of pollutant and pollutant reduction approaches and legacy pollutants in the watershed?
- ✓ Are there established factors of safety and the ability to refine and gain recognition for more efficient BMP construction and operations?
- ✓ Can stormwater credits be given for retrofitting and enhancing existing systems?

Other Community Benefits

An advantage of GI is its use to satisfy the requirements of other infrastructure and regulatory programs and community development needs. In addition, the funding of GI projects can be leveraged or integrated into other efforts, which can lower the overall financial burden to communities.

- ✓ Are there opportunities for water reuse and conservation?
- ✓ Can the program be integrated with other utility programs such as drinking water and wastewater?
- ✓ Are there potential air quality benefits?
- ✓ Can the program be targeted to areas of underserved communities?
- ✓ Can the reduction in flows and volume from the P3 effort be used for resiliency planning and to preserve infrastructure capacity?

Jobs

The creation of local green jobs, workforce development, and the more efficient management of local government stormwater programs are critical to the partnership. The demonstration of the benefits to the community in the number, quality, and predictability of benefits to the local job market and economy are essential.

- ✓ Can the work be done by local management, planning and engineering, construction, and maintenance firms?
- ✓ Is there a certification and training process for local companies?
- ✓ Can the CBP3 contractor receive benefits for hiring local firms?

Outreach

The CBP3 model is a partnership between contractor and all of the key stakeholder groups in the community. This partnership requires timely communication on progress, feedback, and forward planning. Transparency and participation must be effective and well documented.

- ✓ Are there opportunities for stakeholders, property owners, businesses, and institutions to become partners in planning and implementation?
- ✓ Do stakeholders have access to all relevant documents, plans, meetings, and reports?
- ✓ Can the progress of the outreach effort be measured and evaluated?
- ✓ Can stormwater credits be obtained by implementing outreach programs?

Stormwater and Local Building Permit Programs

There must be a process in place to allow the contractor to obtain permits as quickly as possible so that the partnership can realize the benefits of fast tracking the construction. There must also be the opportunity to refine and advance new technologies and construction practices so that the GI system operates as efficiently as possible.

- ✓ Can projects be streamlined or fast tracked through the system?
- ✓ Can innovative practices for enhanced stormwater treatment be permitted and credited?
- ✓ Is there a certification and verification program for new stormwater products and technologies?
- ✓ Can municipal program management, administrative, project management, and staff engineering jobs be shifted to the private sector?

Procurement and Contract Process

The CBP3 program must allow the community and the contractor to have equity in the contracting and procurement process. This requires flexibility, financial rewards for performance, and recognition of performance in the contract evaluation process.

- ✓ Are performance-based contracts allowed?

- ✓ Are there provisions for including and developing local businesses?
- ✓ Are negotiated and sole source contracts allowed?
- ✓ Can long-term contracts be allowed?
- ✓ Can the contractor realize benefits for lowering construction and maintenance costs?
- ✓ Can the community realize benefits of lowering revenue streams from fees and taxes if the contractor operates more efficiently?
- ✓ Can private entities act as agents for the municipality for right-of-way, maintenance, and construction easements and agreements?
- ✓ Can the contract be used to respond to Capital Improvement Projects, in addition to storm water management/ compliance projects?

Policy and Regulations

The state and local government must have enabling legislation and a regulatory process that allows for the formation of a P3. The regulatory agencies must also be vested in the approach and allow for flexibility in the development of innovative BMPs and recognize the pollutant load reduction benefits.

- ✓ Does your state have enabling P3 legislation?
- ✓ Does enabling legislation allow for non-transportation projects (or more specifically, does it allow for storm-water infrastructure or other public works projects) in a P3 arrangement?
- ✓ Is your state a home-rule or Dillon rule state that specifically allows for the creation of P3 entities?
- ✓ Does enabling legislation allow local governments to enter into P3 arrangements?
- ✓ Does enabling legislation allow for availability payments as a method to pay financing entity?
- ✓ Does enabling legislation allow for (or not preclude) streamlining of environmental permitting?

VIII. Establishing the Steps for Developing a CBP3

The development of a CBP3 requires a series of activities that engage a wide-range of partners and stakeholders in order to be successful. Some of these activities may be relatively straightforward and easy to accomplish, while others may be quite complex and require significant resources. Listed below are the key activities and a summary of the goals and objectives that must be accomplished to support the community and partnership efforts.

Key Activities

Document Local Legislative and State-wide Enabling Legislation Boundaries Conditions

Most communities will have unique local codes and regulations that will impact the method in which the CBP3 is developed. A thorough analysis of the local enabling legislation, contracting methods, and procurement regulations must be evaluated to determine the approval process and to make sure that it is consistent with state enabling legislation.

Develop Procurement Requirements and Opportunities

The local procurement process should include or be modified for performance-based contracts, flexibility, and long-term commitments. Provisions should be made to allow for improvements and refinements to the contract language so that both parties can benefit from lessons learned in sub-contracts, procurement of goods and services, and operations. The use of local firms and businesses should be rewarded.

Propose Potential Revenue Streams Dedicated Fees, Loans, and Hybrid Funding Combinations

There may be numerous public and private sector funding streams and opportunities that are available to the community. This funding stream includes federal grants and local financial institution sources. All viable options and mix of predictable and dedicated funding streams should be considered for the short-and long-term funding of the retrofit effort.

Meet with the Regulatory Community and Resource Agencies

The regulatory and resource agencies at the local, state, and federal level are also partners in this effort. They must be assured the contract language, monitoring, and reporting methods meet the regulatory requirements, are transparent, scientifically sound, and can be reviewed and reported to the public as efficiently as possible.

Compare and Coordinate with Similar Communities in Size and Resources that have Adopted a P3 Approach

Partnerships between local communities within and outside of the watershed can be formed to share information and resources. This includes contract and procurement language workshops on progress, training, local products; and monitoring resources.

Develop Internal Capacity Staffing Outside Training and Resource Needs

The transition between the conventional program approach and the partnership and interface with the CBP3 contractor may require a long-term resource and capacity plan in order to insure that the contract can be properly managed and that the overall governance goals and requirements of the local government infrastructure needs are met.

Conduct a Study to Determine Cost Saving and Program Efficiencies Value for Money

The potential short- and long-term fiscal benefits to the community (e.g., fee reductions, lowering of capital needs, job creation, triple bottom line, and community development benefits), needs to be determined and demonstrated to the public and property owners in the community.

Conduct Workshops with Stakeholders and Interested Parties

A strong partnership must be established outside of the agreements between the local government and the contractor. The long-term commitment to the community will require the identification of key stake-holders, property owners, local businesses, developers, and other parties. The involvement and interest of these groups may be very dynamic so that there needs to be an open and continual process for communication that is accessible to all groups.

Develop a Request for Qualifications (RFQ) to Evaluate the Capacity and Track Record of Interested Contractors

The RFQ process will allow for an evaluation of the capacity, previous success, and commitment of potential contractors to the community. It will allow for an open dialogue and will help the community to begin the procurement and contract process.

Negotiate with Contractor

The contract process should allow for input and negotiation with the contractor so that the optimal structure of the contracting and subcontracting procedures for both parties can be established.

Check In and Verification Process and Adaptive Management Process

The contract should be based on an adaptive management approach where the performance of the system and the efficiency of the contractor can be evaluated at key points throughout the term of the contract.

Develop a Comprehensive Reporting System that Allows for Stakeholder Input

The long-term and extensive nature and impacts of the GI retrofit approach will require that progress on compliance, costs, community development, job creation, and financial benefits to the community be reported to all vested partners and stakeholders. This will allow for input, buy-in, and improvement in the program over the contract period.

IX. Potential Business Structures for GI-Driven Stormwater Management CBP3s

A CBP3 can have many potential types and combinations of business and contractual arrangements that will allow both parties to be flexible and adaptable to the long-term requirements for implementation and maintenance of the program. Figure 5 presents a schematic of a model for a Limited Liability Company (LLC) that could be used as a partnership between a municipality and a developer/contractor. The model illustrates the relationship of the key partners, including community stakeholders and financial organizations and the activities of the partnership for the implementation of the stormwater retrofits.

Partnership Model - General

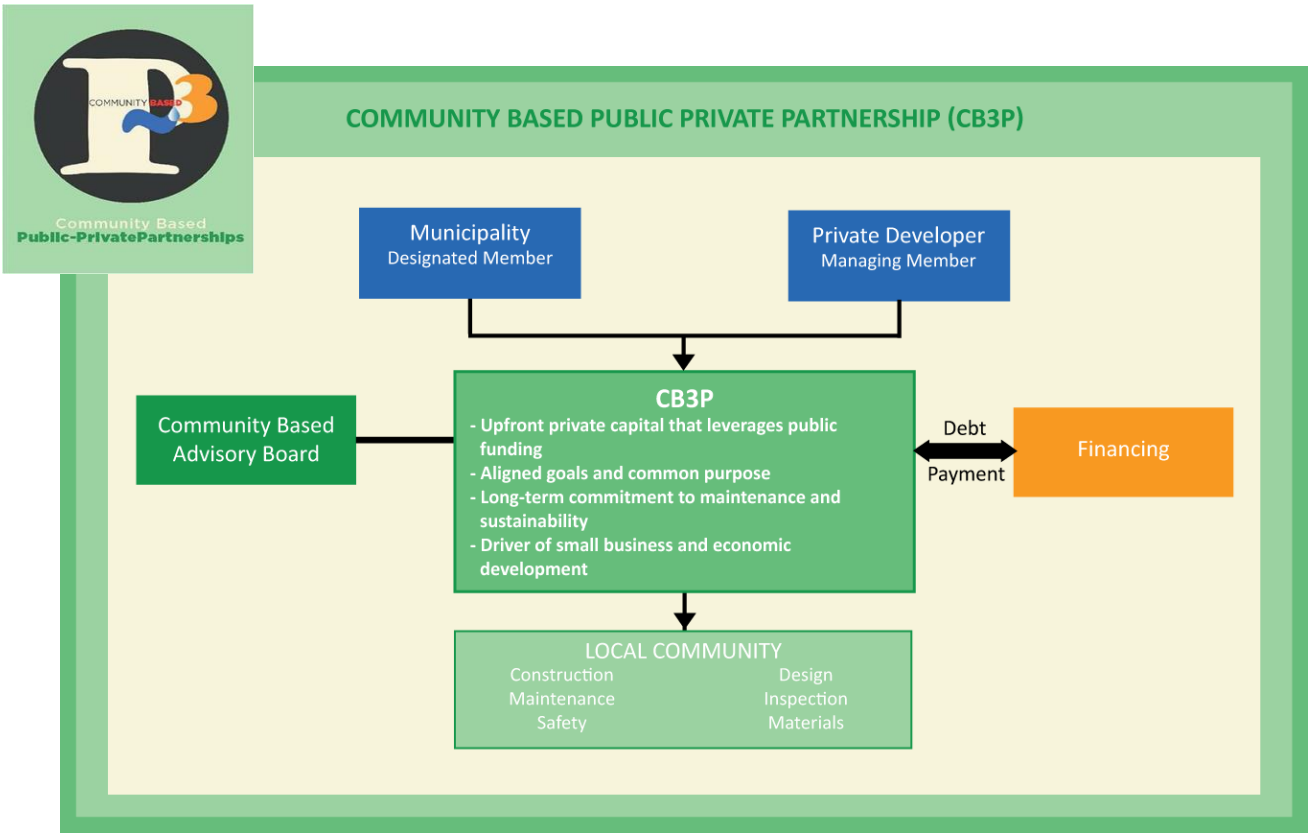

Figure 13: Partnership Model -General

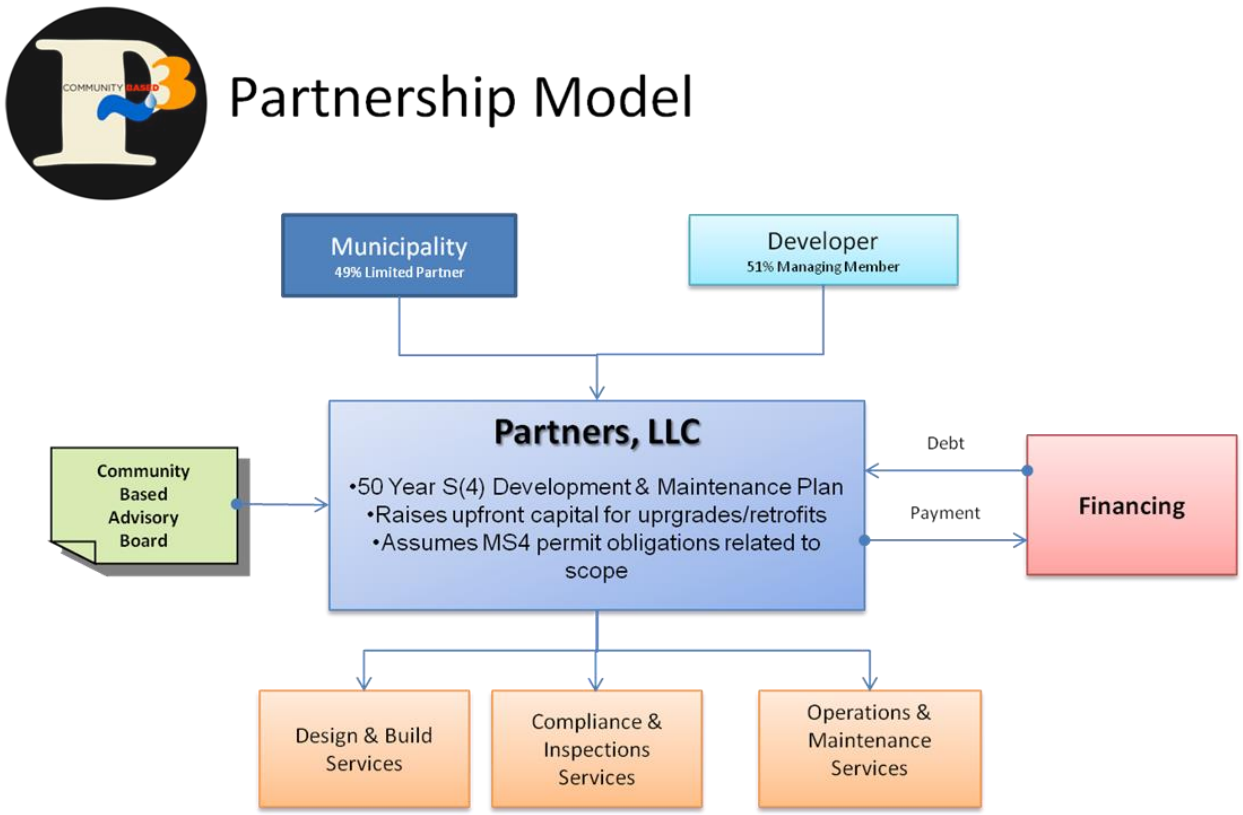

Figure 14: Partnership Model Using an LLC

Partnership Model Using an LLC

The municipality and the developer have formed a LLC. The developer is the managing member in the LLC. The term of the agreement is over 50 years and the developer is responsible for raising the up-front capital as well as meeting the obligations of the MS4 permit. The main activities of the partnership can be categorized as Design Build, Compliance and Inspection, and Operations and Maintenance. The developer reports these activities to the municipal partner and then the reports and activities are forwarded to the regulatory agencies, stakeholders, and financial institutions for monitoring and confirmation of compliance. The partnership relies on input from a community advisory board that insures decisions are transparent and reflect the needs of the communities. The financial institutions secure an adequate funding stream and ensure that the construction risks are appropriate. (Figure 5)

The types of partnerships and contracts that can be used to implement and maintain a CBP3 are as follows.

- A CBP3 between a municipality and developer in a LLC;
- A CBP3 through a privately held LLC; and
- A municipality borrowing public capital through conventional contracting mechanisms.

These approaches are further described in the following sections, including descriptions of issues relating to: governance, financing, program and asset management, compensation, contracting, and future activities.

CBP3 with Municipality in a LLC/Partnership

This structure is highly flexible, and creates true partnership relationships with aligned interests between public and private entities. The partnership provides the following benefits:

- Lowest cost of private capital;
- Greatest amount of control and governance by public entity;
- Greatest amount of flexibility for the program to achieve both typical project goals; and
- Ability to address complex local economic development and community goals.

Described below are some of the key features of this arrangement that distinguish the LLC from other types of arrangements.

Governance

Each member has designated powers and responsibilities, such as the managing member and municipal member). The partnership (which can be technically in the form of a LLC or a limited partnership) can be defined as the pooling of resources like labor and money by organizations that share decision-making power, risks, and benefits in the pursuit of common objectives and goals. It is this sharing that distinguishes a LLC-based partnership from other relationships between the public and private sectors, including the traditional contractual arrangement whereby a public organization pays for the delivery of products or services. Partnerships involving power-sharing are often termed "real," or "collaborative," partnerships, whereas those involving a sharing of only work or resources are described as "operational" partnerships.

Major actions that would impact the partnership are governed by decisions outlining the level of agreement needed of both members, and in the absence of such an agreement, the LLC will not act. Major decisions taken within the partnership/LLC context, are easily amendable, allowing the municipality greater flexibility and control of those decisions or areas that they deem most important to now and in the future. Provisions can be made for particular situations that require special handling. Decisions are not based on nominal majority interests. The LLC can make decisions through management committees and boards, including such public participants as the municipality may choose to include. Subject to financing requirements, the municipality can be given rights to: 1) terminate the LLC at will, 2) remove the managing member without cause, or 3) terminate all service agreements with the LLC, in each case compensating the private partner for costs and lost income. Removal of the managing member will permit the LLC to continue as the borrower under financing without retaining the private partner. The managing member can be removed for cause.

Financing

The LLC carries out financing as a Special Purpose Entity (SPE) or SPE subsidiary. Payment sources can be LLC earnings plus either capital contributions from the municipality member or contractual service payments from the municipality. The municipality payments can come from either a designated source (e.g., stormwater fund) or general fund. If the LLC defaults on a debt, the lender/trustee can either foreclose under a security instrument or remove the managing member from the LLC, substituting its own managing member. In the latter case, the LLCs status as the borrower and the municipality's standing with the borrower would be unaffected. The debt would not be treated as a municipality borrowing and limiting any investor recourse to the municipality.

Program and Asset Management

Program and asset management is identified, implemented, and maintained through agreements between: 1) the municipality and the LLC, and 2) the LLC and specified service providers, some of which could be entities related to the managing member/private partner. These agreements would clearly outline the scope and delivery of the identified work. Private partners are paid for performance, with a portion of the compensation tied to meeting specified incentive criteria. These actions provide flexibility to adapt scope and incentive criteria to continue to meet and support municipality objectives as they evolve. The municipality may provide for such competition for future scope beyond the initial scope among other potential providers as it finds desirable.

Compensation of Private Partner as Program and Asset Manager

Compensation is through fixed fee payment for services (including incentive fees based on performance metrics), contracted through program and/or asset management agreements/task orders, without a share of the LLC cash flow or LLC profits. All excess cash flow and profits are owned by the LLC for project reinvestment and not the private partner.

Subcontractor Contracting

Subcontractor contracting is carried out by the LLC, and is not subject to municipality procurement rules (except to the extent required by the LLC in either its operating agreement, program agreement, or as a matter of the member agreement). The LLC evaluates contractor performance. If the contractor is related to the managing member, the evaluation can be made by the municipality member. Sanctions, rights and responsibilities of parties are not subject to municipality procedures. Contracting rules are customized through the LLC, specifically to encourage and allow for the participation of local, small, and minority business enterprises.

Future Activities

These activities are at the discretion of the municipality or as provided by program agreements. The municipality and LLC may decide to engage in additional activities. Excess revenues are retained within the LLC for any activities subject to municipality control. These revenues can be used for future activities, whether newly added to LLC authority or in furtherance (or O&M) of existing activities. In addition, revenues can be paid out to municipality for competitive solicitation under municipality procurement rules. If retained within the LLC, funds would likely not require further appropriations action or be subject to municipality procurement rules.

CBP3 – Purely Private LLC in Contractual Arrangement with Municipality

This structure creates a constructed partnership relationship with aligned interests between public and private entities, but can achieve just about all of the same benefits as a true partnership if structured appropriately. If structured appropriately the arrangement can still provide lowest cost of private capital; continue to give control and governance to the public entity while still divesting risk; and provide flexibility for the program to achieve both typical project goals and more complex local economic development and community goals.

Governance

Established primarily within the context of the program and asset management agreements; and includes authority of the municipality and the private partner as per the contractual agreements. Established by the partners within an evolving program that defines and sets common goals and objectives throughout the life of the program. Heavily focused on the scope of services and resources, and described as an "operational" partnership. Most major actions/decisions require agreement of both the municipality and the privately controlled LLC. Management committees and boards, including such public participants, can be brought into municipality decision-making. Termination of agreements is a contractual matter, subject to negotiation.

Financing

The LLC carries out the financing as a SPE. Payment source can be LLC earnings, which come from contractual service payments by the municipality. Municipality payments can come from either a designated source (i.e., stormwater fund) or a general fund. If the LLC defaults on debt, lender/trustee can foreclose under security instrument effectively terminating the borrower. It may be possible to use a "springing member" structure, under which a lender party (or a municipality party) could become the sole member or managing member of the LLC, but that would complicate the borrowing. Debt would not be treated as a municipality borrowing and would most likely not be tax-exempt.

Program and Asset Management

Identified, implemented and maintained through agreements between 1) the municipality and the LLC, and 2) the LLC and specified service providers, some of which will be entities related to the private partner. Pay providers for performance, with a portion of compensation tied to meeting specified incentive criteria. The municipality designates projects to be assigned to the LLC through various program and service agreements requiring more internal municipality contract administration and overhead expenses. Agreement processes will provide for pricing rules and determinations.

Compensation of private partner as Program and Asset Manager

Compensation is through fixed fee payment for services (including incentive fees based on performance metrics), recognized as LLC cash flow or profits. The LLC may be authorized to generate and carry out additional business. Because the municipality is not a member of the LLC, it would not ordinarily benefit from additional profits generated by the LLC.

Subcontractor Contracting

Depending upon rules established by the program agreements, contracting may be carried out by the LLC, and is not subject to the municipality procurement rules (except to

the extent required in the program agreements). Evaluation of contractor performance would be made by the LLC, subject to such municipality determinations as may be required by the program agreements. Sanctions, rights, and responsibilities of parties may be subject to municipality procedures. Contracting rules are customized through the LLC, specifically to encourage and allow more participation of local, small, and minority business enterprises.

Future Activities

These activities are at the discretion of the municipality or as provided by program agreements. The municipality and LLC may decide to engage in additional activities including reinvestment of excess revenues subject to contractual negotiations of constructed partnership. Any additional utilization of funds will require further appropriations and be subject to the municipality procurement rules.

Municipality Borrowing Public Capital and Contracting

This structure is less flexible and does not create a partnership relationship with aligned interests between public and private entities. In addition, it does not achieve the leveraging of private capital. In addition, the public funds and municipal procurement rules have limitations that can impact the ability for the program to effectively achieve stormwater infrastructure project goals and more complex local economic development and community goals, let alone the address of retrofits on private properties.

Governance

These provisions include rights of parties established through explicit contract terms within various service contracts.

Financing

Carried out by municipality and recognized on its books. The payment source can be from either a designated source (i.e., stormwater fund) or a general fund, and can be limited to those sources. If the municipality defaults on debt, it would likely have an adverse impact on the municipality's bond rating. Debt would be tax-exempt (as governmental bonds, not subject to the volume cap) and subject to various constraints on use.

Program and Asset Management

Identified, implemented, and maintained through agreements between the municipality and specified service providers, some of which will be entities related to the private partner. (Bond rules would likely prevent long-term service contracts with a private partner LLC.) The municipality takes on more surety of execution risk and construction default risk. The municipality may provide for such competition among potential providers as it finds desirable. Providers should be paid for performance, with a portion of compensation tied to meeting specified incentive criteria.

Compensation of Private Partner as Program and Asset Manager

Compensation to all contractors is through fixed fee payment for services (including incentive fees based on performance metrics).

Subcontractor Contracting

Carried out under municipality procurement rules. Evaluation of contractor performance made by the municipality. Sanctions, rights, and responsibilities of contract parties are subject to the municipality procedures. A more formal process may produce greater procurement barriers to local, small, and minority businesses to participate and compete for work.

Future Activities

These activities are at the discretion of the municipality. Excess revenues are determined through contract negotiation. Excess revenues are less predictive due to a more volatile cost structure with the private partner having reduced ability to drive down market pricing.

X. Examples of GI-Driven P3 Approaches in the Mid-Atlantic

The "Clean Water Partnership"- Prince George's County GI Stormwater Retrofit Model: "An Affordable Alternative to Finance, Construct and Maintain Water Quality Infrastructure"

By Larry Coffman, Prince Georges County Department of Environment

Introduction

Prince George's County, Maryland is using an innovative 30 year-long Public Private Partnership (P3) business model to finance, design, build, operate and maintain (FDBOM) a massive urban stormwater retrofit program to meet EPA's Chesapeake Bay TMDL requirements. This is not a typical design build contract. This P3 program has been purposefully designed to promote innovation and create a true partnership between the County and the private sector to: share financial and legal risks; drive costs down through technological innovations; obtain greater efficiencies through market forces; and stimulate economic development by creating new sustainable business opportunities, jobs and building community wealth. This is not a privatization program but, rather a long-term teaming agreement with clear standards to ensure the interests of the County and the private sector are very closely aligned. The magnitude and longevity of the program provides an unprecedented opportunity for long-term economic development gains and job creation. This paper provides an overview of the P3 program's impetus, goals, benefits and organization.

Driver/Need for a New Business Model

The County is under a Phase I MS4 permit and required to operate a comprehensive urban stormwater water quality control program to prevent water quality degradation from new development and to take remedial retrofit and prevention measures to restore locally impaired waters. Local water quality restoration is accomplished by meeting a Total Maximum Daily Load (TMDL) pollutant load allocation standard. Generally, this is accomplished through pollution prevention programs and construction of retrofit water quality treatment mechanisms to address existing uncontrolled development.

However, since the County is located in the Chesapeake Bay watershed, EPA Region 3 has established an unprecedented additional TMDL requirement for local governments to restore the Bay by 2025, see the link: http://www.epa.gov/chesapeakebaytmdl/ . EPA and the Bay states established waste load allocations and milestones for the MS4 local jurisdictions for sediment, phosphorus and nitrogen. In Maryland, ten jurisdictions including Prince George's County were assigned waste load reduction goals and required to develop a Watershed Implementation Plan (WIP) to show they intended to meet the Bay TMDL goals, see link: http://www.princegeorgescountymd.gov/sites/Sustainable/Services/WaterQuality/WIP/Pages/default.aspx

Prince George's County's WIP requires retrofit of approximately 15,000 acres of uncontrolled impervious surfaces by 2025 at an estimate cost of $ 1.2 billion. A critical evaluation of the

County's capabilities indicated the County could not meet the milestones or afford the program as described in the WIP. In general, the County's highly structured capital improvement program implementation process makes mass production, speedy construction or optimizing cost efficiencies impossible. Every step of the conventional capital improvement process (planning, design, permitting, construction, operations and maintenance) is lengthy, adds complexities and costs and more importantly prohibits innovation to gain efficiencies of any kind.

In order to meet the compressed time frame and drive costs down a more efficient business model was needed. A new model was required driven by innovation to accelerate the implementation, increase affordability though market forces, advance highly efficient lower cost technologies and reduce long-term operation and maintenance costs. The P3 model seemed to be the best fit as it utilizes the private sector's ability to innovate and use market forces to more rapidly and affordably build and operate needed public infrastructure. Although a P3 model has never been used to implement a comprehensive stormwater retrofit program, there was enough experience with other infrastructure projects such as highways, solid waste facilities, and water / wastewater treatment plants that a model could be developed for stormwater. It seemed reasonable the P3 business model combined with more streamlined permitting could reasonably meet the time constraints and drive costs down significantly. Early indications were a P3 program could drive down cost by as much as 40% thus saving the County over 400 million dollars over the life of the retrofit program.

EPA's National Interest in a New Retrofit Business Model

Across the country, local governments are increasingly investing in sustainable Low Impact Development (LID)/Green infrastructure (GI) practices to retrofit urban areas for improved stormwater management to restore impaired waters and meet CSO requirements. This use of LID/GI for urban stormwater retrofits is expected to significantly increase as the multiple economic, environmental and social benefits of LID/GI over traditional gray infrastructure practices become more widely known, see the link: http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm. Despite these benefits, the scale of urban retrofit required to meet desired water resources goals will require major capital investments; long-term funding commitments for asset management; and, create additional administrative burdens for local governments. Local governments need affordable solutions as they are generally ill-equipped to meet the long-term financial requirements to build and maintain an extensive LID/GI infrastructure. EPA believes the P3 business model will significantly improve the economic feasibility, and practicality of retrofit programs to better leverage public sector resources by encouraging private investment and shared risk to implement sustainable LID/GI practices, see the link: http://water.epa.gov/grants_funding/cwf/privatization.cfm

Public Private Partnerships in General

There are a wide variety of P3 models. Please see the link for the National Council of Public Private Partnerships for more information: http://ncppp.org/howpart/ppptypes.shtml. In exploring how to adapt a P3 model to the Bay TMDL retrofit requirements, the County evaluated a number of models. First, the County has used a long-term P3 business model for landfill gas-to-electricity facilities at our two landfills. The County contracted with a private entity to finance, design, build, operate and maintain the infrastructure as well as market both gas and electricity to purchasers. So our own experience with P3 contracts has been very positive and has worked well for over 20 years.

Another important model evaluated was the United States Department of Defense's Military Housing Privatization Imitative (MHPI). This P3 program began in 1996 to deal with all of the DOD's housing needs. The DOD's P3 performance based MHIP experience clearly demonstrates that a well-planned program provides: significant cost savings and greater affordability; enhanced capacity to leverage public funds and expand services and benefits; a significant shift of program responsibilities and risks to the private sector; and, expedited delivery of quality services and projects, see the DOD's website with more details on the success of their P3 program: (http://www.acq.osd.mil/housing/mhpi.htm).

Best Fit P3 Model for Urban Retrofit

A variation of the DOD's MHPI model looks to be well suited to meet the County's needs. In this model the private partner would act as the general contractor and program manager in partnership with the County through a limited liability company (LLC) framework. Program transparency is maintained through joint program administration and decision making expressed in the LLC operations. The private partner would provide all or part of the initial capital costs and the County would pay the private partner a monthly fee that would include the debt service plus costs for operation and maintenance from the County's water quality retrofit fund. When necessary the private partner would provide all upfront costs with an affordable extended payback period.

Under this contract the private partner gets a base fee plus an incentive fee. The base fee is 50% of a project cost and is paid on a monthly basis. The incentive fee is 50% of the project cost and is only paid if all performance standards are met. The performance standards include meeting cost saving targets, delivering project on time, meeting economic development goals (creating local businesses) and optimizing local job creation. The private partner doesn't get paid and can lose the incentive payment if the performance goals are not met. This performance fee based approach ensures the private partner's first priority is to meet the County's program / performance goals and not optimization of profits.

The basic P3 organization structure is shown below. This general model is quite flexible but required work to adapt and customize it to the County's unique procurement process, funding availability, permitting process, compliance issues and local water protection / sustainability needs. The use of a limited liability corporation or LLC ensures a close partnership with the private partner and is important to transparency of all operations. There is also the possibility of greater community input into the planning and implementation of the retrofit program as the public can be part of the LLC board.

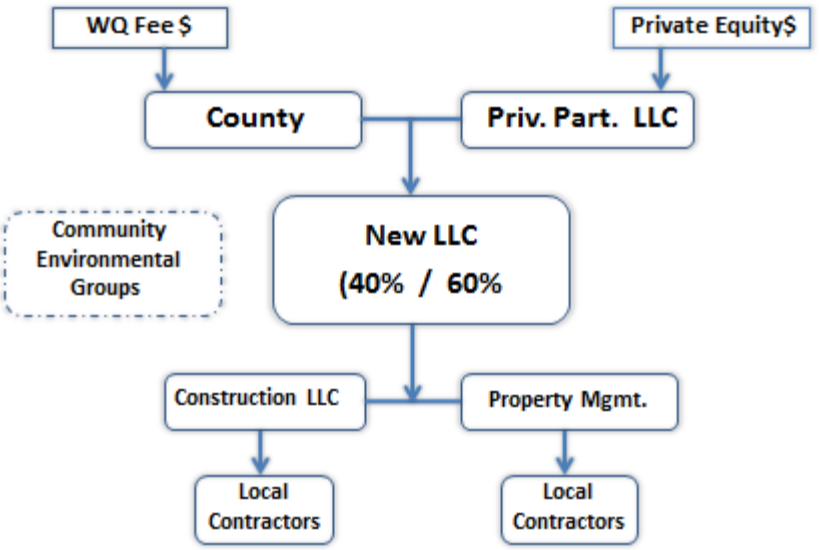

Figure 15: P3 Organization Structure

P3 Benefits and Advantages

The P3 business model provides a wide range of benefits to the County primarily through the transfer of some risk and most of the responsibility to the private partner to implement all aspects of the retrofit program. The benefits include:

1. Better program oversight. The LLC P3 model permits the County to be a partner with direct involvement in the oversight of the LLC operations and management. Further, the County's LLC representatives could include municipal officials, residents and environmental groups to allow public input by impacted communities.
2. Off the books debt. The private financing and debt is issued to the LLC. This allows the County to increase its overall debt load and structure the debt in a more affordable manner. For Local governments without bonding authority this will allowing borrowing and use of private bonds.
3. Less staff required. No need for the County to hire new staff for program administration, enforcement, project management, inspection or maintenance. All these functions are transferred to the private partner.
4. More affordable. The private partner pays the initial startup costs and County payments do not begin until projects are in the ground and approved. The cost to the County will be very low initially and increase over time at a rate that can be controlled.
5. Drive costs down through market forces. There are many options available to the private partner to increase affordability beyond competitively bidding contracts, these include: leverage the scale and long-term timeframe of the contract to negotiate lower costs for materials and services; requiring innovation to improve technology; development of more efficient construction practices, maintenance and program administration practices; greater

adaptability to lower costs and improve efficiencies based on lessons learned; and, time savings due to reduced administrative burdens, overlapping design and construction scheduling, and reduced need for redesign or reconstruction.

6. Creation of new local jobs and businesses. This P3 retrofit program is unique in the scale of work and its long-term nature thus providing sustainable incentives to develop new local businesses. Once a contractor is part of the P3 program and performs well, they are guaranteed predictable work for many years. This long-term sustainable cash flow provides an incentive and resources for long-term financing and business growth not currently achievable through the County's conventional piecemeal bidding of contracts.
7. Designed for adaptive management and flexibility. The contract will evolve over time to improve efficiencies and to incorporate additional services as needed to adjust to lessoned learned, financial constraints and changing regulations. The LLC partners can modify the retrofit program requirements on the fly as needed without renegotiating fees or services as long the changes meet the performance goals and the LLC board's approval. Flexibility is needed by the private sector to take advantage of all the possibilities to gain cost and performance efficiencies; optimize leverage to obtain lower cost financing, products and services; expedite permit reviews; use performance standards; encourage innovation to reduce the cost of technology, design, construction and maintenance.
8. More streamlined program administration. Using typical local government contracting and procurement process to manage this program would have been nearly impossible as there would have been multiple contracts with many firms. Under this P3 model the County only contracts with the private partner on a one-time basis. This drastically reduces the time spent on procurement, project management and contractual entanglements between multiple service providers.
9. Private contracting practices. The private sector has more ability to leverage business relationships, allowing flexibility to better adapt to change in order to achieve cost savings, efficiencies and improve performance. Private parties adjust to unforeseen circumstances through more informal, less costly or time-consuming processes. In contrast, traditional public sector contracting practices make it difficult to achieve lower costs or deliver services in a timely manner. Public contracting is often characterized by very rigid formalized procedures, standards and time consuming red tape requiring frequent costly formal renegotiations and change orders.
10. Many options to gain efficiencies to lower costs. The scale and long-term of the program allows the private partner to reduce costs through standardization of design, construction and maintenance practices. This P3 model encourages:
    a. Sustainable maintenance programs to become more cost efficient because economies of scale can be applied. For example, the per unit maintenance cost will fall as the number of units increase. The private sector can better leverage procurement of supplies, services and use of equipment. Efficiencies can also be achieved by standardizing practices and optimizing scheduling of routine maintenance. As the cost per unit for maintenance goes down it then becomes more cost effective to begin a proactive rather than a reactive maintenance program. The long-term nature of the P3 program also provides market incentives and greater competition to drive down maintenance.

b. Economies of scale also allow the P3 private partner to leverage both the project scale and time frame to achieve cost savings in financing, professional services and service providers. In large scale programs, technology cost savings can be achieved where products can be standardized, mass-produced and materials discounted.

c. Competitive bidding for P3 contracts will be keen. The long-term predictability and large scale of the urban retrofit program represents a unique business opportunity for the private sector for guaranteed long-term revenues. A long-term guaranteed revenue stream is highly desirable. However, the P3 contractor selection will not be based solely on lowest bidder but also qualifications and experience to ensure performance standards can be met.

Brief Comparison of Traditional and P3 Retrofit Programs Benefits

The table below is a comparison between traditional capital improvement programs and a P3 approach. In general, much of the County's responsibilities can be transferred to the private partner thus eliminating the need to hire and carry additional staff. The private partner will handle all procurement services.

Table 5: Comparison Table of County vs .P3 Program Retrofit Program Aspects

Item	Traditional County	Traditional Description	P3 Approach	P3 Description
Staffing				
Project Management	15	Each project manager oversee several projects	1	Only one project manager need to track P3
Inspectors	10	Each to oversee several projects	3	P3 will be required to inspect and certify
Field Engineers	0	None proposed	2	Needed to approve field modifications
Professional Service Contracts	13	Consultants need to design projects	3	P3 provides consultants
Funding				
Funding Options	Bond sales / tax	Could reduce fees for bond sale	Private financing / tax	Perhaps better rates and terms
Contract Terms				
Retrofit Cost per Acre	$100,000	Piecemeal costly designs	$70,000	Optimized BMP to reduce costs
Project Procurement Time	12-18 months	Typical bid process time	2-4 weeks	Up to P3 general contractor
Planning Time	Months	Several months	Days to Weeks	Site visit for BMP placement

Item	Traditional County	Traditional Description	P3 Approach	P3 Description
Maintenance	County maintains	Additional burden to County	P3 maintains	P3 takes all responsibility
Retrofit Practices	Use Maryland standards	Costly and not optimized for retrofit	Optimized flexible standards	Only a few techniques will be used

P3 Program Unique Features

As this is the first comprehensive urban stormwater P3 program, there are many unique features of the program. Some of these features are below.

Pilot Program - The County is implementing this P3 program as a pilot program in collaboration with EPA and the State to demonstrate the affordability and efficacy of using a privately financed public private partnership contract to implement a comprehensive urban retrofit program. It is EPA's goal to use this pilot program to demonstrate a viable approach to accelerating the restoration of the Chesapeake Bay by reducing urban retrofit costs through innovation in technology, alternative financing and use of private market forces.

Innovation and Standardization - The County and private partner will jointly develop and approve 6 or 7 basic generic retrofit practices that will allow easy integration into existing urban roadways with low cost long-term maintenance burdens. The private partner will be given a general permit to implement these practices to allow for minimal approvals, planning and design work to help drive cost down and expedite implementation. The goal of standardizing and simplifying the types of practices is to better achieve optimum performance, reliability and lower costs. Standardization of materials, design, construction, operation and maintenance will allow market forces to drive down cost through economies of scale and leveraging long-term contracts. The basic retrofit practice for roadways will play off of a basic / standard system theme for "urban bioretention design" with a high flow media /vegetation filter and volume underground storage for retention and reuse/ infiltration or detention, see Figure 1. This basic design is infinitely variable to allow maximum flexible to integrate a practice into an urban setting to achieve performance goals. The final practice configuration (size of filter surface are and volume storage) will vary by site constraints such as: available surface area, utility locations, proximity to structures, adequate drainage area, elevations/depth, etc. One example is the use of street trees. This practice will require greater soil

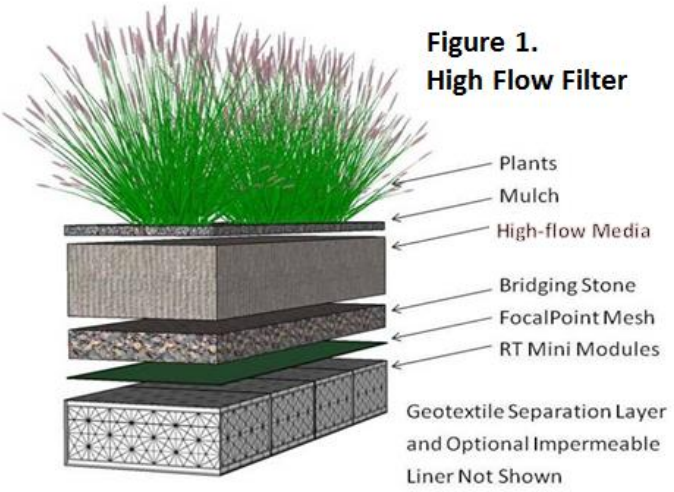

Figure 16: High-Flow Filter Diagram

depth to physically support the tree and allow for future root growth. The street tree configuration where site constraints are tight will take the shape of a tree box system with limited storage.

Where there are fewer site constraints and more space, an entire block may be retrofitted converting the green space between the curb and side walk to a filter storage area. The idea is to use a basic treatment approach of high flow filters in combination with underground storage and vary as necessary. The final standards and specifications will be worked out jointly between the County and private partner.

Provide other sustainability services – It will be possible to collaborate with a private partner to provide other services to County residents while working on retrofit projects in a community. For example, the County could develop a variety of "Advanced Sustainability Franchises" as a general environmental and economic benefit for County residents that would provide incentives to conserve energy, save water, use solar and/or wind power and recycle or to retrofit private properties for stormwater management. The County could provide the private partner with exclusive marketing advantages to make available to residents' energy/water audits and to offer performance contacts to residents to perform the improvements. The exclusive marketing advantages may include only allowing the authorized agent(s) of the private partner to offer County rebates or tax credits. The County could charge a small franchise fee for every property owner who enters into a contract with private partner's agents. This franchise fee would only be enough to pay for the County's administration cost to provide rebates. The private partner would work with service providers to find and offer the most efficient and cost effective sustainability services.

Other sustainability programs may also be developed to incentivize and encourage stormwater retrofits on private property to install rain gardens, rain barrels, down spot bioretention systems, rain water harvesting, solar power systems, and tree planting and special recycling programs. We would expect the private partner to work with the private sector to find and offer the most effective and cost effective sustainability services.

Lessons Learned

Developing any P3 program to ensure success is inherently complex and challenging and may take several months to negotiate. Some of the most challenging issues are selecting the right partner, financing, governance, performance incentives and fees, legal issues and ensuring flexibility and innovation. These are described in more detail below.

Select the right partners. Selecting the right partner is the most important step. You will need to find a true partner to help solve problems, act in your interest, and work within your financial constraints and accept as much legal and financial risk as possible. This is not easy. You will need to: a) do your homework to have a good foundation in P3 fundamentals to assess the general capabilities of a potential partner; b) use a Request for Qualifications process to find the best qualified firms and best ideas to compare approaches; c) select a firm with a known track record and references; and, d) look for optimum flexibility and use of adaptive management measures needed to adjust to changing politics, regulations and economic conditions.

Get experienced technical and legal counsel. If you're entering into your first P3 agreement you'll need good technical and legal advice. Establishing sound performance and technical requirements for governance, planning, design, permitting, construction, maintenance, inspection and approval processes is difficult and complex. You'll need a consulting firm with both engineering and P3 work experience. The same is true with the legal aspects of the P3 contract and negotiations. You

must be sure that you have appropriate authority to enter into a P3 agreement, obtain private financing, develop appropriate governance and the agreement is legally sufficient to provide the adequate contract administration tools.

Understand and incentivize objectives. Much time is spent in articulating program objectives and then memorializing those objectives in the master program agreement in a fashion that ensures the private partner remains incentivized through the length of the contract. The success of the program will depend on how successful the negotiations define the objectives and ensure long-term performance.

Financing - Private financing is generally more expensive than public financing through municipal bonds. However, there are advantages to private financing that allow the private partner to better take advantage of market conditions and achieve greater savings through market forces. This involves fully funding reserve funds to ensure that subcontractors are paid timely to avoid carrying charges and inflated prices due to late payments. Further, when you look at the total cost of a privately financed P3 program, the cost savings generated by the private sector can completely offset any increase in private financing costs. Another advantage of using an LLC special entity is the debt is assigned to the LLC and not the public entity thus increasing the amount of debt available to the public entity. For local governments without bonding authority, a P3 program with private financing may be the most viable option to raise capital to implement needed public infrastructure.

XI. Use of Alternative Market-Based Tools

A variety of funding and financing options are currently available for GI investments. Common funding sources include general funds, stormwater utilities, grants, special taxing districts, bonds, State Revolving Fund dollars, and traditional loans. While funding is a critical component of any infrastructure investment program, the ability to gain efficiencies at the operational level through market-based alternatives is key to driving down the high costs of urban GI retrofits. A strength of the CBP3 approach is the ability to capture these market-based approaches under one umbrella that can be overseen and coordinated by the CBP3 entity.

This section explores the relationship between the CBP3 entity and operational market-based alternatives within the CBP3 context. Additionally, this section will present concepts that use non-traditional market-based options, such as credit trading/offsets, banking, and stormwater fees/rebates, within the context of a CBP3 environment to illustrate the complementary role these options can play in a CBP3.

GI Implementation at the Operational Level

The focus of the subject of CBP3s in this document up to this point has been primarily on the architecture and funding/financing aspects of this programmatic approach, and the advantages associated with innovative approach. However, flying at the "100,000-foot" level in this discussion does not address how GI will be sited/identified, designed, installed/constructed, and inspected/maintained on the ground level. This connection between the CBP3 entity and on-the-ground operations is key to understanding how GI implementation can occur. Additionally, there are approaches available to the sector that could harness market-based forces to further drive down costs and increase efficiencies.

As has been previously discussed, a CBP3 can increase efficiencies through economies of scale, streamlining design and permitting, and a less onerous procurement program. All of these aspects tie into GI implementation; however, the actual path and approach to implementation is not addressed in these elements. For instance, the unit cost of a material component of a standard GI approach in a program may be driven down due to economies of scale; however, the costs associated with actual construction using this material has not been addressed. With this said, there are examples of implementation approaches that can be layered under the CBP3 umbrella to gain further savings and acceleration of implementation. The previous section provides some of these examples (Washington, D.C.'s SRC and Philadelphia's GARP programs).

Roles at the Operational Level

A premise of the examples provided in the preceding section is that there are "low hanging fruit" for GI implementation. Specifically, some sites are well-suited for quick and easy GI implementation at a relatively low cost due to site-specific conditions, such as soils, landscape features (slopes, etc.), land use type, opportunity costs, downstream conditions, existing infrastructure constraints, and other limiting factors. For those sites where implementation falls into the "easy/inexpensive" category, the economics of GI implementation are favorable when compared to other sites where constraints are high and land use types do not favor low-cost

GI solutions. For instance, an abandoned parking lot in a socioeconomically-challenged area that lies on well-draining soils with few infrastructure constraints and mild slopes that drain to waterway that is not considered "high value" or protected would be likely candidate for a low-cost site for GI implementation. To contrast, a high-rise condo complex in a high-value urban area may be an order of magnitude more expensive in terms of unit cost (dollars per impervious acre treated/"greened"). This heterogeneity in conditions (reflected in costs for implementation) provides additional opportunities to drive down costs for GI implementation, and is the basis for the DC SRC trading market.

Another cost-saving dynamic is project aggregation, which is the focus of PWD's GARP program. The premise of aggregation is that scale (economics of scale) can drive down costs, as has been previously discussed. Additionally, aggregation can provide cost savings by reducing per project transaction costs. Transaction costs include "soft" costs of a project including administrative, legal, procurement, and similar non-construction costs that can comprise between 10-40 percent of total project cost (Natlab, 2013). The CBP3 program will reduce some of these costs (procurement, some legal, etc.); however, it is anticipated that by grouping or aggregating projects together, those transaction costs not captured by the CBP3 program can be spread out across several projects, thereby further reducing per project cost.

Considering the efficiencies that can be gained by market-based forces, as described above, layered on top of those already gained through a CBP3framework, there is an overall synergistic cost-reduction from this "nested" approach to GI implementation.

Turn-key Service Providers

In a CBP3 context, one can envision the organic development of "turn-key" provider private entities who provides an array of implementation services, including project identification/siting, performing feasibility analyses on identified sites (for financial viability), full site/project design, project management, construction, and inspection and maintenance services. Multiple "turn-keys" could be unleashed by the CBP3 to operationalize the effort to implement GI widely.

For example, in a trading program that employs a limited number of approved standard GI practices (Coffman suggests 6-7 standard design/approaches for Prince George's County, MD) that can be used to generate credits. These credits could be purchased by the CBP3 entity, and having multiple providers would generate cost-reducing competition to the benefit of the CBP3 entity (and the municipality). It is anticipated that turn-keys would represent profit-maximizing entities who employ top-level specialists in GI implementation who could most efficiently scan the landscape for scenarios providing the lowest-cost opportunity for GI implementation. Some turn-keys could potentially specialize in land use types/scenarios to further increase efficiency. For instance, one turn-key may focus retrofitting of large commercial strip malls or church parking lots, while another turn-key may deal only with large institutional or industrial sites. This specialization could allow turn-keys to become familiar with specific land use types in order to lead to cost-optimized/maximized "harvesting" of stormwater credits on sites.

In an incentived grant program, such as the GARP program, the CBP3 entity could set cost thresholds for projects they would invest in. As with the credit trading approach, multiple "aggregators" could work to identify

the best grouping of sites that would meet, or exceed, the cost threshold set by the CBP3 entity. Also, specialization of GI implementation in this context could occur if the CBP3 potentially set varying cost thresholds that could vary by land use type or scenario, thus recognizing the cost variability associated with GI in different contexts. This could help to ensure that a mix of land use types/scenarios experience "greening", rather than just the "low-hanging fruit" scenarios.

Market-Based Tools and Private Properties

A challenge for GI retrofitting efforts is related to the installation of GI on private properties. The usual course of action in a GI plan by a utility or municipality is to target readily-available publically-controlled properties (e.g., roadway ROWs). The reason for focusing on public spaces upfront is related to the complications in engaging with specific private property owners on various project-related issues. Additionally, there may be challenges in using public funding sources (SRF as an example) for use on private properties. While there are challenges in implementing GI on private properties, there is a limited amount of available public space in which to retrofit, and in some situations, the regulatory requirements associated with GI retrofits far exceeds this capacity. This is the situation in Philadelphia and Prince George's County, MD, and it is likely that there will be an increase in permits and consent decrees that reflect these conditions in other areas as well. Considering this trend, the topic of how CBP3s and market-based tools work with private property holders.

As has been discussed, stormwater programs for MS4 permit holders are funded in multiple ways, with stormwater utilities being one of the most common approaches after general funding use. Similarly, wastewater utilities who are faced with CSOs can charge rate payers to specifically address their wet weather program. One model for an incentive-based market approach is to provide a rebate on a fee related to stormwater or wet weather costs. This type of approach is commonly provided by stormwater and wastewater utilities; however, these are often not substantive rebates. One example is Philadelphia, which provides an 80 percent rebate on their stormwater fee. Another example is Washington, D.C., who provides a 55 percent rebate on their MS4 stormwater fee and a 4 percent rebate on their wet weather program fee. A turn-key provider who would handle all aspects of GI implementation and maintenance could use this rebate as a selling point. More specifically, a private property owner could alleviate a cost simply by allowing a turn-key to use their property to implement GI. This incentive could work in either the aggregating or the trading contexts.

One challenge in relying on fee rebates as an incentive is the relatively low fee level associated with stormwater-related programs, especially stormwater utilities (Thurston, 2012). In other words, fees are often not high enough to drive private property owners to take action in an incentive program because either the rebate is too small, the cost of GI implementation is too high, or both. Considering this challenge, a turn-key provider could potentially construct a deal with a private property owner to allow them access to their property for the sake of installing/constructing GI for a portion of the profits generated from the project after the turn-key is paid by the CBP3 entity. This arrangement would likely include a maintenance agreement to allow inspection/maintenance staff (employed by the turn-key) to access the site as required to maintain the GI as dictated by the municipality/utility. Table 6 summarizes how the strengths and limitations of various market-based frameworks described above as

well as how a CBP3 program could enhance the impact of these frameworks. Figures 17 and 18 illustrate the relative cost-effectiveness and overall values of traditional and innovative approaches to GI implementation.

Table 6: Aspects of Market-based Tools and How These Can Be Strengthened by CBP3

Market-based Tools	Fee/Rebate	Trading/Off-sets	Grant/Subsidy
Definition	Provides low-level incentives for on-site GI investment for private property owners through relief from a user-fee funded stormwater charge	Allows for a portion of required runoff retention or treatment to be purchased through credits on an exchange or trading house platform or though bi-lateral transactions from off-site sources of excess retention or treatment	Public entity pays a private entity (turn-key) to design, build, and maintain a project or set of projects based upon cost-effectiveness
Private Property Owner Benefit	Reduction of stormwater fee (if fee exists) and water or energy-related utilities	• Payment by turn-key for use of property to generate credit • Potential for stacked incentive by reducing stormwater fee (if a fee exists) and water or energy-related utilities	• Payment by turn-key for use of property to implement GI • Potential for stacked incentive by reducing stormwater fee (if a fee exists) and water or energy-related utilities
Strength of Approach	Provides an incentive for property owners to implement GI on site	Trading can help to use cost heterogeneities to lead to more cost-efficient GI implementation – these cost-efficiencies can be greater if used in a watershed-based context rather than confined to single jurisdiction	• Awards private entities who can provide GI implementation more cost effectively • Can leverage power of project aggregation to lower costs
Limitation of Approach	• Limited to programs with a stormwater utility • Likely limited to capturing early adopters • Difficult to make the economic case for these programs in most cases	• Credit generators may act as “lone entities” required to gain capital financing for each project • Credit generators may work at a relatively small scale (parcel, neighborhood) when targeting GI projects	• Turn-key services providers will act as “lone entities” required to gain capital financing for each project. • Turn-key services providers will work at a relatively small scale (parcel, grouping of parcels, neighborhood) when targeting GI projects. • Turn-keys may “game” the program by developing projects that meet the required grant/subsidy cost threshold rather than most cost-efficient possible

Market-based Tools	Fee/Rebate	Trading/Off-sets	Grant/Subsidy
How CBP3 Can Enhance	• Drives efficiencies and innovation in the designs and technologies used • By lowering GI costs via economics of scale, the fee/rebate program may become more economically viable/feasible • With more "agents" in the field engaging with the private sector, there is an opportunity for public outreach/engagement and education on fee/rebate programs	• Drives efficiencies and innovation in the designs and technologies used • Can leverage economies of scale to reduce costs for standardized GI practices implemented by turn-key credit generators; • Can reduce the need for lone entity turn-keys to self-finance • Reduces the burden on the public partner to run a trading program (clearinghouse, etc.) • With more "agents" in the field engaging with the private sector, there is an opportunity for public outreach/engagement and education on stormwater issues and GI program	• Drives efficiencies and innovation in the designs and technologies used • Can leverage economies of scale to enhance cost reductions based upon project aggregation for standardized GI practices implemented by turn-key private entities • Can reduce the need for lone entity turn-keys to self-finance • Reduces the burden on the public partner to run a grant/subsidy program • With more "agents" in the field engaging with the private sector, there is an opportunity for public outreach/engagement and education on stormwater issues and GI program

Table 7: Relative Cost-Effectiveness of Various Approaches to GI Implementation Approaches

Cost-Effectiveness of GI Implementation		
Traditional	***Market-based Alone***	***CBP3 and Market-based***
Least Cost-Effective • Piecemeal approach • Inefficient costs of materials, etc. • Inefficient procurement programs • Death by a thousand cuts (change orders, add-ons, etc.)	Enhanced Cost-Effectiveness • Increased economies of scale • Reduced transaction costs • Somewhat piecemeal still disconnected to regulatory requirements.	Most Cost-Effective • Full economics of scale • Further reduced transaction costs • Programmatically holistic (regulatory requirements) • Integrated design-build eliminates "change order" dynamics

Table 8: Relative Value to Communities of Various Approaches to GI Implementation Approaches

Community Benefits		
Traditional	***Market-based Alone***	***CBP3 and Market-based***
Lowest Overall Value • Slower implementation • Most costly/less efficient • Piecemeal implementation • Enhanced community aesthetics • Increased property values	Increased Overall Value • Faster implementation and lower costs compared to traditional • Less piecemeal than traditional, but still elements of piecemeal approach • Enhanced community aesthetics • Increased property values	Greatest Overall Value • Fastest implementation • Significantly lower costs (40% or more) • More green/local jobs • Support for local small businesses • Attracts public/private investment opportunities Enhanced community aesthetics • Increased property values

Philadelphia's Greened Acre Retrofit Program (GARP)

By Erin Williams, Philadelphia Water Department (PWD)

Background and Overview

PWD transferred what was originally a water use-based stormwater fee to a parcel-based fee that established a rate for non-residential property owners based upon the amount of impervious cover at the property level. For some non-resident private property owners, this shift represented a significant increase in fee payment. To incentivize fee payers to adopt green stormwater infrastructure, PWD has established the provision that up to 80 percent of the fee could be eliminated assuming the installed practice met the requirements of controlling at least the first inch of stormwater runoff on site. The intent was that the cost-avoidance motivation associated with GI adoption would provide the incentive to implement GI on private properties.

A report released in January, 2013 titled *Creating Clean Water Cash Flows*, authored by a collective of the Natural Resource Defense Council, the Nature Conservancy, and EKO Asset Management Partners, investigated innovative approaches to finance large-scale investments in stormwater infrastructure. Results from these efforts have highlighted that the costs associated with stormwater retrofits in the Philadelphia area are generally higher than the return on investing in stormwater infrastructure construction for a majority of non-residential property owners. Specifically, the report states that when considering avoided stormwater fees as the only metric of project payback, "the discounted payback periods of most green infrastructure retrofits on private parcels stretch beyond ten years, which is longer than most investors would be willing to accept." Considering this, it was clear that PWD should consider options beyond simply relaying on avoided stormwater fees to generate significant investment in stormwater infrastructure on privately-held non-residential properties.

The result of this pivot was PWD's launch of the Greened Acre Retrofit Program (GARP), which provide grants to those who can retrofit a parcel below a specified cost efficiency threshold. Generally, this program provides grant funding to companies or contractors to construct stormwater projects across multiple properties in Philadelphia's combined sewer area. GARP combines engineering/construction quality with client management to maximize greened acres and benefit to PWD, while still providing benefit to the property owners via credits. Engineering/construction quality and experience are nothing new here. GARP's core element is project aggregation, which is an approach that groups projects together under a single retrofit effort to reduce transaction costs, by spreading this cost over many projects, and by gaining economies of scale, thereby transforming projects with unreasonable costs and return-on-investment (ROI) horizons to be more financially attractive efforts when viewed as a whole.

Eligibility

Funding for GARP is reserved for stormwater retrofit projects on private property in the combined sewer area only. Properties undergoing redevelopment are not eligible for GARP funding and must comply with PWD's Stormwater Regulations. Recipients of the grant funds are limited to companies and project aggregators that can assemble large areas, often over multiple properties, for stormwater management projects. The recommended minimum project size is 10 acres.

Evaluation Requirements

GARP applications will be evaluated based on a variety of criteria including total area managed, cost to PWD, and quality of long-term maintenance plan and availability of matching funds. Competitive applications will limit grant requests to $90,000 per impervious acre managed or less. Agreements or contracts with any participating property owners must be included in the application.

Process and Initial Results

Applications can be submitted electronically to PIDC at any time. A selection committee comprised of PWD staff evaluates applications and issues decisions at the close of each fiscal quarter. Selected grantees will enter into a subgrant agreement with PIDC to move forward with project design and implementation. Owners of properties participating in the GARP grant project are required to execute an Operations and Maintenance Agreement with PWD. Project aggregators are required to execute an Economic Opportunity Plan as part of the subgrant agreement.

To date, PWD has awarded one application worth $8.3 million for 90 acres across 8 unique properties. All sites are expected to be constructed by the summer of 2015. Currently, two sites are completed with an additional two site under construction.

Incentivizing Green Infrastructure Retrofits with Trading in the District of Columbia

By Evan Branosky, DC Department of Environment

Overview

The Stormwater Retention Credit (SRC) trading program in Washington, DC provides incentives for the voluntary installation of green infrastructure that reduces stormwater runoff. Revenue from SRC trades can help to finance the cost of installing and maintaining projects.

New stormwater management regulations provide the basis for trading. On July 19, 2013, the District Department of the Environment (DDOE), the environmental agency for Washington, DC, issued regulations that require major land disturbing projects[1] to retain the volume from the 1.2 inch storm. Similarly, major substantial improvement projects[2] must retain the volume from the 0.8 inch storm. Once these projects retain 50% of their Stormwater Retention Volume on site, they may achieve their remaining volume off-site. The off-site retention volume (Offv) is an ongoing obligation and must be met on an annual basis.

Projects have two options for achieving Offv. They may pay in-lieu fee equal to $3.50 per gallon per year or buy and use SRCs, which achieve one gallon of Offv for one year. Whereas in-lieu fee is paid to the District Government, SRCs are traded in a private market. Properties generate SRCs by reducing stormwater runoff through the installation of voluntary green infrastructure. Owners trade their SRCs in an open market to others who use them to meet Offv obligations.

Program Benefits

DDOE's program is designed to provide flexibility for regulated sites while maximizing the benefit to District waterbodies. DDOE cites two hypothetical scenarios to illustrate the potential for cost-savings and flexibility. In one scenario (Scenario A), a 0.25-acre site (Site 1) with 100% impervious cover (assumed to be a high-rise residential building, for example) controls the entire 1.2-inch storm volume onsite through relatively high-cost controls, such as a green roof or a stormwater harvesting system. The estimated cost for Site 1 is $3.25/gallon, or $25,152. In the second scenario (Scenario B), Site 1 retains 0.75 inches on site with the remaining 0.45 inches of runoff retention achieved by use of SRCs generated at an off-site location (Site 2, also 0.25 acres and 100% impervious), which is located on a site that allows for less costly practices, such as bioretention or permeable pavement. The cost for retention on Site 2 is $0.65/gallon, which results in a total cost of $17,603 for the combined retention provided at Site 1 and 2 in Scenario B. Compared to Scenario A, Scenario B results in a 30% cost savings to provide the same amount of runoff retention.

In addition, DDOE's Scenario B provides an increased benefit to District waterbodies by retaining more stormwater on an annual basis than would be retained in Scenario A. Using 2009 rainfall data, DDOE calculated a 53% increase in annual stormwater retention in Scenario B, as compared to Scenario A. The reason for this has to do with the fact that many of the storms that occur in a

[1] Major land disturbing projects are development projects that disturb 5,000 ft² or more of land area.

[2] Major substantial improvement projects are development projects where the cost of improvement equals at least 50% of the assessed value of the structure prior to improvement and the combined footprint of the improved area and land disturbance is ≥5,000 ft²

year in the District are smaller than 1.2 inches (90th percentile storm for the District) and the fact that the smaller retention practices in Scenario B receive drainage from two sites (more impervious area) than the larger practice in Scenario A. Consequently, the practices in Scenario B fill to their capacity much more frequently than the practice in Scenario A.

Beyond achieving a higher rate of overall retention, the SRC program should help to drive the implementation of GI in socioeconomically challenged areas outside of the urban downtown core area where opportunity costs related to land value are relatively low. This driver can help to facilitate a catalyzed "greening" of areas that are most need of the social and economic benefits of GI. Additionally, higher rates of GI implementation outside of the downtown core area may help to provide enhanced protection to headwater tributaries who are most impacted by flashy urban storm discharges.

Credit Certification and Maintenance Requirements

DDOE is the sole SRC-certifying authority, and eligibility requires that projects achieve retention above existing retention or requirements, be designed in accordance with a DDOE-approved stormwater management plan, complete final and ongoing inspections by DDOE, and document the ability to maintain the project over the certification period. DDOE certifies up to 3 years' worth of SRCs, and will re-certify every 3 years as long as eligibility requirements are met.

A unique feature of this program is that one SRC equals 1 gallon of runoff retention for 1 year. Likewise, the in-lieu fee corresponds to one gallon of runoff retention for 1 year. The one-year lifespan of an SRC and the 3-year certification cycle ensure that retention performance is maintained and provides flexibility for SRC generators who decide to pull out of the market and use their land in other ways.

Initial Activity

DDOE certified the first SRCs in April 2014 and approved the first trade in September 2014. As regulated projects finish their construction phases and more people learn about SRC trading opportunities, DDOE expects trading activity to increase. For current information on the SRC trading program, including the registry of SRCs and participation instructions, visit ddoe.dc.gov/src.

XII. Potential Financing and CBP3 Implementation Scenarios for EPA Region 3

This section presents a range of financing scenarios that illustrate potential pathways communities can adapt and modify for their local needs to fund a CBP3. In addition, the section provides scenarios on how these financing options operate within the context of the contractual, management, and regulatory arrangements encountered within EPA Region 3 states (i.e., Pennsylvania, Maryland, the District of Columbia, Delaware, and Pennsylvania).

Public-Private Partnerships and the Impact on Stormwater Financing

One of the most important attributes of P3 structures is the impact on infrastructure financing. By effectively partnering with private firms, local stormwater programs are in a position to jointly mitigate financing risk and more efficiently allocate and distribute fiscal resources. Most importantly, the positioning of stormwater management programs link program revenue directly to capital improvements and O&M services and functions.

Revenue and Funding Options and Criteria

The potential impact and innovation associated with P3 financing structures ties directly to the capacity for establishing sufficient and sustainable program revenues. Public or private partners assume the responsibility for allocating and distributing revenues and the government retains ultimate responsibility for insuring that social needs and objectives are met. Therefore, in deciding which funding source, or combination of sources, to use, local officials can apply criteria for their choice by answering the following questions (NAFSMA, 2006):

1) Is it legal?
2) Is it equitable in the sense that: (a) it is proportional to the level of services that payers receive; and, (b) that it takes into consideration the needs of special groups of payers?
3) Is it sufficient to meet anticipated costs?
4) Is it flexible (i.e., adjustable to changing conditions)?
5) How costly is it to administer during the initial set up and for ongoing oversight and maintenance (e.g., what are the data requirements, and how compatible is it with existing data processing systems)?
6) How consistent is it with other local funding and rate policies?
7) How stable a source of revenues is it?
8) Can it be used to create opportunities and incentives for payers to reduce their contributions to stormwater by changing their behavior?

Of course, the unique nature of P3 structures and the interaction between public and private institutions will influence the answer to each of these questions. Although there are a variety of resources and funding tools available to local communities for supporting stormwater programs, the foundation of local programs is based on local revenue generation in the form of taxes and fees.

Table 9:CBP3 Financing Scenarios Summary Table

Scenarios	Description
Scenario 1: General Fund Financing	Traditional Approach to Stormwater Management
Scenario 2: Stormwater Utilities	Many communities are creating stormwater utilities to provide dedicated funding for stormwater management. This dedicated revenue source creates greater opportunity to use P3s for leveraging more DBOM and other local needs.
Scenario 3: Leveraging Private Investment through SRF Program	The benefits provided by the SRF program, coupled with the fee-based financing systems, can create incentives that can effectively incentivize more effective private engagement and participation in stormwater financing systems. For example, SRF programs nationwide generate significant cash flows every year that could be used to establish innovative loan guarantees for urban stormwater management and green infrastructure projects.
Scenario 4: Establishing P3s through Targeted Grant Programs	Grant programs—federal, state, and philanthropic—remain popular at the local level and are often the focus of initial program development efforts. Although a fundraising strategy will never be sufficient to support stormwater programs in the long-term, they can be very effective at both launching nascent programs and advancing innovative new approaches for addressing stormwater and green infrastructure efforts. P3s create a very effective opportunity for leveraging grant resources.

Scenario 1: General Fund Financing

Most communities have traditionally funded stormwater management from taxes paid into their general funds. The general fund is a government's basic operating fund and accounts for everything not accounted for in other funds, such as a special revenue fund or a debt service fund. There are advantages to using general funds to support stormwater programs. The majority of local governments across the country have existing revenue and debt programs, which makes the process of supporting new and expanding programs familiar and uncomplicated. In addition, financing through the general fund allows local leaders to consider stormwater financing relative to other community priorities. There are, however, several significant drawbacks to expanding storm-water management activities through general fund financing (Favero, 2014).

In most communities, there is great competition for general fund dollars between municipal programs; using the general fund revenues to support growth in stormwater obligations requires communities to either increase taxes or divert existing resources to the stormwater program. Compounding resource availability issues is the fact that stormwater management improvements typically have a low priority in many communities, unless the municipality is reacting to a recent major storm event or regulatory action.

Another deficiency of financing stormwater management through the general fund is the lack of transparency of the general fund financing system. The total cost of stormwater management is not readily apparent when these costs are dispersed among general fund departmental budgets. This is especially true in those communities that do not have stormwater programs with clear budgetary authority, which makes it difficult to determine where financing

decisions related to stormwater management are being made. In addition, as stormwater management costs increase, general fund budgets are often not increased in parallel to meet those needs.

There is also the issue of equity and fairness in the financing system. Tax-exempt properties do not support any of the cost of stormwater management, even though many of them, such as governmental properties, schools, colleges, and universities are major contributors of stormwater runoff. Finally, general funds are primarily supported through property taxes, which are based on assessed property value. The cost of stormwater service to individual properties bears no relationship to the assessed value of the property. Therefore, this method of recovering stormwater management costs is more often than not inequitable (Favero, 2014).

Public-Private Partnerships

As discussed in Scenario 2, stormwater management is uniquely appropriate for fee-based financing, thereby linking the service and function of the infrastructure with revenue generation and investment. However, P3 structures have been used effectively within general funding financing systems, including in support of stormwater management. In addition, these contracts have traditionally been supported through general fund revenues as part of local capital improvement plans and associated capital budgeting processes.

Scenario 2: Stormwater Utilities

Many local governments that are responsible for stormwater management continue to face escalating costs at a time when general fund revenues are either stagnant or declining. To address this challenge, many communities are creating stormwater utilities to provide dedicated funding for this critical community service (Black and Veach, 2012). It is the existence of these utilities, and the codified revenue streams they represent that establishes much of the private sector interest in P3s, stormwater management notwithstanding. In addition, the direct connection between revenue generation and the function of the financed infrastructure creates the opportunity for long-term efficiencies and innovations within the P3 structure. For this reason, P3s have become very common in industries that are appropriate for fee-based revenue generation, including:

- Transportation (through the collection of tolls);
- Drinking water supply;
- Wastewater management; and
- Energy delivery and production.

For this reason, the need to accelerate and scale stormwater management programs creates unique opportunities to establish innovative P3 structures based on stormwater utilities and enterprise programs.

Stormwater Utilities

A stormwater utility is a financing mechanism that imposes user-service fees on owners of properties that create runoff; the utility is administered separately from general property taxes. Many local governments across the country are shifting their stormwater financing from management from (often) disaggregated general fund supported programs to fee-based enterprise

programs and/or utilities. In the 1970s stormwater utilities were viewed as novelties in a few western states; by 1994 there were about 100 utilities; and by 2013 the number had increased to more than 1,400 utilities, across 39 states and the District of Columbia (Western Kentucky University, 2013). With the number of MS4 permits growing, and in the Mid-Atlantic Region where Chesapeake Bay restoration requirements are imposed by the Bay states, the number of stormwater utilities can be expected to grow at an increasing rate (Favero, 2014).

Stormwater utilities and enterprise programs provide several distinct advantages over tax-supported programs. Unlike taxes, utilities (Favero, 2014):

- Are more equitable in the sense that they can be used to link fee levels to the service benefits that payers receive;
- Can provide an opportunity and incentives for payers to reduce their fees by installing BMPs on their properties;
- Can be dedicated to stormwater services only, and need not compete for allocations with other programs and obligations; and
- Can be designed to obtain payments from tax-exempt properties, such as churches, hospitals, public properties, and schools.

In most states, stormwater utilities are legal, although in some, they require special voter approval. The legality of utilities has been challenged in courts of law, but when the utilities meet certain legal standards, almost invariably their lawfulness has been upheld. The operative legal standards are: 1) the fees charged must be fair and reasonable; and 2) the fees must bear a substantial relationship to the cost of services and facilities (American Public Works Association, 2003).

Structuring user fees is a technical effort that involves considerations of the bases for fees, fee levels, approaches to different types of property, exemptions, and credits. Of course, the process becomes perhaps more technical when coupled with the formation of a public-private partnership. Generally, however, experiences across a variety of utilities and documented by the American Public Works Association (2003) provide guidelines for structuring fees. The guidelines are that fees should:

1. Be tied in a reasonably accurate and technically defensible manner to a measure of the impervious area or other indicator of runoff volumes from property parcels;
2. Utilize an accurate database for determining charges and preparing bills;
3. Distinguish among classes of properties such as residential, commercial, and industrial – to reflect differences in stormwater services they require;
4. Distinguish within classes to set fees in proportion to the contributions that parcels make to the total runoff generated by their class;
5. Be legally and politically acceptable;
6. Provide a procedure for appealing charges;
7. Be flexible in the sense that they can be modified with a reasonable amount of effort;
8. Generate adequate revenue to meet program costs; and
9. Require no more than reasonable expenses to implement.

When forming a stormwater P3, each of these guidelines must be considered in terms of how fees will support the partnership and conversely, how the partnership will impact the local community's program goals and requirements. How these guidelines are interpreted will vary thereby reflecting local

community values and unique P3 structures. In short, there is not a one-size rate structure to fit all communities (Favero, 2014).

Benefits of Fee-Based Financing

By establishing stormwater fees, communities can realize multiple financing benefits, including:

- ***Sustainable revenue flows:*** Most importantly, fee-based financing systems establish consistent revenue flows thereby ensuring support for capital investments and long-term operations and maintenance of stormwater systems. In addition, the establishment of stormwater utilities results in the reorganization of stormwater activities at the local level, which in turn creates program efficiencies.
- ***Reduced cost of capital:*** Codified revenue flows result in higher credit ratings and more favorable borrowing terms for local governments. This in turns creates incentives for private investment, specifically through P3 structures.
- ***Innovative financing mechanisms targeting the private sector:*** Fee-based systems allow communities to establish innovative financing mechanisms that can ultimately incentivize engagement by private landowners, investors, and project managers, including:
  - ✓ Direct owner funding from cash or from financing made available by traditional creditors where project and performance risk resides with the owner.
  - ✓ Third-party off-balance sheet financing whereby a project developer takes the project, performance and operating risks in exchange for annual payments representing a portion of the estimated fee savings.
  - ✓ Application of the Property Assessed Clean Energy ("PACE") financing model that involves non-recourse debt financing by a sponsoring municipality that is secured and repaid by an assessment on each property's GI improvement.
  - ✓ On-bill financing sponsored by water and sewer utility and/or third-party investors where on-bill collections are used to repay the sponsor's project financings (U.S. EPA, 2014e).

Enterprise Fund Accounting in a P3 Environment.

A stormwater utility relies on an accounting system or process known as an enterprise fund. An enterprise fund is a form of accounting that utilizes a separate fund or cost center for a specific purpose (Wayne County, 2014). Revenues generated within a specific department (e.g., a stormwater program) are generally sustained by enterprise funds. Under enterprise accounting, the revenues in expenditures of services are partitioned into separate funds with individual financial statements, rather than commingled with the revenues and expenses of all other government activities. Common types of enterprise funds are public utilities including drinking water, wastewater, trash disposal, and increasingly stormwater management.

Traditionally, establishing an enterprise fund does not create a separate or autonomous entity from the municipal government operation. The municipal department operating the enterprise service continues to fulfill financial and managerial reporting requirements like every other department. However, P3 structures can often result in more autonomous reporting, accounting, and financing systems. Exactly how autonomous these new programs become will depend on the community, the specific program and

financing needs. It is essential, however, that each new P3 address key programmatic, revenue, and cost issues when negotiating and establishing stormwater P3 programs, including:

- ***Revenues:*** Similar to any operating department, it is essential that potential public and private partners effectively estimate and determine revenue and anticipated revenue requirements. As discussed above, these revenues will primarily be based on stormwater user charges and fees. Enterprise revenues are often required for use in support of the expenditures of the enterprise fund only, rather than to support ongoing municipal operations or subsidize the general fund. However, this restriction varies from state to state. In some jurisdictions, enterprise revenue can be transferred to the community's general fund with the support of the appropriate governing bodies. The decision to restrict enterprise revenues to the enterprise expenditures has a direct impact on potential P3 structures and the engagement and application of private capital. Part of the role of the private sector in P3 structures is to help mitigate program and financing risk. However, as risk goes up, the cost of capital goes up, and the required compensation to the private firm increases. One of the best ways to reduce financing risk, thereby reducing the cost of capital and long-term implementation is to codify revenue streams and restrict them to enterprise activities.

  Finally, an important consideration for establishing stormwater P3s will be the relationship between the public and private partners in generating and allocating program revenues. Though there are many examples of private firms or partners managing and administering revenue generation and allocation—privately managed toll roads for example—the use of P3s in a stormwater setting is in its nascent stages and it is unclear whether or not private entities or firms will be appropriate for actually establishing and collecting fees. This is an especially important issue in communities where the application of stormwater fees is still relatively controversial. It is likely that in the short term, the responsibility for establishing and adjusting fees will remain with local governments; it is equally likely that that role will be transferred to private firms in certain communities in the future.

- ***Costs:*** The costs associated with operating a stormwater enterprise fund and the associated P3 vary; and encompass a broad spectrum of administrative, environmental, legal, and capital functions. These costs include direct costs, indirect costs, employee benefits, legal and borrowing costs, and capital expenditures. All of these programmatic cost requirements must be considered when negotiating the P3 structure. For example, if a private firm will be responsible for capital investments as well as long-term operations and maintenance, many of the direct, indirect, and even capital cost requirements will be the responsibility of the private firm. This, of course, creates an opportunity for significant program efficiency by transferring these responsibilities to firms that are more equipped to establish cost efficiencies than those associated directly with the enterprise fund.

The Advantages of Enterprise Fund Accounting and P3 Structures.

A community may account for a certain level of services in the general fund, special revenue fund or an enterprise fund. The advantages of using an enterprise fund rather than the other two methods, especially in

regards to establishing P3s are potentially significant.
For example:

- ***Demonstrate total cost of service:*** With all the direct, indirect and capital cost of providing the service in a consolidated fund, establishing P3-based enterprise programs will enable communities to identify the true cost of providing a service, in this case, stormwater management.
- ***Provide useful management information:*** With the consolidation of revenues and the cost of services and information on the operating performance (positive or negative) of the fund, public and private entities will have useful information to make decisions on user charges and other budgetary items. The community will be able to analyze how much the user fees and charges support the services, and to what extent if any tax levy or other available revenues are needed to subsidize the enterprise fund and the P3. The community will also be able to include the fixed assets and infrastructure of the enterprise as assets in the financial statement and recognized the annual depreciation of these assets.
- ***Retain investment income and surplus:*** Unlike services operating in the general fund or a special revenue fund, all investment earnings and any other operating surplus is retained in the enterprise fund rather than returned to the general fund at year-end. In addition, many P3s establish provisions for ensuring the cost savings generated through efficiencies are invested back into stormwater management programs. Once a surplus is certified as available (similar to free cash), it may be used to fund operating, capital, or debt service costs associated with the enterprise.
- ***Provide better ability to implement capital improvements:*** P3 structures and enterprise funds will potentially result in better service to the community, and will enable public leaders to better plan for and implement capital improvements, because these needs can be forecasted and integrated into the long-term financial management of the enterprise.

Creating Program Efficiencies and Financing Innovation: State Revolving Funds and Grant Programs

Though revenue generation is the foundation of stormwater financing systems, as well as stormwater P3 structures, there are other mechanisms and resources that have the capacity to reduce program costs, create efficiencies, and accelerate program investments. Two specifically are important to new stormwater programs: State Revolving Funds (SRF) borrowing and environmental grant programs.

Scenario 3: Leveraging Private Investment through the SRF Program

One of the more interesting financing opportunities available to new local P3 partnerships is the Clean Water State Revolving Fund (CWSRF). Specifically, there are unique opportunities for the CWSRF to be used to leverage private investment, especially through the establishment of formal public-private partnerships, in support of green infrastructure programs and projects in urban communities.

The CWSRF is the Federal Government's largest water quality-funding program. Although the CWSRF program has been most closely associated with supporting local wastewater infrastructure investments, SRF funds are increasingly being used to finance

other water quality efforts and programs, including nonpoint source pollution reductions and green infrastructure improvements. As a result, more than $3.8 billion in CWSRF funding has supported projects such as septic conversions, agricultural best management practices, and sanitary landfill construction and improvements. As the local need for urban stormwater management financing tools continues to build, the CWSRF will become an even more important financing vehicle.

CWSRF Financing Flexibility

Since its establishment in 1988, the CWSRF has funded more than $90 billion in water quality infrastructure projects. These investments have taken a variety of forms, including (Code of Federal Regulation, 2010):

- ***Project Loans:*** the most common application of the SRF program has been the use of subsidized infrastructure loans to communities and utilities. Specifically, SRF programs offer interest rates at or below market rates, with some offering interest-free loans.
- ***Purchase of Debt or Refinance:*** SRF programs may purchase or refinance a community's existing infrastructure-based debt. This program is targeted to disadvantaged communities.
- ***Loan Guarantees and Insurances:*** one of the most potentially innovative uses of the SRF program is the use of credit enhancements or loan guarantees. SRF programs can issue loan guarantees (often referred to as credit enhancements) or insurance; the result is improved access to credit markets access and/or reduced loan interest rates.

The benefits provided by the SRF program, coupled with the fee-based financing systems, can create incentives that can effectively incentivize more effective private engagement and participation in stormwater financing systems. For example, SRF programs nationwide generate significant cash flows every year that could be used to establish innovative loan guarantees for urban stormwater management and green infrastructure projects. Specifically, the innovative private sector financing mechanisms described above, including PACE financing and on-site water quality mitigation could be effectively incentivized and financed through an SRF credit enhancement or loan guarantee program. (U.S. EPA, 2014e). In addition, the use of P3 structures where private capital is the foundation for stormwater investments would result in significant leveraging of public resources, both through the SRF program and local stormwater utility fees and revenues.

Scenario 4: Establishing P3s through Targeted Grant Programs

In the long-term, local stormwater financing efforts must be supported through local revenue tools and resources, either through general fund taxes, or better yet, stormwater utilities and enterprise programs. However, grant programs—federal, state, and philanthropic—remain popular at the local level and are often the focus of initial program development efforts. Although a fundraising strategy will never be sufficient to support stormwater programs in the long-term, they can be very effective at both launching nascent programs and advancing innovative new approaches for addressing stormwater and green infrastructure efforts. P3s create a very effective opportunity for leveraging grant resources.

The majority of public grants, specifically those supported through federal programs, are designed to advance new and innovative ideas and approaches for addressing environmental and social issues. In addition, the grants are designed to leverage non-federal resources as a means of

demonstrating the commitment of multiple institutions the project outcomes. P3 stormwater programs, especially those that are predicated on private financing, create tremendous opportunities to leverage public dollars with private investment. As a result, communities with established P3 structures will presumably be well positioned to receive grant funding. Though there are myriad of grant opportunities that can potentially support local stormwater management in general and P3 programs specifically, three are uniquely important: Clean Water Act Section 319 Grant program; Environmental Justice Grants; and, the Transportation Investment Generating Economic Recovery, or TIGER Discretionary Grant program.

Clean Water Act Section 319 Grant Program

The 1987 amendments to the Clean Water Act (CWA) established Section 319 Nonpoint Source Management Program. Section 319 addresses the need for greater federal leadership to help focus state and local nonpoint source efforts, such as stormwater management. Under Section 319, states, territories, and tribes receive grant money that supports a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects (U.S. EPA, 2013b). Section 319(h) specifically authorizes EPA to award grants to states with approved Nonpoint Source Assessment Reports and Nonpoint Source Management Programs. The funds are used to implement programs and projects designed to reduce nonpoint source pollution (U.S. EPA, 2012a).

A state may use Section 319 funding for a variety of activities, including urban stormwater management programs. The funding is often used to advance innovative efforts to reduce nonpoint source pollution, with a focus on fostering the development and implementation of innovative approaches such as pollution prevention, ecosystem management, and community-based environmental protection strategies. Stormwater P3 programs would be uniquely appropriate for this type of funding. In addition, the 319 program requires non-federal matching funds; as a result, support of P3 structures through the 319 program would provide significant leveraging opportunities.

TIGER Grant Program

Another potential opportunity for stormwater P3 programs is the Transportation Investment Generating Economic Recovery, or TIGER Discretionary Grant Program, which provides a unique opportunity for the DOT to invest in road, rail, transit, and port projects that promise to achieve critical national objectives. Since 2009, Congress has dedicated more than $4.1 billion for six rounds to fund projects that have a significant impact on the Nation, a region or a metropolitan area (U.S. DOT, 2014).

The TIGER program enables DOT to examine a broad array of projects on their merits, to help ensure that taxpayers are getting the highest value for every dollar invested. In each round of TIGER, DOT receives many applications to build and repair critical pieces of our freight and passenger transportation networks. Applicants must detail the benefits their project would deliver for five long-term outcomes: safety, economic competitiveness, state of good repair, livability, and environmental sustainability (U.S. DOT, 2014). Clearly, stormwater P3s would potentially address many of these issues, especially for those communities where transportation infrastructure is a critical part of the stormwater infrastructure.

Environmental Justice Small Grants Program

Finally, the Environmental Justice Small Grants Program provides an interesting opportunity for communities establishing P3 structures to address critical social needs. By definition, urban stormwater management efforts focus on communities that have traditionally been disenfranchised in a variety of ways; effectively addressing stormwater management needs creates a unique opportunity to allocate resources in communities that have often been overlooked in regards to infrastructure investments. Though the Environmental Justice Small Grants Program would not generate significant revenue for implementing P3s, it would provide communities with an opportunity to ensure that P3s are being developed in a way that addresses the needs of all parts of the community. In effect, the establishment of the P3, and potentially leveraging these grant resources, creates an opportunity to dramatically change how disenfranchised communities engage in the financing process.

CBP3 Hypothetical Scenarios for Mid-Atlantic Communities

The following are a series of sample scenarios that illustrate the fiscal, regulatory, and partnership approaches that communities in EPA Region 3 may encounter. This section was developed to show how a community may solve some of the potential barriers and demonstrate some of the benefits for partnership approaches. A summary of these scenarios is provided below in Table 10.

Table 10: Mid-Atlantic CBP3 Scenarios Summary Table

Scenarios	Description
Scenario 1: Dedicated Stormwater Fee	This scenario is based upon a community with a stormwater utility. An RFQ for a P3 would be developed and tailored to fit the needs of the community. A new and separate private entity ("CBP3 LLC") comprised of informed professionals from both the P3 private party as well as the municipality would be established.
Scenario 2: VA Phase I MS4 – No Dedicated Stormwater Utility Fee	Non-fee revenue generation can come from a variety of sources, including general funds, pay in-lieu of programs, and grant funding. This scenario is assumed to be a large (Phase I) regulated stormwater community within the Commonwealth of Virginia. Virginia has very favorable P3 enabling legislation that allows for a variety of infrastructure projects (including non-transportation); and while being a home rule state, Virginia has not provided such home rule authority to its local governments, current legislation has illustrated the applicability at the municipal level, therefore, the proposal to use a CBP3 in this scenario is very favorable.
Scenario 3: PA Phase II MS4s – Regional Approach	While the topic of stormwater financing often focuses upon large, Phase I communities, the need for funding goes beyond these approximately 700 communities and impacts the nearly 7,000 Phase II communities. Considering this, the use of CBP3s by Phase II communities may be an attractive option, especially in states with large numbers of Phase IIs, such as Pennsylvania, which has nearly 1,000 of these communities in their MS4 program. This scenario will consider the adoption of a CBP3 by group of Phase IIs in a coordinated fashion within Pennsylvania.
Scenario 4: DC Phase I MS4 and Stormwater Retention Credit Trading Program	To illustrate the flexibility of a CBP3, this scenario will focus on the unique opportunities available for District of Columbia and private investment. A CBP3 could be established in the fashion described in Scenario 1. A difference between this scenario and Scenario 1 is that a heavier emphasis could be placed on leveraging the incentive-based programs available in the District for on-site retention retrofits.
Scenario 5: DE Phase I or II – PACE or SRF Leveraging	This scenario investigation is based upon a hypothetical framework proposed in the State of Delaware. Specifically, this framework is comprised of a conglomeration of multiple funding sources and programs.
Scenario 6: Philadelphia, PA – Grant Funding Leveraging	In this scenario, there is recognition from the municipality that publicly controlled land available for retrofits may be limited in the context of meeting regulatory requirements. Further, this recognition respects that retrofits done on privately held land reduces the burden on the public sector when addressing regulatory requirements. The example used in this scenario is the Philadelphia Water Department's Stormwater Incentives Management Program (SMIP) and Green Acre Retrofit Program (GARP).

Scenario 1: Dedicated Stormwater Fee

A fundamental element for a CBP3 is a dedicated revenue source. A leading framework for consistent and dedicated revenue targeting stormwater infrastructure investment is a stormwater utility. Today, approximately 1,300 stormwater utilities exist (Western Kentucky University, 2012; Black and Veatch, 2013), which represents approximately 17 percent of all regulated stormwater entities. Considering the strong complementary role a stormwater utility would play in a CBP3, a "low-hanging fruit" scenario would be a community with a stormwater utility.

In this scenario, an RFQ would be developed and tailored to fit the needs of the community. The effort to develop this RFQ would be led by a group experienced practitioners in assembling P3 arrangements. The RFQ would be based upon regulatory driver(s) as well as input gained from key stakeholders, such as watershed groups, religious institutions, and business leaders. Teams comprised of professionals with experience in leading P3 efforts, infrastructure finance, and technical aspects (design, construction, maintenance) of stormwater infrastructure would submit bids based upon information provided in the RFQ. After the preferred team was chosen based upon a best-value metric (as opposed to lowest-bid), negotiation efforts would occur to address details not covered in the proposal stage. Critical aspects of the RFQ would include schedule, payment terms, and monitoring requirements, among other details.

A new and separate private entity ("CBP3 LLC") comprised of informed professionals from both the P3 private party as well as the municipality would be established. The CBP3 LLC would gather funding from both parties as determined in the negotiation effort. This funding, along with the dedicated revenue source (stormwater utility fees) would be leveraged to attract low-interest loans from private financing parties to underwrite the CBP3 LLC.

The LLC would then start the work of putting stormwater infrastructure in the ground following the terms of the negotiated contract by identifying areas of most cost-effective treatment and prioritizing design and construction efforts based upon the results of these initial investigations. For areas located in the public ROW, the LLC would likely follow steps agreed upon in the contract to install stormwater infrastructure. For installations proposed in privately controlled areas, the LLC would likely engage in public outreach efforts and work with property owners or community groups (e.g., homeowner associations) to convey the need for stormwater infrastructure and ascertain acceptance of stormwater infrastructure in communities. The LLC may also leverage any incentive-based programs the municipality may provide to attract private property owners in high-priority areas. Capitol for these efforts would be taken from the pooled funds from both the public and the private partners, including funds from underwriters.

Once in the ground, efforts to monitor infrastructure performance would be based upon negotiated conditions to ensure that practices are providing services as needed. Payments to the LLC would come from stormwater fees collected over time and would be based upon the availability of the infrastructure to meet the conditions of the contract (following the "availability payment" paradigm for P3s). Ongoing efforts would confirm the performance of installed infrastructure over time through monitoring efforts. Additional investments would address infrastructure not meeting performance requirements.

Due to the ubiquitous nature of stormwater utilities throughout most parts of the country, a municipality with a stormwater utility in any state with enabling legislation could apply to this scenario.

Many of the steps laid out in this scenario regarding the development of an RFQ, selection of team, and negotiation of contract are similar or the same as those associated with other scenarios presented in this section. Differences between those presented in Scenario 1 and other scenarios will be highlighted.

Scenario 2: VA Phase I MS4 – No Dedicated Stormwater Utility Fee

While stormwater utilities represent the most stable form of dedicating funding in the stormwater sector, there have been challenges to the formation of these entities based upon issues such as equity of legitimacy. For instance, some states or localities regard the fees charged by stormwater utilities as a tax based upon a variety of legal and regulatory reasons (MLive Media Group, 2014, St. Louis Today, 2014). In other instances, the use of impervious cover as a basis for stormwater fees has been deemed as unfair to certain types of property owners who may incur relatively high fees based upon the assertion that other factors exist, such as soil type or connectedness of impervious cover, which are not captured in fee determination in most cases (WEF, 2013).

For these reasons, and others not listed here, the formation of a stormwater utility may be statutorily impossible or politically infeasible. As previously mentioned, less as 20 percent (20%) of regulated stormwater entities rely on fee-based revenues, which leaves the majority of these entities to use other means to address funding needs for stormwater infrastructure. Non-fee revenue generation can come from a variety of sources, including general funds, pay in-lieu of programs, and grant funding. In these instances, the revenue generated from these frameworks can be considered as dedicated funds if they are established to pay for services directly associated with the design, construction/installation, operations and maintenance, and the monitoring of stormwater infrastructure.

An example considered for this scenario is the development of a dedicated funding stream tied to property tax valuation (for instance, five cents per $100 of property tax). Proponents of this type of funding stream point out that the administration of a stormwater utility requires significant overhead expense and property taxes are tax deductible while utility payments are not (Fairfax County, 2009).

This scenario is assumed to be a large (Phase I) regulated stormwater community within the Commonwealth of Virginia. Virginia has very favorable P3 enabling legislation that allows for a variety of infrastructure projects (including non-transportation); and while not being a home rule state may limit authority, current legislation has illustrated the applicability at the municipal level, therefore, the proposal to use a CBP3 in this scenario is very favorable.

The mechanics of this scenario are very similar to Scenario 1 in terms of developing an RFQ and negotiating a contract. It should be noted that the PPEA legislation allows specifically for local authority control, for public sector to hire own technical and legal consultants, and state legislature approval is not required, all of which are favorable for P3 investments for stormwater (Brookings Institution, 2011). A drawback of the PPEA legislation is the lack of availability payments (Wagner, 2011), which may limit the ability for the public sector to limit risk in a CBP3 arrangement.

Regarding leveraging private funding, there is a potential that since the dedicated revenue source being tied to a value (property assessments) that has proven to be volatile in the recent past may adversely impact the ability to obtain low-interest loans. If this does not end up being an impediment, the framework regarding the establishment would be the same or similar to Scenario 1.

Scenario 3: PA Phase II MS4s – Regional Approach

While the topic of stormwater financing often focuses upon large, Phase I communities, the need for funding goes beyond these approximately 700 communities and impacts the nearly 7,000 Phase II communities. Large communities often have more resources and financial capabilities than small- and mid-sized communities. Considering this, the use of CBP3s by Phase II communities may be an attractive option, especially in states with large numbers of Phase IIs, such as Pennsylvania, which has nearly 1,000 of these communities in their MS4 program.

This scenario will consider the adoption of a CBP3 by group of Phase IIs in a coordinated fashion within Pennsylvania. Benefits to an aggregated approach would be the ability to share resources and to address common challenges. Considering the regulatory landscape, it may be more advantageous for grouping these communities together in an "umbrella" or a watershed permit.

Another advantage would be for all communities to have consistent revenue-generating frameworks. For instance, all communities may have developed a stormwater utility based upon similar attributes and generating consistent levels of revenue. This would ease the ability of a CBP3 LLC to shop for private funding, and would place the LLC in a position of strength when negotiating the terms of private borrowing compared to a patchwork varying revenue-generating frameworks. In terms of developing support for a clear dedicated funding source for stormwater infrastructure, a community may wish to join with others to realize the potential cost savings associated with a CBP3 program but may not have a utility or other similar program to provide significant and consistent revenue dedicated for stormwater infrastructure. In this instance, the financial advantages of leveraging dollars gained through a fee to attract private dollars as part of a coalition of other Phase IIs might be a good selling point to overcome opposition to the development of a robust revenue-generating vehicle.

For a group of Phase IIs with consistent stormwater finance programs and regulatory goals, the use of a CBP3 may be an attractive option. The mechanics of establishing a RFQ, selecting a team, negotiating a contract, establishing a CBP3 LLC, and launching/running a program are similar to those presented in the previous scenarios. However, the bureaucracy associated with a coalition may provide unique challenges during the various steps in the process of establishing a CBP3 program. Strong coordination would likely overcome this challenge, so bureaucratic challenges associated with establishing a multi-jurisdictional CBP3 should not be considered a barrier.

Perhaps the more significant challenge of establishing a coordinated CPB3 program in Pennsylvania is the lack of proper enabling legislation, which currently is limited to transportation projects. However, the significant stormwater needs in a state like Pennsylvania may provide the driver for legislation that broadens P3 programs. Considering that this type of legislation was recently introduced in Pennsylvania, it is conceivable to think that similar legislation would be introduced again. The lack of home

rule authority may impede the ability for local governments to have the autonomy needed to develop unique arrangements to address their challenges. Further investigation is needed to determine the ability for different types of municipalities to engage in P3 arrangements.

Scenario 4: DC Phase I MS4 and Stormwater Retention Credit Trading Program

To illustrate the flexibility of a CBP3, this scenario will focus on the unique opportunities available for District of Columbia and private investment.

Drivers for stormwater infrastructure investment in the District are the Chesapeake Bay TMDL as well as the need to comply the recently enacted MS4 permit requiring 1.2" on-site retention for new development. In an effort to find cost-efficiencies, the District Department of the Environment (DDOE) has established the Stormwater Retention Credit program, which allows property owners and site developers to generate Stormwater Retention Credits (SRCs) by providing on-site stormwater retention beyond those required for respective sites. These credits can be purchased (in an open market run by DDOE) by developers who are required to provide half of the requisite on-site with the option to meet the remaining retention volume through credits obtained through the SRC program. Expectations are that this incentive-based program will lead to high amounts of retrofits in socio-economically challenged and environmentally sensitive areas. Beyond the SRC program, a stormwater fee has been established with credits/rebates given to those who provide retention onsite.

A CBP3 could be established in the fashion described in Scenario 1. A difference between this scenario and Scenario 1 is that a heavier emphasis could be placed on leveraging the incentive-based programs available in the District for on-site retention retrofits. These strong incentive programs may provide the interest needed for many property-owners to allow a CBP3 to design, construct, install, and maintain BMPs on their property based upon a pre-determined sharing of revenue generated based upon the sale of SRCs. In this way, the CBP3 LLC may act like a pseudo-Energy Service Company (ESCO), which installs energy efficient appliances and fixtures in return for a fee paid by the property who realize a cost savings due to reductions in energy usage (Bullock and Caraghiaur, 2001).

Scenario 5: DE Phase I or II – PACE or SRF Leveraging

This scenario investigation is based upon a hypothetical framework proposed in the State of Delaware. Specifically, this framework is comprised of a conglomeration of multiple funding sources and programs. As stated previously, the Delaware P3 enabling legislation is focused primarily on transportation projects with some allowances for other types of infrastructure investments. The governing body required to approve of Clean Water-sector P3s (CWAC) is the same body that leads the Clean Water SRF program in the state. This bridge of responsibilities, along with other funding sources, may provide an opportunity for the use of a CBP3 approach for stormwater.

There are significant efforts and costs required to establish and provide initial funding for a CBP3. In Delaware, this upfront cost could be provided through the SRF program. The use of SRF dollars for stormwater and GI is on the rise, and has been pioneered by communities such as Onondaga County, New York (Syracuse) who have successfully received SRF funding for stormwater by grouping together GI projects and illustrating the benefits of this investment through technical analysis (NYS Environmental Facilities Corporation, 2014).

A proposal to use a P3 framework for stormwater infrastructure investment in a community, based upon initial infusion of capital from SRF dollars could be coordinated and facilitated by the CWAC.

However, a CBP3 program requires a dedicated funding source. As has been detailed previously, a stormwater utility program could provide this dedicated funding source. It should be noted that some communities in Delaware currently have a functioning stormwater utility that include a credit/rebate program to incentivize property owners to construct/install stormwater infrastructure voluntarily. Another option to complement a user-fee based stormwater revenue program, if fees provide an adequate stream of dedicated funds or in lieu of a stormwater utility program, is the use of the Property Assessed Clean Energy (PACE) program. This 2008 program has been adopted through legislation in 31 states. Virginia, Maryland, and the District of Columbia are the only EPA Region 3 states with PACE enabling legislation currently (PACENow, 2014). PACE programs give local governments the authority to establish financing districts. Property owners may then fund energy-efficient and renewable energy investments with funding security by a tax lien on the property with the owner repaying the money as a special line item on the annual property tax over a varying length of time—often between 5 and 20 years (PACENow, 2014). Some PACE programs allow for water conservation measures to be included; and in other programs, the energy savings associated with GI (e.g., green roofs) have been included in PACE portfolios (NRDC, 2012). A study focusing on the NoMA (North of Massachusetts Avenue) business district in Washington, DC and the ability to successfully incentivize private land owners to adopt GI on-site illustrated the utility of the PACE program used in conjunction with other incentive-based programs such as SRCs and reduction in stormwater fees (District of Columbia, 2011). If PACE enabling legislation existed for Delaware, and other financing programs were properly aligned (CWAC approved of stormwater infrastructure investment through P3 as well as through the SRF program), there is a strong possibility that a CBP3 could be successfully implemented in a Delaware municipality. It should be noted that Delaware has partial home rule authority, which may provide authority for local governments, but further research is needed to determine if statutory conditions would limit or complicate the ability for local governments to adopt a CBP3. As with Virginia and other partial and non-home rule states in Region 3, this potential barrier can be removed through targeted state legislation specifically allowing for public works projects to be included in the allowable P3 investment projects defined in statutes, as well as providing the authority for local communities with stormwater infrastructure investment needs, the autonomy to establish CBP3s.

Scenario 6: Philadelphia, PA – Grant Funding Leveraging

A final scenario is the use of significant grant funding associated with a municipal stormwater program leveraged by a CBP3 program to incentivize on-site stormwater infrastructure investment on private properties. In this scenario, there is recognition from the municipality that publicly controlled land available for retrofits may be limited in the context of meeting regulatory requirements. Further, this recognition respects that retrofits done on privately held land reduces the burden on the public sector when addressing regulatory requirements.

The example used in this scenario is the Philadelphia Water Department's Stormwater Incentives Management Program (SMIP) and Green Acre Retrofit Program (GARP). These programs will fund retrofit

programs that are cost-effective while capturing and retaining at least the first inch of runoff. Eligible projects for SMIP can be located within the combined or separate sewer areas, and are limited to projects costing $100,000 per impervious acre or less and has no minimum project size. The GARP program is similar; however, it is confined to the combined sewershed and has a maximum per acre cost of $90,000 and a minimum project size of 10 acres. The reason for this difference is to accelerate the "greening" of impervious acres within the combined sewershed by capturing the cost efficiencies related to project aggregation. By combining potential retrofit projects together or identifying large properties who can benefit from retrofitting, the cost associated with identifying, design, permitting, and administration (commonly known as "transaction costs") can be spread across multiple projects and area (NRDC, 2012). Commonalities between the program is that projects that are shown to control runoff generated in the public ROW are given preference, and that projects awarded grant funding are also eligible for a reduction in stormwater fees through the Philadelphia Water Department (PWD) stormwater credit program. Rewarding more cost-effective retrofit projects reduces overall costs associated with program retrofits.

An established CBP3 entity could utilize this type of robust incentive-based grant program by working with property owners to help identify eligible projects. As previously noted, one type of transaction cost is searching for and identifying cost-effective projects. An established CBP3 entity would be in the community meeting with potential project owners on a large scale as well as engaged in robust analyses to identify retrofit projects making this entity a welcomed complement to a SMIP or GARP-like program. Additionally, private property owners would be appreciative of a CBP3 who may identify their property as an eligible project considering that work would be done at no cost to them and they would receive the on-going benefit of a reduced stormwater fee. The dedicated funding source for this scenario is a storm-water utility.

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