MARKET-BASED ALTERNATIVE DELIVERY & FINANCE OPTIONS TO IMPLEMENT GREEN INFRASTRUCTURE RECOMMENDED FOR THE MILWAUKEE METROPOLITAN SEWERAGE DISTRICT

Prepared by: RISC SOLUTIONS

June 2018

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Lastly, any related communications can be directed to the following.

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1.0 EXECUTIVE SUMMARY

This project, funded by the Great Lakes Protection Fund (GLPF), provides possible frameworks for establishing a public-private partnership to deliver and/or finance large-scale integrated green infrastructure (GI) within the Milwaukee Metropolitan Sewerage District (MMSD) service area. MMSD is a Wisconsin-based wastewater utility that has committed substantial resources to the use of green infrastructure in improving their operations. This commitment has positioned MMSD to build upon its past work to implement integrated green infrastructure for stormwater management on a large scale.

This report presents a set of public-private partnership options for MMSD that lead to large-scale deployment of green infrastructure. Options presented herein include CBP3, EIBs, stormwater credit trading, and a stormwater bank. Of these, CBP3 and EIBs emerge as the preferred partnership models recommended to MMSD.

For one of the two CBP3 scenarios presented herein, at the end of year 30 and using assumptions presented here-in, MMSD will have a surplus cash balance of $467 million. In addition, other key features of CBP3s include its ability to use either public or private finance, proven program efficiencies, and transfer of risk from the government to the private-sector partner. For example, the CBP3 in Prince George's County in Maryland is set up using $48 million via a State Revolving Fund loan at 1.1% interest, and costs 30% less compared to traditional procurement (Prince Georges County 2016).

On the other hand, EIBs can provide access to new sources of capital with the ability to transfer performance risk from MMSD to private investors. EIBs can be structured such that new, innovative environmental interventions can be tested for their effectiveness and piloted to make the case for long-term deployment. Other benefits include the ability to accommodate flexible transaction structures and delivery methods, ability to engage multiple payors, and pursue shorter term loans for assessing green infrastructure solutions.

Community-based Public-private Partnership (CBP3) and Environmental Impact Bonds (EIBs) are recommended solutions to the challenge of delivery and/or finance of large-scale green infrastructure that meets MMSD's 2035 vision

This report details several options available for private delivery and financing, which include:

- CBP3
- EIB
- Stormwater credit trading
- Stormwater bank

The report also expands on these options by presenting a modular approach incorporating a hybrid use of an EIB and a CBP3, as well as opportunities to incorporate stormwater credit trading and/or a stormwater bank over time.

The array of four options are presented and contrasted in Table 1-1. CBP3 and EIB emerged as attractive options as information specific to MMSD, was collected, although all options considered have their challenges. For example, MMSD noted that that it lacks legal authority to hold a surplus under a CBP3. It further noted that use of an EIB would require a state statute change, and that the

Table 1-1: A comparison of four detailed options for MMSD's green infrastructure (GI) program

BENEFITS	STORMWATER CREDIT TRADING	STORMWATER BANK	EIB	CBP3
Existing Statutory Authority	○	○	○	●
MMSD Retains Governance And Control Of Program	○	●	●	●
Performance Based-Fee Structure	○	○	●	●
Long-Term Operation And Maintenance Included	●	●	◐	●
Private Partner Assumes Risk For Construction, Financing, and Maintenance (EIB may include or exclude maintenance at Borrower's option)	●	●	◐	●
Fully Scalable Solution	○	●	◐	●
Flexible Public Commitment	○	○	●	◐
Shifts Costs To Developers	●	●	○	◐
Provides Data Collection On GI Effectiveness and Includes latest innovative practices	○	○	●	●
Opportunity For MMSD Member Community To Assess GI	○	○	●	○
Provides Long-Term Socio-Economic Benefits	●	●	◐	●
Potentially Reduces Fee Increases	●	◐	●	●
Enables Economies Of Scale And Program Efficiency	○	○	●	●
Target Most Cost-Effective, High-Impact Private Parcels	○	●	○	●
Exceeds MMSD's 20% local business utilization requirements	○	◐	○	●

● - Full benefit ◐ - Partial benefits ○ - No benefits

stormwater credit trading and banking would require a new legislation to overhaul MMSD's service area communities' fee payment processes.

Pros and Cons of a CBP3 for MMSD

CBP3s are designed to be in place for an extended period - two or more decades – as a means of developing service delivery programs that recognize efficiencies and costs savings. The "front-end" investment of time and energy required to create the partnership can yield valuable benefits for decades. Benefits of a CBP3 are many and include:

- Performance-based contracting provides assurances to the governmental entity (Figure 1-1).
- The public partner retains governance and decision authority (Figure 1-2).
- The private partner only receives the fixed, "pay for performance" based fee. Fees are aligned with public entity interests and program goals such as local workforce inclusion and local hiring requirements. Financial risk can be allocated to the private sector in exchange for the dedicated revenue stream by the public partner.
- Program savings and residual cash-flow are returned to the public partner.

- Upfront capital investments can be obtained from the private partner. Public and private financing can be blended to reduce the cost of capital.
- Long-term operation and maintenance (O&M) remains the responsibility of the private partner.
- Long-term contracting encourages innovation and creates the incentive for adaptive management and operational flexibility.
- Utilizing a design/build/ delivery/maintain methodology limits construction risk and thereby reduces costs.
- Long-term, "pay for performance" contracts encourage rapid scale-up to meet project demands and financial funding requirements.
- CBP3 drives local workforce development and creates long-term economic development for residents, at-scale.

Challenges of using a CBP3 include:

- Public perception can hinder institutional acceptance of a CBP3, based on past P3 projects (even if they are not similar to a CBP3).
- Fear of shifting regulatory requirements that would change performance requirements after entering a long-term contract unless such a provision is included in the contract documents.

Aside from lower costs compared to traditional procurement across the country, a key benefit of a long-term P3 is its ability to be credit positive for a public entity. For example, Moody's Investors Service evaluated a 2016 agreement between Wayne State University and Corvias and rated the partnership as credit positive for the university because it allowed them to free-up $102 million of their balance sheet for other borrowing needs (Colomer 2016).

MMSD's 2035 regional green vision is ambitious in scope and has a strong basis as far as socio-economic-environmental payback. The 42,000 acres of new green infrastructure is expected to nearly double MMSD's stormwater detention capacity, save over $40 million in infrastructure costs, create 500 green jobs, and increase property values well over half-a-billion dollars (MMSD 2013).

Also, noting 70-to-30 private-to-public space availability for green infrastructure, any CBP3 crafted to meet MMSD's 2035 Vision needs to ensure its relevance to work on private properties (MMSD 2013).

Pros and Cons of an EIB for MMSD

Key benefits of the EIB model include:

- Ease of execution and access to new sources of impact capital, which can accelerate funding for innovative uses.
- Lack of a long-term privatization or encumbrance of an asset.
- A high degree of flexibility to scale innovations and transfer risks from pilot projects, based on a performance-based repayment model that is focused on transparency and results-oriented thinking. The transaction structure can also be customized to involve multiple payors (or borrowers) or those who benefit from the interventions explored, while meeting the borrowers' environmental and social objectives.
- Possibility of engaging multiple payors who benefit from green infrastructure projects (e.g., housing authority, economic development, public health, etc.)
- Ability to use a variety of preferred delivery methods with the public

borrower(s) retaining or transferring construction and maintenance risks to the private partner.
- Limited commitment, as necessary to test the performance of interventions and therefore leading to shorter contractual relationships and the ability to assess benefits before making long-term capital investments.

Challenges of using the EIB model include:
- EIBs are a new method of financing and given the need to measure and track outcomes, transaction costs and cost of capital may be more than that of issuing a traditional bond.
- EIBs require that the public entity (or entities) articulate and quantify performance metrics for the projects being financed. This is predicated upon internal alignment and stakeholder involvement within the public sector that demands focused engagement and agreement on outcomes to be achieved. Generally, having an internal champion is important for this to work well.
- EIBs may require additional staffing or resources to be committed to monitoring and evaluation of projects being financed, which could play out as an added cost to the borrower in some cases.

A CBP3 or an EIB could allow MMSD to continue to be a national leader in proactive management of stormwater
For over two decades, MMSD has led the nation in developing and instituting innovative green infrastructure programs and strategies to complement grey infrastructure by attempting to restore the natural flow of water. These green strategies clean and reduce the amount of stormwater runoff volume and pollution carried into creeks, rivers, and Lake Michigan.

If created, MMSD's CBP3 or EIB would become the first such delivery and/or finance vehicle within the Great Lakes basin and continue to showcase MMSD's leadership across the country.

Next steps
It is anticipated that nearly 12-18 months are needed to successfully setup a CBP3. The following steps are needed:
- Host a visioning process to identify goals associated with long-term investments.
- Develop procurement processes that are suitable for a CBP3.
- Assess revenues and funding streams.
- Connect with regulatory personnel.
- Connect with other CBP3 communities.
- Evaluate and/or develop internal capacity staffing, outside training, and resource needs.
- Create a communications program founded on transparency.
- Develop a Request for Information or Qualifications (RFI/Q) to evaluate the capacity and track record of interested contractors.
- Negotiate with the chosen contractor.
- Execute verification and adaptive management processes.
- Develop a comprehensive reporting system that allows for stakeholder input.

Figure 1-1: Contrasting the perspectives of the government and the industry in a CBP3

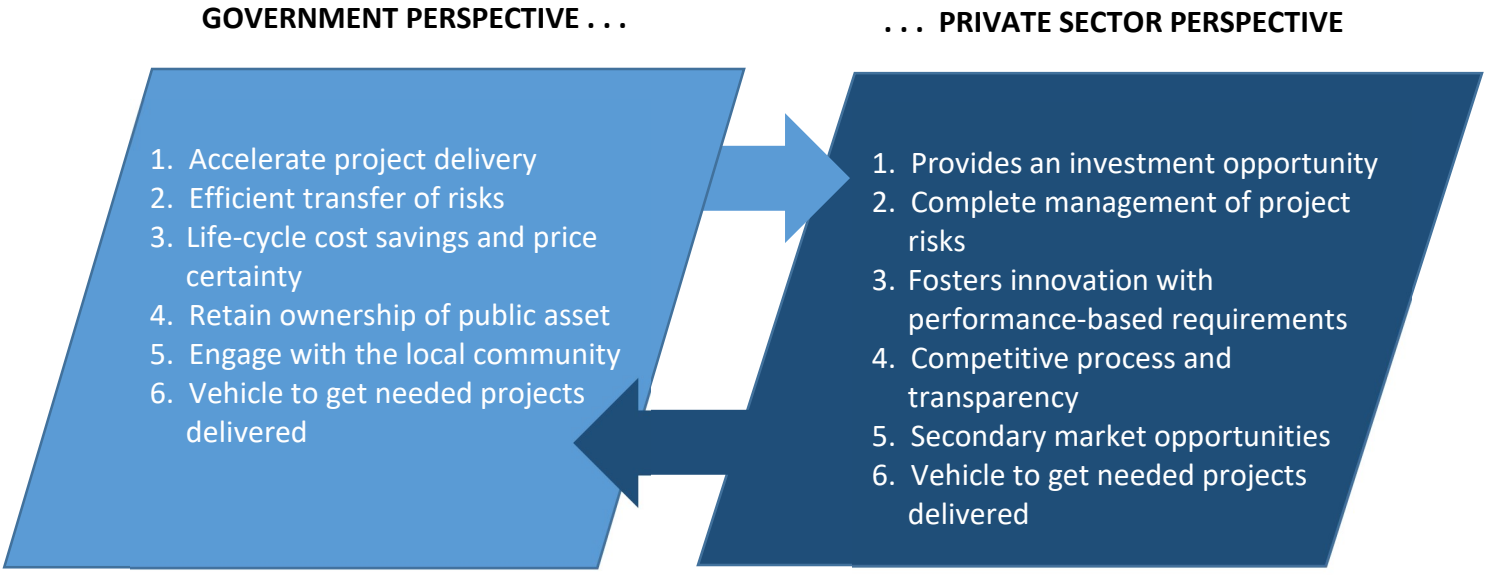
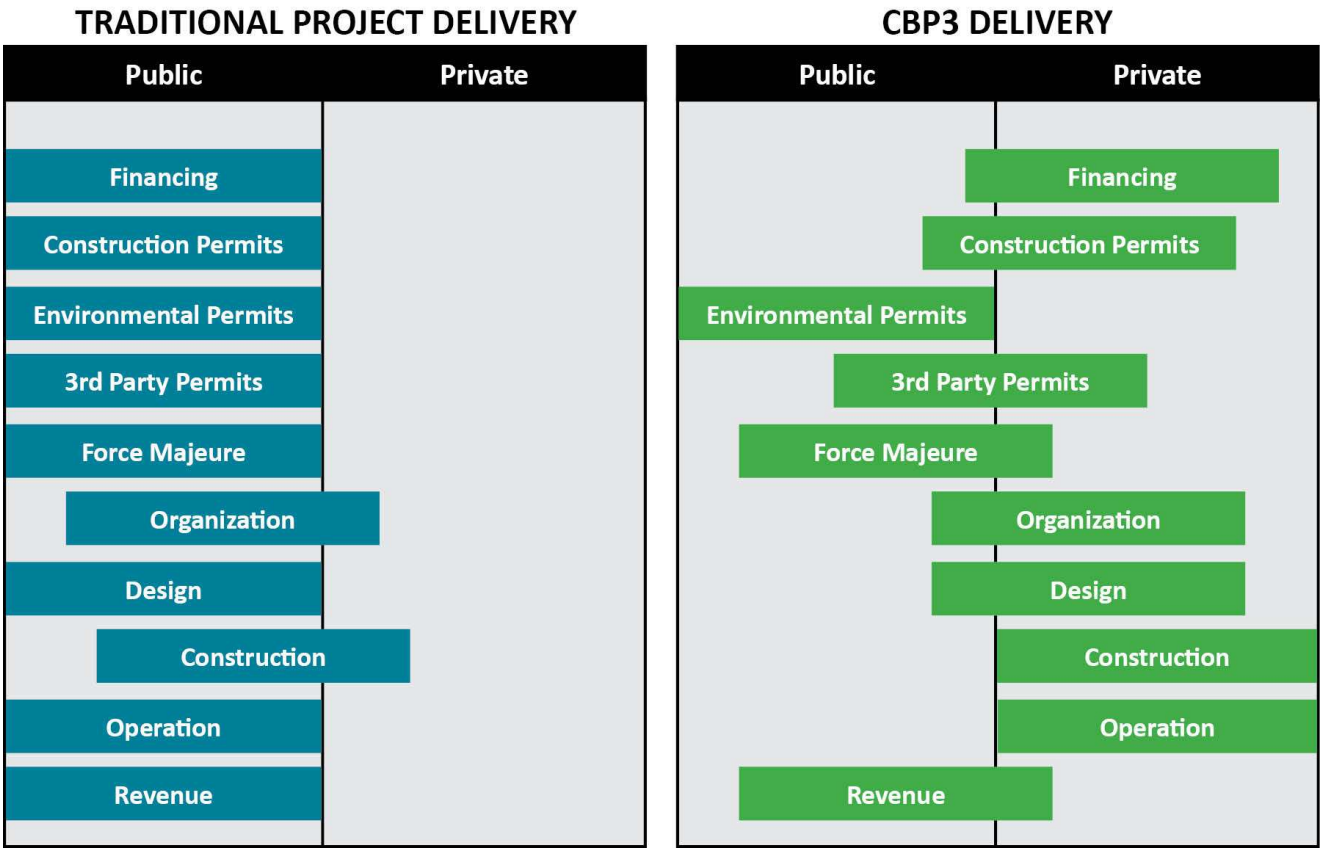


Figure 1-2: Optimized allocation of risks in a CBP3



For an EIB, on the other hand, the following steps are needed:

- Host a visioning process to identify goals associated with long-term investments.
- Develop procurement processes that are suitable for an EIB.
- Assess revenues and funding streams.
- Engage with financial stakeholders.
- Agree on outcome metrics to measure performance of the green infrastructure projects.
- Define the financial flows and structure of the transaction.
- Draft issuance documents and legal paperwork.
- Engage with investors.
- Issue the debt.

According to the U.S. EPA's Environmental Finance Advisory Board (EFAB), each dollar of recycled SRF program equity can generate $3 to $14 of SRF guarantee capacity for green infrastructure projects. Nationwide, this translates into $6 billion to $28 billion in added potential green infrastructure funding capacity (Lueckenhoff and Brown 2016).

Report Outline

In what follows, Section 2.0 outlines public and private financing options, Section 3.0 summarizes four different transactional frameworks, and Section 4.0 showcases success measures for both MMSD and the private financier/ aggregator. Lastly, Section 5.0 discusses a set of recommended next steps for MMSD to take on if it determines that CBP3 or an EIB as a viable option.

2.0 FINANCING & DELIVERY OPTIONS FOR MMSD's GREEN STORMWATER INFRASTRUCTURE

A detailed summary of goals and benefits of MMSD's 2035 Vision plan to construct 42,000 acres of green infrastructure are discussed in Appendix A. To achieve these goals, in addition to its access to low-cost, tax-exempt municipal bonds, there are public and private financing options available to MMSD. Public funding options include revenue sources like stormwater user fees (by municipalities), accessing SRFs, utilizing newer 'green' bonds, or obtaining grants (Table 2-1).

In addition to these public sources, there are several private financing structures to consider. While private financing has traditionally been more expensive than public financing, it offers several advantages including:

1. Risk transfer to private sector.
2. Access to broader variety of financing options.
3. Significantly more scalable than public financing.
4. Quicker access to innovative practices.
5. May free up capital on balance sheet for other investments.

2.1 PUBLIC FINANCING OF GREEN STORMWATER INFRASTRUCTURE

All public sponsors seek to maximize the non-debt financing sources available to them for green infrastructure, including grants, loans, and state or federal funding. In addition, public sponsors like MMSD, which enjoy strong balance sheets, have the option of funding green infrastructure through tax-exempt municipal bonds, repaid as a general obligation of the issuer or as a revenue bond from system-wide user fees. One positive factor in implementing a large-scale green infrastructure program in today's low interest rate environment, shown in Figure 2-1, is reduced interest costs, making all

Figure 2-1: Municipal market data index 20th year maturity by rating grade

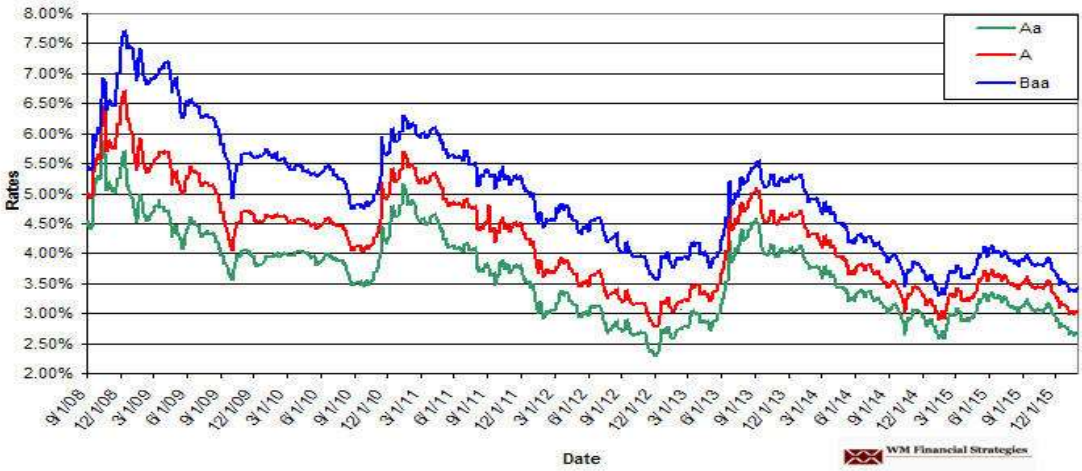


Table 2-1: A summary of pros and cons of financing options for large-scale implementation of green infrastructure

OPTION	PROS	CONS
Traditional Public Revenues and Financing Options		
Service Fees	- Reliable revenue source	- Potentially divorced from stormwater impact
Property Taxes / General Fund	- Reliable revenue source	- Not specifically designated for stormwater and thus difficult to allocate for stormwater projects - Does not capture tax-exempt properties
System Development Charges	- Easy implementation	- Dependent on new development (less reliable) - Potentially divorced from stormwater impact
Stormwater Management Rules	- Shifts responsibility for stormwater management to developers - Potentially reduces fee increases	- Public sector does not control stormwater management implementation
Grants & Low-Interest Loans	- Low-cost financing	- Limited availability which makes it challenging to scale up
Stormwater utility	-Cost for stormwater management borne by property owners with impervious surfaces - Dedicated revenue source towards stormwater management	- Ability to establish utility depends on local and state regulatory context
Tax increment Financing (TIFs) & Linkage Fees	- Cost for stormwater management borne by new development	- May be challenging to implement for regional entities unless they have taxing authorities
Clean Water State Revolving Fund	- Low interest rates	- Ceiling is dependent on state where project is being executed
Water Infrastructure Finance and Investment Act	- Low interest rates	- Ceiling is 49% of a project cost - Highly competitive
"Green" or Private Financing		
Green Bonds	- Structurally similar to traditional public bonds - High levels of investors demand	- Uses bonding capacity - Transaction costs if green bond certification is pursued - Cost to certify doesn't add value
Qualified Public Infrastructure Bond	- Low-cost financing	- Unproven structure
Environmental Impact Bond	- Shifts burden of risks associated with green infrastructure innovation - Provides rich data on effectiveness of intervention - Flexible structure	- Variable repayment - May require statutory authority

forms of infrastructure including green infrastructure, more affordable (Howard 2007). For borrowers like MMSD, an emerging asset class of "green bond" may be particularly attractive. Green bonds target investors who wish to fund environmentally beneficial projects and can be issued in the form of tax-exempt municipal bonds (Ceres 2014). These bonds are addressed in more detail in Section 2.1.3.3.

In addition to financing, public sponsors may have the option to increase existing revenues by enhancing or implementing a regulatory system to allow for a fee collection specifically for green infrastructure, which can be used to repay a public sponsor's revenue bonds as well as to operate and maintain the green infrastructure. This may take the form of implementing or increasing stormwater dedicated fees or similar configurations and is discussed further in Appendix B.

2.1.1 STORMWATER MANAGEMENT RULES

An alternate funding option is to shift the cost of stormwater management to private developers by requiring them to pay for their own stormwater runoff. This benefits MMSD by limiting increases in stormwater fees without implementing new fees, reduces the need to access debt markets, and preserves bonding capacity for other projects. Public sponsors can establish or strengthen regulation requiring developers to manage a certain amount of rainfall, either by installing Best Management Practices (BMPs) on-site or by paying an "in-lieu fee." This regulation works well in a situation where there is sufficient demand for new development or redevelopment to overcome the incremental costs (often modest) to developers.

As an enhancement to a stormwater management ordinance, public sponsors may also choose to build an off-site allowance and/or in-lieu fee into the regulation. This allows developers to assess both the cost of compliance and potential design implications, and to achieve compliance through on-site green infrastructure or paying for off-site retention. This is often an attractive option for site-constrained developers. This fee can be pooled and used by the public sponsor to implement green infrastructure projects in priority areas. However, the regulation must be sufficiently stringent (and the in-lieu fee affordable enough) to make off-site compliance an attractive financial option. Implementing an off-site allowance is also a fundamental component of establishing stormwater retention credit trading, private financing tool available to public sponsors addressed in Section 2.3.2.

2.1.2 GRANTS & LOW-INTEREST LOANS

Stormwater management grants and low interest rate loans are available for various types of projects on a state-by-state basis. Clean water or drinking water state revolving fund (SRF) dollars can be used to develop capital projects. In Wisconsin, the Clean Water Fund Program, shown in Table 2-2, provides subsidized interest rate loans to municipalities seeking to fund wastewater and stormwater infrastructure projects. In addition to SRF, the newly established WIFIA funds are also a lucrative low-interest loan option for MMSD.

Table 2-2: Wisconsin's Clean Water Fund Program (CWP)

Topic	Description
Agency	Wisconsin Department of Natural Resources
Types of Projects	Projects must be primarily for water quality purposes. A municipality receiving funding for a stormwater project must have a need to control stormwater runoff rates, volumes, and discharge quality as required by any of the following: a WPDES stormwater permit, a performance standard, and/or a plan approved by the department or a stormwater management plan.
Eligible Applicants	Any city, town, village, county, county utility district, town sanitary district, public inland lake protection and rehabilitation district, metropolitan sewerage district, or tribe.
Application Deadline	Applications submitted by October 31, 2017, are eligible for funding in State FY 2019, which begins July 1, 2018, and ends June 30, 2019. Loan closing is eight months following date of application
Loan Interest Rate & Terms	The rate for stormwater projects is 70 percent of the current market interest rate, which is 3.40 percent, and is effective until February 13, 2017. The rate for stormwater projects is 2.38 percent. CWFP can provide hardship financial assistance in the form of a reduced interest rate loan, or award a grant of up to 70 percent of the municipality's project cost eligible for below-market interest rate for projects that meet the following criteria: 1) The project is for compliance maintenance, un-sewered, or new/changed limits. 2) The municipality's median household income is 80 percent or less of the state's median household income. 3) The estimated total annual charges per residential user would, without hardship assistance, exceed 2 percent of the municipality's median household income.
Amortization	The loan repayment period may be for no longer than 20 years after the date of the financial assistance agreement.
Loan Fund Priority Ranking	Projects needed to maintain compliance with existing permit limitations receive the highest priority score in the category of project type and the largest interest rate subsidy.

2.1.3 NEWER "GREEN" FINANCING OPTIONS

2.1.3.1 Qualified Green Building Sustainable Design Project Bonds

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.

2.1.3.2 Qualified Public Infrastructure Bond

In January 2015, the White House announced the creation of a new type of bond vehicle, the QPIB, which has been tailored to enhance public-private partnership investments. QPIBs are similar to Private Activity Bonds (which are tax-exempt bonds issued by or on behalf of local or state government for the purpose of providing special financing benefits for qualified projects, most often for projects of a private user, and the government generally does not pledge its credit.), however, they are expected to have no expiration dates, no issuance caps, and the interest on these bonds is not subjected to the alternative minimum tax with the overall effect of lowering financing costs for private participation in public infrastructure investments (USEPA 2015).

2.1.3.3 Green Bond Issuance

Public sponsors can issue a green bond to fund green infrastructure projects in their area. Similar to a regular bond issuance, private investors would buy the green bond

According to the U.S. EPA's Environmental Finance Advisory Board (EFAB), each dollar of recycled State Revolving Fund (SRF) program equity can generate $3 to $14 of SRF guarantee capacity for green infrastructure projects. Nationwide, this translates into $6 billion to $28 billion in added potential green infrastructure funding capacity (Lueckenhoff and Brown 2016).

While typically more expensive than public financing, private financing is lucrative because it transfers risk, it's scalable, and it can significantly reduce overall costs due to quicker access to innovative practices.

that would provide up-front capital to build or maintain green infrastructure projects. If the issuer has a strong credit rating, issuing the bond under the full faith and credit of the organization will generally allow the organization to access a better cost of capital. Alternatively, repayment could be based on revenues generated by the project or by a particular revenue stream, assuming investors had enough confidence in the stability of the revenue stream. For example, if the bond would be financing a park or recreational area that would involve charging a fee to users, the income created could be allocated to serve as repayment for the bond. However, depending on the size of the project and the project usage levels, it may be unlikely that usage fees alone would generate enough reliable revenue to fully cover bond repayment.

As an indication of the appetite for green bonds, some investors have been willing to support very long-dated bonds because of their environmental benefit. One example of this approach in the water sector is the Green Century Bond. The District of Columbia Water and Sewage District announced the issuance of $350 million in taxable Green Century Bonds in July 2014, which extend the maturity date to 100 years compared to the usual 30 or 35 years for municipal bonds. Another benefit of green bond issuance is that it can bring new investors to the table.

2.2 PRIVATE FINANCING OF GREEN STORMWATER INFRASTRUCTURE: ENVIRONMENT IMPACT BONDS

An environmental impact bond (EIB) uses private capital to de-risk innovative public projects. An EIB is a short-to- medium-term financing tool designed to assist borrowers in making better long-term financial and capital planning decisions. One such decision may be whether—and on what terms—to enter into a CBP3.

Note that, based on input from MMSD bond counsel (Appendix C), clear statutory authority does not currently exist to issue EIBs. Accordingly, the best mix of funding through indebtedness and other alternative means should be considered first.

2.2.1 ORIGINS OF EIBs

The EIB structure is based on financial innovation in the social sphere, where social impact bonds are an increasingly popular way of financing high-impact, early-stage public-private partnerships (Hartley 2014).

In the social impact bond model, private investors fund, through an intermediary who structures the transaction on behalf of investors, deliver social services to the government. This is typically an innovative approach that is perceived as risky, but which if successful can result in cost savings

For MMSD, benefits of private financing include a) the ability to choose repayment sources to fit a project's stage, b) implementation at scale leading to savings, efficiencies, and socio-economic benefits, c) risk transfer, and d) ability to target private parcels for inclusion and maximum impact.

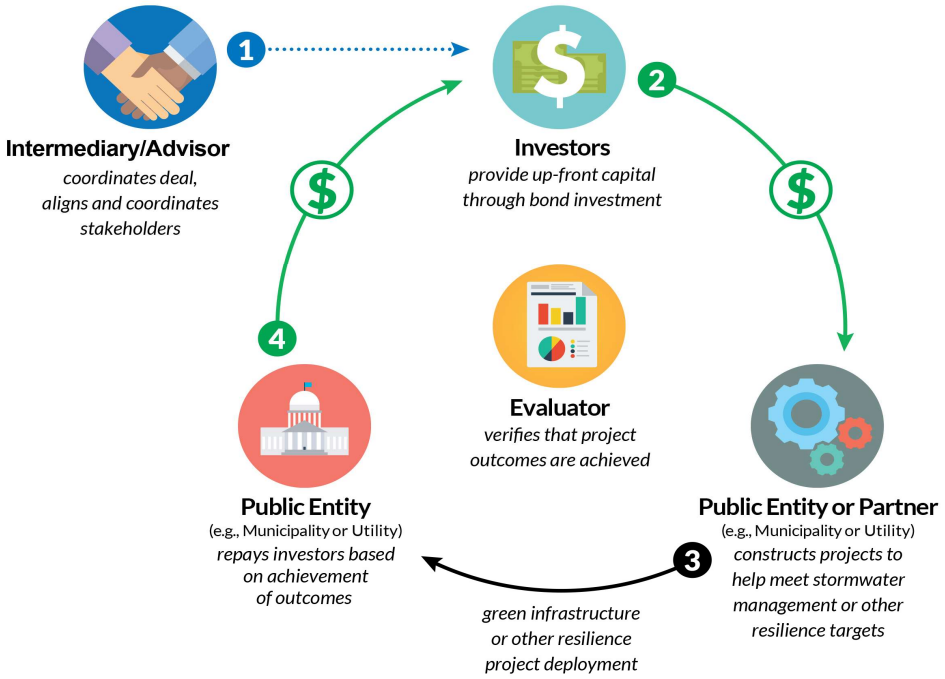
and improved outcomes. Examples of existing social impact bonds include reducing prisoner recidivism, improving early childhood education, and better patient healthcare outcomes. The government, who benefits in the event social services can be improved through these innovations, repays investors a variable amount based on performance.

Similarly, EIBs are a tool for helping cities finance innovative programs and projects where traditional sources of financing may be harder to access. These bonds draw in private capital for investments in environmental projects such as green infrastructure for improving water quality and are repaid based on the relative success of the project in achieving anticipated outcomes. In addition to financial de-risking, key benefits of the impact bond model are ease of execution, which can accelerate funding for innovative uses, lack of a long-term privatization, or encumbrance of an asset, and a very high degree of flexibility. The structure of an EIB is shown in Figure 2-2.

EIBs have gained significant traction recently. As of April 2018, aside from DC Water, cities of Atlanta and Baltimore had announced plans to use EIBs to fund green infrastructure.

In September of 2016, the D.C. Water and Sewer Authority (D.C. Water) issued the first-ever EIB for $25 million, to address combined sewer overflows through investments in green infrastructure (Quantified Ventures 2017). The tax-exempt bond was sold in a private placement to Calvert Foundation and Goldman Sachs Urban Investment Group. At the time, D.C. Water was under a consent decree with the U.S. Environmental Protection Agency—as green infrastructure emerged as a viable,

Figure 2-2: Overview of an EIB Transaction Structure



innovative alternative to grey infrastructure tunnels for managing urban storm water volume, D.C. Water wanted to test the effectiveness of green infrastructure through a pilot project in place of its existing tunneling plan. As green infrastructure had not been deployed at scale before, D.C. Water chose to issue an EIB to better offset and manage the risks of their proposed project. Working closely with team member Quantified Ventures, a pay-for-success broker, D.C. Water structured the EIB so that core project risk would be transferred to investors and the city would gain an evidence-based understanding of expected outcomes and costs before considering future investments in green infrastructure projects.

While standard municipal bond holders invest in an issuer's ability to repay on schedule, DC Water's EIB investors bet on whether the green infrastructure pilot would produce outcomes 'as expected', 'better than expected' or 'less than expected'. Investor returns were tied to project outcomes, such that D.C. Water would pay interest at a fixed rate, with potential performance payments based on stormwater captured on-site by the green infrastructure interventions (see Figure 2-3 and Table 2-3 below):

- Tier 1: If the interventions were to perform better than expected, DC Water would pay investors principal and interest plus an outcome payment

Figure 2-3: Pay-For-Success Performance Tiers for the D.C. Water EIB (Neighborly 2017)

Table 2-3: Pay-For-Success Performance Tiers for the D.C. Water EIB (Neighborly 2017)

TIER	OUTCOME RANGES	CONTINGENT PAYMENT
1	Runoff reduction: > 41.3%	DC Water will make an outcome payment to investors of $3.3 million
2	Runoff reduction: 18.6 - 41.3%	No contingent payment
3	Runoff reduction: < 18.6%	Investors will make a risk share payment to DC Water of $3.3 million

- Tier 2: If the interventions were to perform as expected, investors would receive principal and interest, but no additional payments would be made by either party.
- Tier 3: If the interventions were to perform less than expected, investors would receive principal and interest but pay a risk sharing payment to DC Water

By identifying, quantifying, and transferring project risk, DC Water's EIB created the incentives to deploy an innovative solution to a historical public policy problem by "de-risking" the project.

2.2.2 STRUCTURE OF AN EIB

EIBs build on the social impact bond model to deliver innovative, sustainability-oriented, cost-effective environmental projects. For green infrastructure, the primary performance metric is often water quantity-based (i.e., gallons of runoff retained or avoided). As described in more detail below, there is also the ability to incorporate co-benefit metrics, for example, to assess green infrastructure's ability to support workforce development or to deliver water quality benefits.

The purpose of an EIB is to demonstrate the cost effectiveness and co-benefit value of green infrastructure for borrowers who may be determining when and to what extent to incorporate green infrastructure into the capital plan. Given MMSD's 2035 Vision goal of capturing 740 million gallons per storm, a green infrastructure EIB may be used to help MMSD refine its green infrastructure capital plan or secure additional buy-in from its municipalities. Should MMSD be interested in pursuing a CBP3, an EIB could be used to better assist MMSD in negotiating fee structures with a private developer.

EIBs are an evolution of the Social Impact Bond model, which are currently used to finance innovative social programs. Key benefits of the EIB model include ease of execution, which can accelerate funding for innovative uses; lack of a long-term privatization or encumbrance of an asset; and a very high degree of flexibility repays investors a variable amount based on performance.

EIBs are among the most flexible forms of public-private partnerships with wide latitude to customize the structure to meet the borrower's environmental and social objectives. EIBs can also incorporate into a variety of preferred delivery methods with the public borrower retaining or transferring construction risk and maintenance to the private partner.

Figure 2-4 outlines one structure of a stormwater EIB. Note that an EIB can be structured to accommodate a variety of performance-based scenarios. In its simplest form, which may be most attractive to MMSD given its strong credit rating, proven track record of project delivery, and O&M arrangement with its municipalities, the private investor would fund only agreed-upon upfront capital costs of the project and performance monitoring expenses. MMSD would be responsible for delivering the project and would retain construction risk. Following a monitoring and evaluation period, MMSD would repay the investor a variable amount based on performance, traditionally validated by an external third-party evaluator. MMSD would be responsible for ensuring maintenance of the project, whether

completed by MMSD itself or by the relevant municipality(ies). This is to ensure that data collected during monitoring is accurate.

If the green infrastructure does not perform to expected levels, MMSD would still be responsible for making a payment to the investor. However, this investment may not recoup the investor's initial capital, and MMSD would receive the green infrastructure project at a reduced cost. Note that this range of repayments is specific and would be tailored to the terms of the transaction that MMSD and relevant parties would develop.

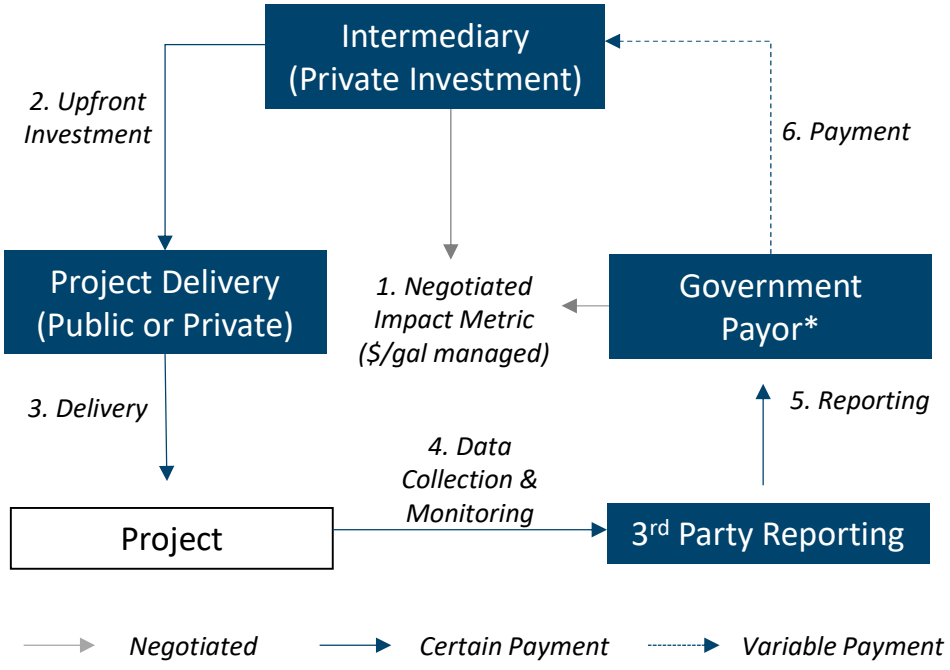
2.2.3 EIB FOR MAXIMUM STRUCTURING FLEXIBILITY

The most notable feature of EIBs is their flexibility. Unlike a CBP3, EIBs can be a short-term, public-private partnership, typically lasting three to five years including construction and monitoring. Additionally,

Because EIBs are deliberately short- to medium-term partnerships, they are ideal for determining a borrower's value and interest in a public-private partnership. The borrower may choose to build upon an EIB with a CBP3 or use data and best practices learned through an EIB to scale using conventional public finance.

EIBs can be structured to meet the needs and objectives of the borrower. For some public partners, a compelling feature of an EIB-funded project is the ability to incorporate a temporary design-build-finance-operate-maintain (DBFOM) delivery model, where the public-sector transfers construction cost risk to a private delivery entity and the operations and maintenance contract is incorporated into the EIB (with transfer back to the public sector at the completion of the monitoring and evaluation period). This can be particularly attractive for borrowers inexperienced at delivering green infrastructure or uncertain

Figure 2-4: EIB for stormwater management



of the operations and maintenance cost associated with green infrastructure.

For potential partners such as MMSD, where there is considerable project delivery capacity and where the bifurcation of capital and maintenance dollars may make a design-build-finance-maintain (DBFM) model complex, an EIB may be structured purely as a financing vehicle that transfers performance risk away from MMSD.

2.2.4 EIB METRICS FOR VALUING PERFORMANCE AND CO-BENEFITS

The success metrics negotiated between MMSD and the investor can be related to one or more measures of success. To meet MMSD's 2035 Vision, this report assumes the relevant metric is gallons managed per dollar spent. Projects funded with this EIB could be used to inform optimum BMP selection and siting, to maximize MMSD's cost effective use of green infrastructure throughout the region. For example, given MMSD's concerns over the effectiveness of porous concrete, an EIB could be structured to quantify the effectiveness of that BMP by its cost per gallon of stormwater retained.

However, another element of EIB flexibility is the ability to consider the inclusion of different or other metrics. For example, MMSD could contemplate an EIB with outcome payments linked to water quality improvements. Additionally, MMSD could consider incorporating a secondary impact metric around green infrastructure co-benefits. For green infrastructure, one likely co-benefit metric could be assessing green workforce development and impact on local jobs in conjunction with green infrastructure projects.

2.2.5 EIB AS A PRECURSOR TO A CBP3

As described above, a CBP3 may be an attractive implementation vehicle for MMSD's 2035 Vision. However, CBP3s are intentionally long-dated partnerships that hinge on key performance payments for green infrastructure delivery and maintenance.

EIBs provide value to public entities considering such long-term partnerships because they provide data on metrics that will be negotiated as part of a CBP3 agreement. An EIB could be used to find the "true" cost, in dollars per gallon managed, of at-scale green infrastructure for certain elements of the regional vision that could potentially be undertaken by a CBP3. This would give MMSD additional information to negotiate payments to the CBP3 private entity.

An alternative EIB structure could also be a guaranteed payment from MMSD, but where the private investor would reserve a portion of its investment to offset maintenance costs for the municipality(ies) where the EIB-funded project(s) are located. This would result in a similarly variable return to investors but would de-risk green infrastructure projects for the municipality ultimately responsible for maintenance. This could be used to demonstrate value of green infrastructure to MMSD's communities, with a longer-term view towards incorporating those communities into a CBP3 if there is demonstrated value from green infrastructure. A summary of the advantages of EIBs is presented below:

- Flexible Execution: Projects funded by impact bonds can be delivered publicly or privately, can include or exclude a component of operations

and maintenance funding, and can be negotiated on one or more impact metric. This flexibility of execution will be reflected in the cost to MMSD; the cost of capital to MMSD will depend on the type and magnitude of risks transferred from MMSD to private investors.

- Flexible Scaling of New, Innovative Projects and Risk Transfer: Impact bonds are not intended to finance large projects at scale, or to transfer long-term project rights to the private sector. Impact bonds can instead help finance small- to medium-term innovations and test out the efficacy of pilots in a way where MMSD can build the case to scale them up over time, with results measured and downside risk of failure transferred to investors.
- Financial Transparency: This model is based on the private partner receiving a variable performance-based fee, linked to a key impact metric (or metrices) as agreed to by the partners. The objective is to reduce the long-term capital program cost to the borrower. While an EIB can be a more expensive form of financing than MMSD public debt, it is intended to finance smaller projects, which can provide data that allows MMSD to make more cost-effective decisions in the future, ultimately resulting in cost savings.
- Active Involvement in the Partnership: MMSD remains an active participant in the partnership throughout the term of an EIB transaction and can build on a narrative that resonates with the goals of internally (to MMSD) and externally aligned stakeholders.
- Shared Values: Through a relationship built on trust and confidence, the partners discuss and develop a common set of values used to establish performance metrics, which may include socio-economic targets.
- Limited Commitment: The term of an impact bond is flexible and driven by the project timeline and time the partners determine necessary to test performance. In general, however, impact bonds are a much shorter contractual relationship than CBP3s, typically 3-7 years including construction, if any. As with the flexible execution component, this allows MMSD to test the potential benefits of a public-private partnership prior to committing to a long-term concession.

2.3 DELIVERY FRAMEWORKS OF STORMWATER INFRASTRUCTURE

This section highlights three large-scale delivery alternatives which could accelerate or enhance MMSD's green infrastructure plan. We note that only one option, the CBP3, is available to MMSD right now. The other two options will require state or local statute changes, and MMSD may not be able to do them unless policy changes are made (Appendix C).

2.3.1 CBP3

In EPA Region 3, which regulates the Chesapeake Bay region, Prince George's County, Maryland, has implemented the first CBP3 focused on stormwater infrastructure. This model offers several advantages and is easily adaptable to the needs of MMSD. In particular, the model allows MMSD to undertake a CBP3 as either a region-wide program, or some subset of

MMSD's member and non-member communities.

A CBP3 is a long-term partnership between a public and private entity to design, build, operate, and maintain stormwater infrastructure. The partnership provides a flexible, adaptive project delivery model that ensures long-term project financing, incorporation of socio-economic goals, and faster, lower-cost implementation of green infrastructure. A CBP3 is easily scalable and uses project financing, which defers upfront costs and enables MMSD to immediately implement significant green infrastructure.

2.3.1.1 Benefits of a CBP3

A CBP3 offers several unique benefits over the other private financing structures discussed in this document, including:

- Ability to fully scale, fund, and implement MMSD's 2035 Vision for green infrastructure.
- Full program management, from design to long-term maintenance.
- Enhanced project delivery capacity and increased pace of implementation.
- Robust community engagement through a tailored, community outreach plan that collaborates with both members and non-members, as well as their stakeholders.

Examples of CBP3s include Prince George's County in Maryland and City of Chester in Pennsylvania.

Among examples of EIBs, in September 2016, a $25 million, tax-exempt EIB was sold in a private placement to the Goldman Sachs Urban Investment Group and Calvert Foundation by DC Water.

Benefits of a CBP3

Variety of Financing Options - *Utilize public and private funding*

Reduce Price Risk - *Faster implementation reduces risk*

Retain Residual Cash Flow - *MMSD retains savings*

Scalable - *Achieve 2035 Vision goals*

Performance-based fees - *Drive results*

- Savings of 30-40 percent over traditional piece-meal implementation of green infrastructure (Prince George County 2016).
- Long-term economic development through the implementation of a socio-economic plan driven by performance-based metrics.
- Flat performance-based fee that drives achievement of MMSD's goals while returning program savings to MMSD through a reserve account.

An expanded discussion of these benefits is outlined below:

2.3.1.2 Socio-economic Benefits

A properly-constructed CBP3, secured by long-term commitment, has the potential to become an anchor institution that supports and builds resilient, sustainable communities.

This is best achieved by aggregating MMSD's thousands of individual drainage and stormwater management projects into a DBFOM model. This model creates economies of scale, streamlines procurement processes to reduce barriers to entry for small businesses, and creates a pipeline of workforce demand that ultimately drives local long-term wealth building opportunities.

3.2.1.3 Socio-economic Plan

Through ongoing discussion with MMSD and its stakeholders, a long-term, metric-oriented socio-economic plan would be developed that expands the breadth and depth of MMSD's existing socio-economic efforts. The plan is tailored to address the unique culture and challenges of the member and non-member communities served by MMSD, and could include issues such as:

- Workforce development for re-entry residents, disadvantaged, or low-income residents including career laddering opportunities.
- Increased subcontractor utilization and development including increasing the percent of small, local, and disadvantaged businesses participating in construction and O&M activities to as much as 50%.
- Community revitalization that addresses blight and localized flooding through project prioritization.
- Community outreach and education about stormwater management.

To achieve these sorts of benefits, it is important that the plan engage both the demand and supply side of the local workforce with two objectives in mind: a) to strengthen the local workforce and its skill set, and b) to increase the participation of local, small, and minority businesses across all competencies and phases of the program.

The engagement can best be accomplished by working collaboratively with existing local and regional organizations, whose mission is to identify and develop existing and potential small, local, and minority-owned businesses.

Supply Side of Workforce Development

Building a strong, local workforce with the necessary 'green' skills, requires a program that works with local trade schools and community colleges to develop green infrastructure curriculum and certification programs. One option is to work with local workforce development boards that use Workforce Investment Act funds to develop and implement workforce development programs and initiatives. In addition, by working with local businesses to identify the specific skills needed, a CBP3 can help shape curricula at local community colleges and training programs to ensure local residents have a clear path to success including career-laddering opportunities. Connecting residents to these development opportunities in a green economy is best accomplished through a robust outreach program to actively recruit locally. Working with local non-profits and community organizations, this outreach builds the pipeline of potential participants.

Demand Side of Skills Needed
The aggregation of all the thousands of projects into a single, well-defined, well-scheduled, fully-funded program creates significant demand through the creation of a project pipeline scheduled for delivery over a known period of time. This "pipeline" of work allows small, local, and minority-owned businesses to invest and grow capacity and 'green' skills over that period of time. These smaller but consistent projects allow developing contractors to gain experience and create a resume of green projects. More importantly, these businesses are able to build the capabilities needed to compete for larger projects both within and beyond the program.

A key component in reducing barriers for small business is to reduce bonding requirements. Since the CBP3 obtains the necessary bonding for the program, this burden is eliminated, enabling small businesses to bid on and participate in projects regardless of the company's size. This arrangement provides the protection necessary for MMSD to assure performance while relieving the contractor of the cost of obtaining these bonds (which are often not available at any cost). To further enhance the positive impacts to small, growing businesses, MMSD should consider offering a variety of project procurement sizes.

Another serious challenge for small, local, and minority-owned businesses can be the bid and procurement processes, which require small businesses to maneuver through certification paperwork and bidding processes that demand more time or effort than a small business can invest. In addition, in order for new and small business to grow, they need to build their experience on project sizes that fit their workforce and estimation skills. To help avoid these challenges, a socio-economic plan can include business concierge services to assist businesses with prequalification requirements and obtaining all required certifications and coverage needed to participate in the program. A known pipeline of projects of varying sizes is also important and allows local, small businesses to bid on progressively larger projects as their experience and capabilities grow. Finally, having a pipeline of projects which follow a clear and consistent bidding and payment processes allows small businesses to plan for expansion and obtain additional capital when needed.

Another serious challenge for small, local, and minority businesses can be the bid and procurement processes, which require small businesses to maneuver through certification paperwork and bidding processes that demand more time or effort than a small business can sacrifice. CBP3s can deal with this challenge by including business concierge services to assist businesses with prequalification requirements and obtaining all required certifications and coverages needed to participate in the program.

2.3.1.4 Pay-for-Performance
Compensation to the private partner in the CBP3 can be based on performance metrics tied to both stormwater management performance and local socio-economic goals. As part of ongoing tracking, an economic analysis tool can be used to measure the results of the program.
At an appropriate point in the program, a regional economic study can be conducted using the IMPLAN model (USDA 2018). The intention is to provide a concise qualitative analysis that includes improvements in the region and the utilization of local businesses. IMPLAN is a widely-respected

CBP3 partnerships can be set up to obtain a highly efficient, low-cost form of financing known as "limited recourse" or "non-recourse" financing (Prince George County 2016). This type of financing is not treated as an MMSD borrowing. Instead, it resides within the partnership structure as a limited liability or special purpose entity and therefore limits investor recourse to MMSD.

model that has the ability to assess both small and regional geographies. A baseline for the region is established by taking a census of all participating subcontractors in the program during the first months of the partnership, including key indicators such as:

- Current number of employees.
- Percent of total purchase value with local minority or disadvantaged enterprise businesses.
- Percent of total purchase value with county minority or disadvantaged enterprise businesses.
- Percent of total purchase value with local business enterprise.
- Percent of the total number of hours logged by individuals performing services in connection with the construction, operation, and maintenance of the project (i.e., administration, maintenance, or activity that may not contribute to the physical construction).

The intention is to provide a concise qualitative analysis that evaluates improvements in the region and the utilization of local businesses.

2.2.1.5 Financial & Legal Structures

By developing a partnership structure that drives surety of execution and lifecycle asset management, MMSD can access a wider variety of funding options and is not limited to either public or private financing. Instead, MMSD can choose a hybrid of funding types that offers the best value for money. The private partner in a CBP3 is

Figure 2-5: Legal framework structure of a CBP3 partnership

agnostic to the type of financing or funding used by the partnership.
There are several ways the legal framework of the partnership can be structured and Figure 2-5 outlines one method – a special purpose entity (SPE). A public-private partnership that is constructed as a SPE has the right to carry out the construction and operation of the CBP3. This enables the partnership to obtain a highly efficient, low-cost form of financing known as "limited recourse" or "non-recourse" financing (Prince George County 2016). This type of financing is not treated as a MMSD borrowing. Instead, it resides within the partnership structure and therefore limits liabilities and investor recourse.

With this type of structure, a dedicated revenue or funding stream can be leveraged to raise the debt required to fund the entire program with no recourse back to MMSD. Historically, this type of project financing has raised capital at 10-to-1 leverage ratios (Luekenhoff and Brown 2016).

It is important to note that, with this structure MMSD retains control of project funding through the trustee lock box (described below), as well as program oversight and budget approvals.

Additional key aspects of a CBP3 structure can include:

- Transfer of Risk: Financial risk is transferred to the private sector. The new partnership will bear the burden of debt and default. MMSD's only financial contribution to the program is a committed revenue stream (discussed in Sections 2.1 and 2.2). This separation of financial risk limits the impact to MMSD's credit rating. Despite the transfer of risk to the partnership, the public partner retains governance and authority.
- Surety of Funding: In addition to long-term O&M being fully funded through the life of the partnership, this model returns residual cash flow to MMSD through deposits into a residual return reserve, which can be used for: 1) additional investment in this program, 2) addressing unforeseen conditions, and/or 3) meeting future additional USEPA or WPDES requirements.
- Surety of Execution: The proposed structure protects MMSD 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.
- Program Scalability: The financial and operational structure of this type of partnership has the flexibility to scale up to meet project demands and financial funding requirements.
- Financial Transparency: This model is based on the private partner receiving only a fixed, incentive-based fee, based upon key performance indicators as agreed to beforehand by the partners. In addition to approving fees, the MMSD also has approval rights on annual budgets, and will receive regular progress reports and updates from the partnership.
- Flexibility of Partnership: The public partner remains an active participant in the partnership in all aspects of the project through the 30-year term, and the legal structure enables the re-alignment of goals and objectives as needed over the partnership term.

Washington, D.C., is the first major U.S. city to pioneer a stormwater credit trading program. The Department of Energy and Environment implemented the trading program in conjunction with their 2013 Stormwater Rule, which dramatically increased the requirement for stormwater retention on private property.

- Shared Values: Through a relationship built on long-term trust and confidence, the private partner and MMSD discuss and develop a common set of values used to establish performance metrics including socio-economic targets.
- Program Transparency: The partnership is managed through adaptive management with regular meetings to ensure projects and program goals are governed.

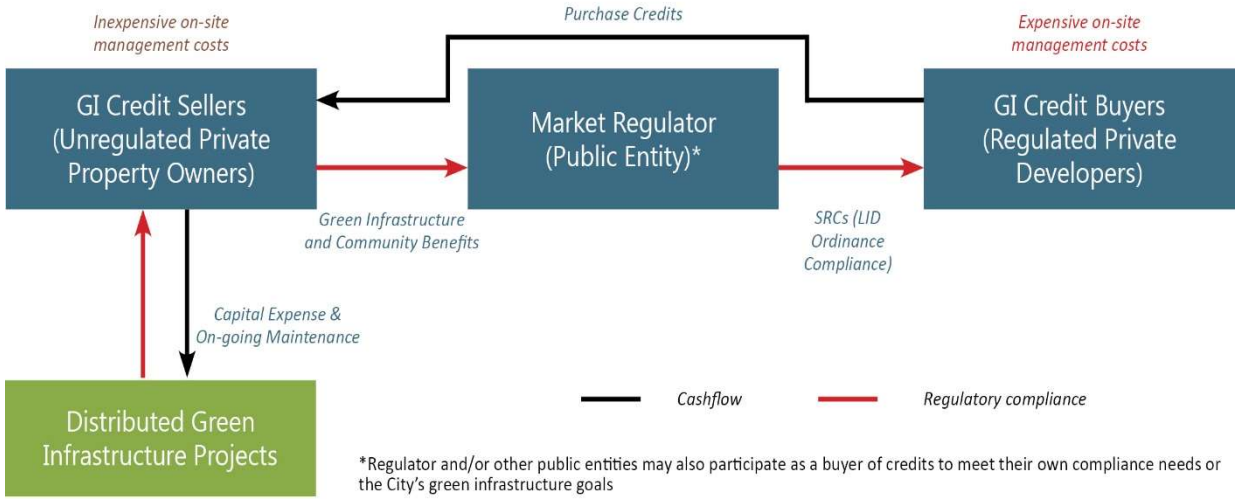
2.3.2 STORMWATER CREDIT TRADING

Credit trading (see Figure 2-6) is an innovative approach to reduce the environmental degradation caused by stormwater through a market mechanism that encourages least-cost mitigation. This approach has been implemented in Washington, D.C., and is similar to nutrient credit trading systems in the Ohio River Valley and other watersheds. This mechanism uses an open market in which developers are able to purchase off-site stormwater mitigation credits to achieve a mandated level of stormwater mitigation at the lowest cost possible.

Based on input from MMSD (Appendix C), clear statutory authority does not currently exist to enact a stormwater credit program as this would require shifting of stormwater management fees to MMSD from its member communities. Because the stormwater systems are owned by the municipalities and such a change would require amendments in state statutes, MMSD does not believe such a major policy change is likely. Details are still presented here-in for completeness. In addition, MMSD noted that implementation of TMDLs in the Milwaukee watershed system may indeed take some form of trading.

As described above, implementation of a stormwater management ordinance with

Figure 2-6: Stormwater credit trading program



the potential for off-site compliance is necessary for stormwater credit trading. In general, the more stringent this regulation, the greater demand for off-site compliance and the more feasible credit trading. For example, Washington, D.C., implemented stormwater credit trading as part of its 2013 Stormwater Rule. The 2013 rule quadrupled the requirement for on-site retention, increasing the regulatory retention requirement for new projects from 0.3 inches to 1.2 inches and, for the first time, required that projects undergoing major renovations also meet stormwater retention requirements.

In strict Low Impact Development (LID) ordinance environments, stormwater credit trading allows developers to either build green infrastructure BMPs entirely on-site, which may add meaningful costs to a project, or to purchase equivalent credits on a market where off-site, lower-cost options may exist. In the Washington, D.C., market, developers must build at least 50 percent of their mitigation requirement on-site, but are able to pursue off-site mitigation through buying credits or paying an in-lieu fee for the remaining half.

Regulators that implement credit trading programs must also develop an in-lieu fee option for the market to be feasible. This is because regulated developers who choose to go off-site need to know that, should there be no off-site retention available for purchase, they can achieve compliance through paying a fee to their regulator. Absent an in-lieu fee, developers are unlikely to take advantage of an off-site option, regardless of the cost-savings, due to concerns about inability to remain compliant in the future. The in-lieu fee also serves as a cap on the market, which allows developers going off-site to assess their future cost of compliance in a worst-case scenario.

In addition to a strong regulatory environment, other key value drivers for stormwater credit trading are a healthy pace of real estate (re)development, variability of land cost, and variability of BMP installation costs. A strong real estate market may drive density, land cost variability, and, potentially, BMP installation cost variability. Each of these are value drivers for credit trading by widening the spread between the price regulated developers are willing to pay for off-site retention. Developers are facing limited site flexibility and high costs to use the land for something other than stormwater retention.

As noted previously, MMSD could only pursue a stormwater credit trading system through revisions to its Chapter 13 Surface Water and Stormwater Rule. Additional key aspects of credit trading include:

- Minimal public-sector cost: The only public investment required for credit trading is establishing and running the market itself, a cost which can often be absorbed into the regulator's budget. There is no public financial contribution required to green infrastructure projects or their maintenance, although MMSD may consider committing additional funding to a stormwater credit trading program in the form of a purchase guarantee (price floor) or public buying program, described in more detail below.
- Access to private property: Credit trading incentivizes voluntary installation of green infrastructure on private property in areas that would

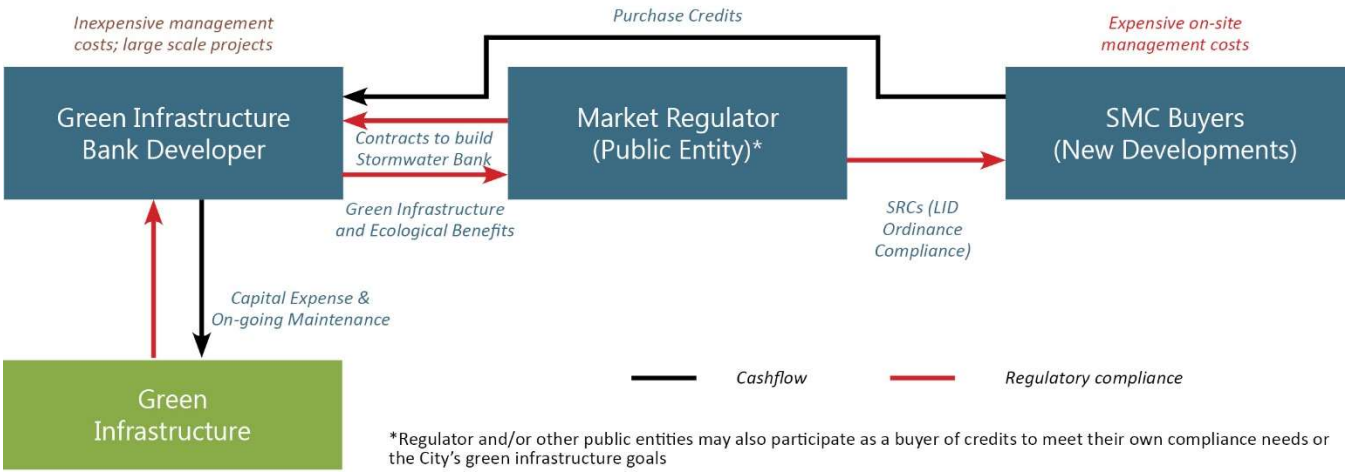
not otherwise benefit from the stormwater management ordinance. This is often an attractive element as it incentivizes green infrastructure on private property without requiring the public sector to encumber private property through easements. For example, MMSD could purchase credits from private property owners who developed voluntary sites. These owners would, through the sale process, commit to maintaining their green infrastructure for a period of time. This would mimic MMSD funding green infrastructure capital spending on private property, without requiring an easement. In this example, should the private property owner who sold credits redevelop the property to remove the green infrastructure, they would be required to pay the in-lieu fee. Fee revenues could fund additional green infrastructure projects undertaken by MMSD or be used to fund more credit purchases.

2.3.3 STORMWATER BANK

A stormwater bank (see Figure 2-7) is another mechanism to attract private capital for building green stormwater infrastructure. Similar to stormwater credit trading, a stormwater bank requires a stormwater management requirement and benefits from strong real estate (re)development demand. However, unlike stormwater credit trading, under a stormwater bank, regulated developers must achieve compliance on their own site or pay the in-lieu fee.

Note that similar to EIBs or stormwater trading, based on input from MMSD, clear statutory authority does not currently exist to enact a stormwater banking program as these would require shifting of stormwater management fees to MMSD. Because the stormwater systems are owned by the municipalities and such a change would require amendments in state statutes, MMSD does not believe such a major policy change is likely. Details are still presented for completeness.

Figure 2-7: Stormwater bank mechanism



By offering the in-lieu fee as the only off-site alternative for developers, MMSD (or its municipalities) would control all the revenue generated from off-site credit purchases, increasing its scope. With this pool of money, MMSD can then pursue the green stormwater infrastructure projects it values most.

MMSD could either manage the stormwater bank by itself, contract parts of it out to private developers and managers, or the entire fund could be externally managed by a private manager/developer tasked with developing a certain amount of stormwater mitigation credits each year.

While both a stormwater credit trading program and a stormwater bank may be attractive options for MMSD, and would allow MMSD to extract value—as defined by installed green infrastructure— it is not recommended that MMSD pursue both a stromwater credit trading program and a stormwater bank model. This is because a stormwater bank model requires a certain level of in-lieu fee revenues to fund meaningful green infrastructure projects. Because developers will most likely purchase credits whenever possible, this would limit funding available through the in-lieu fee.

3.0 TRANSACTIONAL FRAMEWORKS & REVENUE SOURCES FOR MMSD

After reviewing the information provided by MMSD, the team identified four possible transactional frameworks that could be pursued in order to leverage private-sector investment into green infrastructure:

- Option 1 – CBP3
- Option 2 –EIB
- Option 3 – Hybrid of a CBP3 and EIB
- Option 4 - Stormwater Credit Trading

Each framework offers a different level of private sector involvement. Both CBP3 and EIB shift much of the risk to the private sector, though they still require public sector involvement to repay the investment. Credit trading allocates the least risk to MMSD. Absent public buying, credit trading can be entirely privately financed. Because stormwater banks require more stringent on-site regulations to be successful, it is not included as an option at this time.

3.1 CBP3 – OPTION 1

A CBP3 provides a flexible framework and enables MMSD to select the length of partnership best suited for its needs, ranging from 15 to 30 years. While there are many ways to structure a CBP3, there are two CBP3 structures covered in this plan. Both structures include the socio-economic benefits outlined in Section 2.3.1, and provide for long-term O&M. In contrast to traditional procurement for green infrastructure where the cost of construction does not include the cost of long-term O&M, the savings created by the economies of scale and improved funding ratios of a CPB3 do cover the costs associated with long-term O&M.

The first CBP3 scenario to consider is the creation of a partnership that implements green infrastructure via MMSD's easements. This option has some project limitations created by the boundaries of easements but should meet the minimum program threshold for securing the most cost-effective financing within a public-private partnership. This option also offers MMSD member and non-member communities the added socio-economic advantages of a community-based, public-private partnership, and benefits MMSD by having project implementation and long-term maintenance affordably managed.

The second scenario involves broadening the scope of the partnership to include implementing green infrastructure on behalf of surrounding member and non-member communities that MMSD serves. This option requires that MMSD be willing to identify five or more surrounding municipalities and reach agreements with each allowing for MMSD to implement green infrastructure in those communities. In this scenario, MMSD may negotiate with the municipality to provide some base-level funding on an annual basis. Many surrounding communities, including Milwaukee, have existing stormwater revenue sources that could be included in negotiations. Assuming MMSD chooses this scenario and obtains authority to fund and implement green infrastructure on their

behalf, then a public-private partnership with MMSD would be formed that includes this expanded scope. The advantages of this scenario is the added flexibility of choosing the best areas for implementing green infrastructure to maximize the volume captured rather than being limited to areas within legal easements. Like the first scenario, this option includes long-term maintenance and provides significantly more socio-economic impact to the municipalities participating with MMSD.

3.1.1 LEGAL STRUCTURE & FINANCING

The proposed partnership structure, shown in Figure 2-5, allows the municipality to separate itself from the financial risk of the program while still maintaining an appropriate amount of control and oversight. The partnership will be a separate entity with independent, financial accountability and rights of access to implement the actual work for contract/project performance. MMSD will retain control over funding through a lender-appointed, third-party lockbox that is setup on behalf of the partnership and managed according to a mutually agreed upon Servicing and Lockbox Agreement. Being done in Prince George County (2016), this structure allows for access to low-cost financing structures, including tax-exempt bond financing and grant funding sources, which provides debt to the project at low interest rates. To ensure the lowest interest rate and 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." Furthermore, debt payments can be interest only for the initial construction phase of the program reducing the amount needed to be contributed to the capitalized interest account. This helps fund initial debt payments during construction while lowering the required debt and required revenue stream. 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.

Based on MMSD's goals and objectives, a long-term debt financing structure allows upfront, private capital to be supplied immediately to fund construction costs and eliminates the need for a large contribution or investment during the initial construction phase. This initial phase is normally when a majority of execution risk is realized. Instead, repayment is 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 provides for long-term O&M. This is added assurance to both financing entities and regulatory authorities that green infrastructure practices are maintained during the entire life cycle of the asset. Payment sources can be partnership earnings (savings realized through the CBP3 agreement) plus either capital contributions from the designated member or contractual service payments from MMSD. MMSD has several options for where payments can originate, and further discussion can determine the best source. The long-term,

The discussion on legal/financing structures presented in this report are based upon work being done in Prince George's county in Maryland and need a careful review by MMSD's legal team.

fixed payments are the only financial commitment made by MMSD.

The private partner's compensation will be in the form of performance-based incentive fees to be awarded with approval of MMSD. Such fees are based on achieving key performance indicators determined beforehand by the partnership. Unpaid fees are invested back into these programs to be used as a source for construction or for future infrastructure upgrades at the discretion of MMSD.

3.1.2 STORMWATER REVENUE STREAM

Using a revenue stream that is determined during the collaboration phase with MMSD, the partnership will leverage the funds and raise the debt required to implement these programs with no recourse back to MMSD. Historically, this type of partnership with a 30-year term has raised capital/annual revenue at 10-to-1 leverage ratios (Lueckenhoff and Brown 2016).

It is critical to reinforce that, within this partnership construct, loan and equity earnings, along with all cash flows, are retained in lockbox accounts and controlled by MMSD. This gives MMSD 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.

3.1.3 PROGRAM & ASSET MANAGEMENT

Program and asset management are identified, implemented, and maintained through agreements between MMSD and the partnership and the partnership and specified service providers. These agreements would clearly outline the scope and delivery of the identified work. The managing member is paid for performance, with a portion of the compensation tied to meeting specified incentive criteria.

One reason for considering a longer-term program (30-year) is the guarantee of continued maintenance, repair, and replacement of the public asset. With a CBP3, future maintenance costs are accounted for within CBP3 contracts and eliminates the need for future budget debates to obtain funding for O&M.

A major benefit of this public-private structure is that through greater private involvement and use of market forces (e.g., competition, efficiencies, flexibility, economy of scales, etc.), green infrastructure and flooding management can be implemented more affordably while allowing for inclusion of new, improved technology as it becomes available.
The program carries reserves that could be tapped, if needed and agreed to by MMSD, 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 contracts include contingencies to protect the program against cost overages. The overall structure is intended to be redundant to provide security and assurance. Additional reserve accounts can be added depending on the risk exposure the partnership deems necessary, taking into consideration the type of work being implemented.

This structure keeps the infrastructure sustainable and modernized throughout the 30-year program through the continual funding of O&M, and, at the MMSD's option, the reinvestment of residual net cash flow into future infrastructure projects.

As the private partner only receives a fixed, incentive-based fee for their role in the partnership, any and all savings are returned to MMSD 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 as added returns to equity providers.

This flexible financial structure allows MMSD to direct funds into things like capital improvement, new green technologies, BMP upgrades, or performance testing for TMDLs 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.

Noted below are two examples of how a CBP3 could be structured financially. Both options include long-term maintenance and operation for the partnership term.

3.1.4 SCENARIO 1 – MMSD CBP3 VIA CONCESSIONS

In Scenario 1, the partnership constructs and maintains green infrastructure and other stormwater-related projects assuming a six-year MMSD capital improvement program (CIP) budget of $120 million ($20 million per year). Proforma in Table 3-1 calculates the annual dedicated revenue source needed to support the debt service payments and maintenance expenses and fees for the 30-year life of the project. It is assumed that similar to for Prince George County (2016), the partnership will be able to construct the CIP projects for $81 million, which is roughly one-third less than the $120 million CIP budget, and also provides annual maintenance at an expense equal to 3 percent of the partnership's construction costs. Under the partnership structure, MMSD transfers the 'price risk' associated with the CIP project costs since there would be no price escalation in the partnership's construction cost estimate. This feature results in total savings realized by MMSD of $5 million to $10 million.

In order to service the construction debt with an assumed 1.2x debt service coverage ratio (DSCR) target, a revenue pledge of $8.9 million is needed. It should be noted that this long-term, fixed revenue pledge not only repays the long-term financing issued by the partnership to fund construction, but also provides for the operations and maintenance for the length of the contract, as well as any associated fees within the structure. At the end of the 30-year partnership, this option provides MMSD with a reserve balance (i.e., residual cash flow or savings) of $32 million which can be applied to MMSD capital or operations projects as needed.

As noted earlier, the exact term of the contract is flexible and can be changed if a longer or shorter duration is preferred. A longer term provides greater socio-economic benefits and provides operations and maintenance for the full lifecycle the implemented green infrastructure. For instance, in Table 3-1, a 15-year program only provides $18.4 million in residual cash flow versus $32 million with a 30-year program (assumes the same dedicated revenue stream of $8.9 million and a 1.2x DSCR).

Table 3-1: MMSD 15-year and 30-year projections

Assumptions & Key Results	
Escalation Rates	
Revenue	0.0%
Expenditures	0.0%
Operating Expense as a % of Construction Costs	3.0%
Construction Costs	$81,291,740
Year 1 Revenue	$8,950,000
Debt	$78,000,000
Tenor	30-years
Interest Rate	5.0%
Debt Service Coverage Ratio	
Average - Project Life	1.2
Minimum	1.2

30 Year Projection	Construction Period	Reinvestment Period	Total
	Years 1-3	Years 4-30	
Revenue	$26,850,000	$241,650,000	$268,500,000
Interest Income	$9,123	$446,389	$455,512
Operating Costs	(11,154,000)	(69,498,000)	(80,652,000)
Loan Proceeds, net of fees	77,220,000	0	77,220,000
Debt Service Payments	(7,800,000)	(143,822,657)	(151,622,657)
Residual Cash Flow to Construction/Reinvestment	85,125,123	28,775,732	113,900,855
Average Residual Cash Flow Available per Year		1,065,768	

Model allows for ongoing Operating Costs totaling $80.7 million and $113.9 million to be invested into BMP Construction over 30 years ($81.3 million during construction period and $32.6 million of residual cash flow available during Reinvestment Period).

Assumptions & Key Results	
Escalation Rates	
Revenue	0.0%
Expenditures	0.0%
Operating Expense as a % of Construction Costs	3.0%
Construction Costs	$65,034,111
Year 1 Revenue	$8,950,000
Debt	$54,990,000
Tenor	15-years
Interest Rate	4.2%
Debt Service Coverage Ratio	
Average - Project Life	1.2
Minimum	1.2

15 Year Projection	Construction Period	Reinvestment Period	Total
	Years 1-3	Years 4-30	
Revenue	$26,850,000	$107,400,000	$134,250,000
Interest Income	$15,341	$96,044	$111,385
Operating Costs	(7,863,570)	(21,776,040)	(29,639,610)
Loan Proceeds, net of fees	54,440,100	0	54,440,100
Debt Service Payments	(4,619,160)	(71,129,994)	(75,749,154)
Residual Cash Flow to Construction/Reinvestment	68,822,711	14,590,010	83,412,721
Average Residual Cash Flow Available per Year		540,371	

Model allows for ongoing Operating Costs totaling $29.6 million and $83.4 million to be invested into BMP Construction over 30 years ($65.0 million during construction period and $18.4 million of residual cash flow available during Reinvestment Period).

3.1.5 SCENARIO 2 - MMSD CBP3 AGGREGATING WITH SURROUNDING COMMUNITIES

Like the first scenario, the term of this structure is flexible. For discussion purposes, the financial details are based on a 30-year term. This scenario is developed utilizing an aggregated approach that leverages stormwater fees of multiple communities to drive efficiency, project speed, and reduce overall costs. As noted earlier, total aggregation of all 28 is not needed, and the following proforma can be adjusted to reflect any number of municipalities that MMSD believes would be interested.

Table 3-2 presented below excludes the communities that have opted out of green infrastructure program that include communities of Thiensville, Caledonia, Germantown, Menomonee Falls, Butler, Brookfield, Elm Grove, and New Berlin. In the remaining municipalities, Table 3-2 shows that 13 of the 19 municipalities have stormwater management fees. The 13 municipalities that have fees were forecasting nearly $44 million in stormwater revenue for FY2016 (MMSD 2015 & 2016 Capital and O&M Budget, 2016 Comprehensive Annual Financial Report). The cities of Milwaukee, Mauwasota, and West Allis represented over 88 percent of the total forecasted revenue. The proforma calculates the maximum amount of construction program expenditures, $447 million, that can be supported by the forecasted revenue of $44 million less maintenance expenses (3 percent of construction costs) and fees for

Table 3-2: MMSD region stormwater management fees (MMSD 2015 & 2016 Capital and O&M Budget, 2016 Comprehensive Annual Financial Report)

Community	Population	2016 SW Fee	2016 SW Revenue	2016 SW Revenue % of Total	Cumulative %	Construction Program	Surplus Cash Available at End of Program
City of Milwaukee	597,867	$76.88	$30,630,609	69.2%	69.2%	$309,000,000	$325,617,450
City of Wauwasota	47,271	$91.32	$4,330,000	9.8%	79.0%	$43,991,684	$43,388,758
City of West Allis	61,254	$77.16	$3,976,908	9.0%	87.9%	$40,634,578	$41,809,940
City of Greenfield	36,903	$63.63	$1,072,769	2.4%	90.4%	$10,957,876	$11,291,754
Village of Brown Deer	12,061	$120.33	$981,088	2.2%	92.6%	$9,934,627	$10,320,297
Village of Fox Point	6,734	$128.64	$668,447	1.5%	94.1%	$6,750,000	$7,086,263
Village of Elm Grove	5,947	$129.04	$614,000	1.4%	95.5%	$6,150,000	$6,655,268
Village of Greendale	14,117	$79.60	$443,561	1.0%	96.5%	$4,531,891	$4,664,274
City of Oak Creek	34,451	$29.00	$353,660	0.8%	97.3%	$3,613,788	$3,717,181
Village of Bayside	4,411	$166.00	$342,033	0.8%	98.0%	$3,450,000	$3,637,166
Village of West Milwaukee	4,142	n/a	$341,075	0.8%	98.8%	$3,483,236	$3,592,975
City of St. Francis	9,365	$64.92	$289,803	0.7%	99.5%	$2,960,855	$3,047,757
Village of Hales Corners	7,730	$56.00	$148,646	0.3%	99.8%	$1,518,587	$1,563,664
City of Muskego	8,519	$9.37	$85,000	0.2%	100.0%	$868,268	$894,570
City of Cudahy	18,354	n/a	n/a	n/a	100.0%	n/a	n/a
City of Franklin	35,620	n/a	n/a	n/a	100.0%	n/a	n/a
City of Mequon	23,334	n/a	n/a	n/a	100.0%	n/a	n/a
Village of River Hills	14,889	n/a	n/a	n/a	100.0%	n/a	n/a
City of Glendale	12,935	n/a	n/a	n/a	100.0%	n/a	n/a
Village of Shorewood	1,732	n/a	n/a	n/a	100.0%	n/a	n/a
Total	**$1,102,962**		**$44,277,599**	**100.0%**		**$447,845,389**	**$467,287,315**

the 30-year life of the project and assuming a 1.2x target DSCR. Revenue and expenses are escalated at 2 percent per year. At the end of the 30-year life this option provides MMSD with a reserve balance of $467 million, which can be applied to capital or operations projects as needed, as indicated in the "Surplus Cash Available at End of Program" above in Table 3-2.

3.2 EIB – OPTION 2

An EIB could be of value to MMSD in determining performance metrics, establishing a performance-based incentive fee, or simply demonstrating the value of green infrastructure to regional communities that may not yet have benefited from installed Fresh Coast 740 projects. A typical EIB could fund about $10-30 million in green infrastructure projects, but is flexible, so MMSD could combine several smaller sized EIBs to total the amount needed, or combine fewer, larger green infrastructure projects into one larger EIB transaction. Regardless of the size of the EIB, this structure reduces MMSD's performance risk for the project, as the returns on the project will be tied to the project's effectiveness in achieving pre-defined outcome(s).

As outlined in Section 2.2, an EIB is similar to a social impact bond, allowing the government to transfer the risk of trying something new partially or wholly to the private sector. Private-sector investors would provide capital to fund the construction, and, if desired, a portion of the maintenance of green infrastructure projects, and the government would repay the loan based on how successful the program was at retaining and managing stormwater. It may be necessary to involve other financial actors that would be willing to backstop the bond in case the project fails altogether, or to compensate investors for co-benefits created by the project, thereby protecting government resources and reducing the perceived risk of the project for investors.

Indicative cash flows for a $10 million EIB shown in Table 3-3 demonstrate the responsibility of MMSD and private investor. Table 3-4 demonstrates indicative returns to the private investor based on whether or not the project achieves MMSD's desired outcome(s).

Table 3-3: MMSD costs for a $10 million green infrastructure project funded through an EIB

Indicative Project Performance: 2 (Perform), Numbers in 000's					
Year	**0**	**1**	**2**	**3**	
Period	*Const*	*Monit*	*Monit*	*Outcome*	
Project Cash Flow					
Project Cost	($10,000)	$0	$0	$0	← Paid by Investor
Monitoring Fees	$0	($100)	($100)	$0	← Paid by Investor to 3rd Party – Note: this depends on how the transaction is structured – MMSD could end up paying this fee instead
Interest	$0	$276	$276	$276	← Paid by MMSD
Principal	$0	$0	$0	$10,750	← Paid by MMSD
Catchup	$0	$0	$0	$0	← Paid by MMSD if "Overperform"
Cash Flow	**($10,000)**	**$176**	**$176**	**$11,026**	
IRR	**4.5%**				

3.2.1 ENABLING CONDITIONS

3.2.1.1 Defining Metrics for Success & Payment Mechanisms

A successful EIB would require MMSD to work with all other relevant actors – including relevant municipalities, investors, project developers, and, potentially, philanthropy – to agree upon what metrics should be used to determine the "success" of the project. Generally, with green infrastructure, this would be related to the ability of the project to control stormwater at a given cost, but other metrics could be related to the social, economic, or environmental co-benefits of the project, such as job creation or increase in local property values. Based on these metrics, the parties would need to agree on performance thresholds of several scenarios (e.g., "underperformance," "performance," "overperformance") that would correspond to differing levels of return to the investor. These parties would also need to agree on how and when those metrics should be measured, what different levels of repayment should be based on each scenario, and when repayments to the investors should be made (e.g., in installments or a balloon payment at the end).

Similarly, the communities involved in the EIB could choose the BMP types used in the EIB. This would allow the municipalities to gain the most valuable information for them in terms of planning future green infrastructure investments.

3.2.1.2 Involvement of Other Funders

The government payer of an EIB is responsible for a performance-based repayment to the EIB investor. This repayment varies based on an outcome relative to the pre-negotiated performance metric(s). For smaller, budget-constrained payers, this can be a drawback of an EIB. For example, a $10 million EIB may have a "downside" (to the investor) case of $9 million and an upside case of $12 million, subjecting MMSD to a potential budget uncertainty of $3 million, or 30 percent of the project. However, for a well-capitalized entity such as MMSD, the uncertainty of financial obligation is typically easily absorbed because of the relatively-small par value of the EIB, and pales in relation to the advantages of proven cost and performance data gleaned through an EIB.

However, there are means of mitigating this budget uncertainty even for sophisticated counterparties such as MMSD. One

Table 3-4: MMSD cost & investor returns for a $10 million project funded through an EIB

Indicative Project				
	MMSD Payout	**Multiple of Investment**	**Investor Return**	**Incremental Annual D/S Cost to MMSD(*)**
All scenarios assume a 3.85% Interest-only payment made on the "underperform" amount from construction completion through payout.				
EIB Performance Outcome				
Underperform	$8,500,000	0.85x	-2.5%	($24,306)
Perform	$10,750,000	1.08x	4.5%	$120,910
Outperform	$11,500,000	1.15x	6.8%	$175,365
***Incremental annual debt service cost to MMSD calculated assume that MMSD would finance its own $10 million green infrastructure project using 20-year debt at an interest rate of 2.5%, versus financing the payout of the EIB using 20-year debt at an interest rate of 3.85%.**				

alternative, which would complement MMSD's split of capital versus operating and maintenance dollars, would be for the investor to set aside a dedicated reserve fund, which, if the project fails to perform, could be transferred to the municipality responsible for maintaining the asset.

Another alternative is to incorporate other funding sources. For example, if MMSD wanted to incorporate a social co-benefit, such as workforce development, into its EIB, a philanthropic funder may assume responsibility for some of the performance payment.

3.2.2 REVENUE GENERATION

3.2.2.1 Avoided Costs

The primary value proposition of an EIB is avoided cost via use of only those practices that perform well. By providing MMSD with performance data, an EIB would allow MMSD to make better choices with respect to its overall green infrastructure plan. For example, if MMSD were to enter into an EIB in advance of future, larger green infrastructure investment, the cost and performance data from the EIB could be used to influence MMSD's investment plan and expectations. An EIB could also assist MMSD in refining its green-grey infrastructure mix with respect to its overall stormwater portfolio because the performance data is available.

MMSD would be able to pay for an EIB using its capital budget. Given the scale of a typical EIB (between $10-30 million) the sewer district could budget for the project with its current revenues. Repayment amounts and the corresponding debt service amounts—assuming MMSD included the EIB payout as part of a bond issuances—are listed in Table 3-4. Negative numbers in "Incremental Debt Service" indicate additional cost to MMSD.

3.2.3 BENEFITS TO PUBLIC SECTOR

3.2.3.1 Innovation with Less Risk

Fundamentally, EIBs would allow MMSD to try implementing innovative projects with private money while reducing the impact on ratepayers if the project is unsuccessful. Substantial savings can be expected from using the data gleaned from an EIB to improve capital spending decisions in the future because only those practices that work, are now used, and the definition of what works can be expanded to incorporate new interventions or technologies.

3.2.3.2 Community Engagement & Buy-in

EIBs require collaboration and cooperation between a range of stakeholders, as outlined above. As a result, the process of setting up an EIB can provide an opportunity for MMSD to build relationships and also to engage relevant stakeholders to better understand the importance of stormwater management and the economic, social, and environmental benefits of green infrastructure projects. An EIB could demonstrate the opportunity of green infrastructure on a moderate scale and make an increase in stormwater fees more politically palatable to allow MMSD to engage in future green infrastructure investment.

3.2.4 OBLIGATIONS OF THE PUBLIC SECTOR

3.2.4.1 Repayment to Private Sector

The costs to MMSD are mostly in the form of repayments to investors. MMSD will need to be able to set aside the funds to repay investors across a range of performance scenarios.

3.2.4.2 Coordination & Administrative Costs
As outlined above, the process of setting up an EIB will require stakeholder engagement and ongoing assessment of the performance of the project, which will require some allocation of resources and time from MMSD, or assistance of outside parties such as Quantified Ventures that assisted in D.C. Water EIB. In general, the cost and time to execute an EIB is markedly lower than a CBP3, reflecting the more modest project scope and length of the public-private partnership.

3.3 HYBRID OF CBP3 & EIB – OPTION 3

Another option for MMSD to consider is formally combining Option 1's CBP3 and Option 2's EIB into a phased partnership. The partnership begins with an EIB designed to incentivize one or more of the local communities to join in a CBP3 with MMSD. In addition, if MMSD lacks sufficient cost and performance data from its existing green infrastructure work, the EIB could provide the data needed to better inform the CBP3 partnership metrics.

The EIB would prove to MMSD and member communities the most effective forms of green infrastructure and allow for more symmetric information between MMSD and its CBP3 partner during CBP3 negotiations.

3.4 STORMWATER CREDIT TRADING – OPTION 4

The success of a stormwater credit trading system rests heavily on the existence of a strong regulatory environment as well as a robust real estate market. For MMSD, this would come in the form of revisions to its Chapter 13 Rule.

Stormwater credit trading is a market platform through which developers can buy and sell stormwater management credits to meet their stormwater management requirements. MMSD could set up a public buying option to bolster the market, in which MMSD could offer to purchase credits at a certain price in order to keep credit prices relatively stable. MMSD could also establish an in-lieu fee to be paid into a stormwater management bank to fund green infrastructure projects in areas of high priority for the district.

3.4.1 ENABLING CONDITIONS

3.4.1.1 Strong Regulatory Environment
Central to the success of a stormwater credit trading system is the existence of regulations that require developers to retain a certain amount of stormwater on-site, and that allows them to purchase credits or fund projects off-site in the event that it is either technologically infeasible or cost prohibitive to meet those requirements on-site. The public sector must also have the resources and capabilities to enforce adherence to these stormwater management requirements and to hold non-compliant developers accountable.

3.4.1.2 Strong Real Estate Market
Developers will be willing to bear the extra cost of retention or buying credits if the real estate market is stable or growing. In less certain markets, imposing additional costs on developers may deter development, thereby affecting other economic priorities for the municipality or region.

3.4.1.3 Credit Trading System Administration
Establishing and operating a stormwater credit trading system requires the public sector to play a role in monitoring and evaluating to ensure the validity of the

credits being traded on the market, such as ensuring that these projects are continuing to provide retention over time.

3.4.2 REVENUE GENERATION

3.4.2.1 Funding for Green Infrastructure Projects

The credit trading system shifts the responsibility of developing and maintaining green infrastructure projects to the private sector. If the credit trading system involves an in-lieu fee, the public sector will receive funding to support the implementation of green infrastructure projects in priority locations around the municipality or region.

3.4.3 BENEFITS TO THE PUBLIC SECTOR

3.4.3.1 Shifting Costs of Green Infrastructure to the Private Sector

A stormwater credit trading system would shift the costs of deploying and maintaining green infrastructure projects to private property developers. The public sector may be relieved of projects otherwise planned for private property, and that property would not need to be encumbered with a long-term easement.

3.4.4 OBLIGATIONS OF THE PUBLIC SECTOR

While the public sector may not be required to provide capital for green infrastructure projects, the public sector will incur costs related to the ongoing administration of the program, including setting rules for trading within and across watersheds, verifying the credits that are being traded, collecting and managing in-lieu fees, and ensuring long-term credit validation and compliance.

This option likely also involves increased engagement with the real estate development community, particularly, if the market is not strong and there is a chance that additional fees and regulation could deter development.

Lastly, if MMSD were to implement a stormwater credit trading system, MMSD or its communities may wish to support the market by committing capital dollars to a purchase guarantee and/or a public buying program. A purchase guarantee would establish a market floor and provide security for property owners considering retrofitting their land with green infrastructure to supply credits. MMSD may also be able to establish a separate fund, out of its capital budget, to buy credits at a market clearing price. These funds could explicitly target—and incentivize private investment in—the highest environmental impact watershed areas.

4.0 MEASURES OF SUCCESS

4.1 SUCCESS AS DEFINED BY MMSD

MMSD has already proven its ability to meet applicable environmental regulations. Building upon MMSD's success and further improve the local environment the following is a summary of what MMSD may consider a successful venture:

1. *Continue its role as a national leader by realizing its 2035 Vision for green infrastructure*: First and foremost, any venture, whether funded privately or publically, must allow MMSD to meet its goals of nearly doubling available stormwater storage volume, substantially reduce Total Suspended Solids (TSS), phosphorus discharges, and reduce urban heat island effect, all while increasing the green space in its service area.
2. *Cost savings for its rate payers:* Implementing MMSD's 2035 Vision would help MMSD save projected tens of millions of dollars in infrastructure spending (MMSD 2013) and increase projected property values by $667 million (MMSD 2013) as a result of deploying 42,000 acres of green infrastructure.
3. *Maintenance of a strong balance sheet:* MMSD currently enjoys strong bond ratings of Aa1/AA+/AAA. Any private financing alternative undertaken by MMSD must comply with its current use of funds and continue to support MMSDs high liquidity and low leverage position.
4. *Creating an anchor institution together with other impressive efforts with organizations, such as The Water Council*: The private financing alternatives suggested for MMSD would be viewed as innovative and visionary partnerships that could leverage the efforts of the Water Council and others to continue to catapult the region for water-related innovative solutions.
5. *Efficiency enhancement, long-term maintenance, and risk management*: The private sector's specialized, stormwater project management expertise to aggregate hundreds of individual drainage and stormwater management projects into a single, design-build-finance-operate-maintain delivery model can deliver significantly streamlined processes where economies of scale can yield great efficiencies. In addition, a well-crafted deal can allow the public party to transfer the risk to the private entity. These "pay for performance" contracts are a win-win opportunity for the public party as they allow the private entity to manage and maintain

Benchmarks for partnership success for MMSD include:
1. Continued role as a national leader for green infrastructure
2. Savings for its rate payers
3. Maintenance of a strong balance sheet
4. Creation of an anchor institution for innovation and visionary partnerships
5. Efficiency enhancement, long-term maintenance, and risk management, and
6. Workforce development and community revitalization

the green infrastructure project for a long time.

6. *Workforce development and community revitalization*: MMSD indicates that 500 green jobs could be created at full implementation, and nearly 160 construction jobs created, on average, between 2013 and 2035 by implementing 42,000 acres of green infrastructure (MMSD 2013). MMSD could leverage these "green jobs" to tailor the CBP3 framework and address the following:
   a. Workforce development for re-entry, disadvantaged, or low-income residents
   b. Local economic development by increasing subcontractor utilization that targets small and/or minority-owned businesses
   c. Community outreach and education about stormwater management

4.2 SUCCESS AS DEFINED BY FINANCING PARTNERS

For the financing partners, there are several criteria on which success for green infrastructure, or any type of investments, would be determined. These include return expectations, risk, and market size/scalability. Some investors may also incorporate "impact" metrics, such as environmental or social outcomes, into their success criteria.

Primarily, success to the private sector is defined as achieving an appropriate financial return based on an investment's risk profile. Return expectations for the private sector depend on the type and mix of financing provided. In some cases, there is an equity investment required for privately-financed projects. This equity has

Benchmarks for partnership success for private partners may include return expectations commensurate with risk taken and market size/scalability. Some investors may also incorporate "impact" metrics, such as environmental or social outcomes, into their success metrics.

a return expectation higher than the debt, typically 12-20 percent. However, overall return expectations to all private investors, which include a mix of debt and equity providers, is frequently much lower and typically in the range of 8-12 percent. It is sometimes possible for privately-financed projects to utilize tax-exempt debt, government grants, low-interest loans, or other concessionary forms of capital. This can further reduce the average financing cost making the project less expensive overall for the public sector while meeting the private investor's return objectives.

For many private investors in infrastructure, a project's success is not merely because it achieves a certain return threshold. Private investors may consider a project a success so long as the project's return is commensurate with the amount of perceived risk. An important success factor for private investors is the ability to structure a transaction where the expected return and perceived risk are well matched. The most important consideration in determining risk is revenue, or repayment, certainty. Therefore, the most meaningful lever for a public sponsor of a privately-financed infrastructure project is providing contractual certainty and evidence of future revenues to repay the investment (note that a guarantee from a philanthropic foundation may help with this). Other levers available to the public sector to reduce the perceived risk of an investment—and,

therefore, the investor's return expectation—are guaranteed siting and planning permission. Typically, pre-approval of permitting is also considered, but in the case of MMSD, that is not applicable.

The size of the marketplace is also important for investors as the overhead to implement investments—particularly, distributed green infrastructure—can be high. One of the benefits of private investment for municipalities as well as for regional units of government, is the ability to defer costs of green infrastructure investments to the future. In order to entice investors to shoulder these costs on the front end, sufficient market size is necessary. For similar reasons, investors would want to see the opportunity to replicate their investments in other regions across the Midwest and possibly the country. The upfront costs associated with investing in green infrastructure would be considered far more manageable and reasonable if investors believed early investments would help catalyze replicable projects in other regions.

Finally, while most private investors determine success purely by financial outcomes, a subset of investors called impact investors ascribe value to non-financial outcomes such as social and environmental benefits. These investors will clearly identify expected outcomes prior to making an investment, and will determine the success of a project across multiple metrics. Some of these investors may be willing to accept financial returns lower than those expected by a traditional private investor in exchange for these outcomes.

5.0 PARTNERSHIP CHECKLIST & NEXT STEPS

In this report, the following four options for public-private partnerships to implement green infrastructure by the MMSD were presented:

- Option 1 – CBP3
- Option 2 –EIB
- Option 3 – Hybrid of a CBP3 and EIB
- Option 4 - Stormwater Credit Trading

Options 1 and 2 are deemed best suited to aid MMSD in delivery and potentially finance of large scale green infrastructure in a timely manner.

This chapter provides a list of resources for CBP3s and EIBs that MMSD's staff may find useful. This chapter includes a partnership checklist, a set of next steps for initiating a CBP3 or EIB agreements, and a reference to an example RFI/RFQ that MMSD can modify and use for its purposes.

5.1 PARTNERSHIP CHECKLIST

5.1.1 CHECKLIST FOR CBP3s

MMSD staff should review the following checklist before taking on the development of a CBP3 (USEPA 2015):

- **Identify existing and new sustainable and predictable revenue streams**: A predictable and reliable revenue stream is required to sustainably fund construction, operations, reporting, and maintenance. Typical revenue streams include:
  - ✓ Funding streams generated from property taxes, utility fees, or fee-in-lieu of programs.
  - ✓ Significant grants, state revolving loan funds, banking and offset programs, trading programs, and user fees.
  - ✓ Multi- sector grants and loans (e.g., stormwater and energy).

- **Identify the measures of success through specific 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 is best delivered through innovation and adaptive management for planning and design of the BMPs. These innovations must be evaluated and verified, with reports on the progress of the effort that can quantify the results and satisfy the requirements of regulatory agencies. A focus on the following is useful:
  - ✓ 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?
  - ✓ How can the reduction in loads from innovative practices be recognized and given regulatory credit?
  - ✓ Will reductions from new sources of pollutants be distinguished from traditional pollutant reduction and legacy pollutant removal?
  - ✓ Can credits be given for retrofitting and enhancing existing systems?

- **Prioritize and include other community benefits**: Green infrastructure can satisfy the requirements of other infrastructure and regulatory programs as well as provide additional community development opportunities. MMSD's 2035 Vision plan captures many of these goals. MMSD should consider including the following in any proposed CBP3:
  - ✓ Opportunities for water reuse and conservation?
  - ✓ Programs integrated with other utility programs including drinking water and wastewater?
  - ✓ Programs targeting the underserved communities?
  - ✓ Flows and volume reductions to support resiliency planning while preserving infrastructure capacity?

- **Include requirements that support local jobs**: A successful CBP3 partnership supports the creation of local "green jobs", workforce development, and the more efficient management of local government stormwater programs. The demonstration of the benefits to the community in the number, quality, and predictability of benefits provide continued support of the partnership. As the CBP3 is negotiated, MMSD should consider require:
  - ✓ Maximizing the work performed by local contracting/maintenance firms.
  - ✓ Establishment of certification and training process for local companies to support the CBP3 work.
  - ✓ Establishment of a requirement/incentive for hiring local firms.
- **Build broad-based support through outreach and transparency**: 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. The selected CBP3 partner should be required/incentivised to:
  - ✓ Provide opportunities for stakeholders, property owners, businesses, and institutions to become partners in planning and implementation.
  - ✓ Provide stakeholders access to all relevant documents, plans, meetings, and reports.
  - ✓ Measure, evaluate, and report all outreach efforts.
  - ✓ Provide alternative stormwater credits by effectively implementing outreach programs?

- **Review and potentially modify stormwater and local building permit programs**: MMSD should consider establishing a process to allow the selected CBP3 partner 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 green infrastructure system operates as efficiently as possible. The final program should consider:

- ✓ The ability for projects to be streamlined or fast tracked through the system.
- ✓ A well-defined and timely certification and verification program for new stormwater products and technologies.
- ✓ A rapid method of evaluating and approving innovative practices for enhanced stormwater treatment be permitted and credited.

5.1.2 CHECKLIST FOR EIBs

For EIBs, generally speaking, checklist outlined above for CBP3s in Section 5.1.1 are the same, except that because performance measurement and evaluations are key aspects of payments, the following need to be considered:

- Is there a clear outcome that can be measured in a cost-effective manner?
- Can stakeholders agree upon the association of financial payments to relative achievement of these outcomes?

5.2 STEPS TO ESTABLISHING 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. Listed below are a set of key steps that must be accomplished to support the community and partnership efforts (EPA 2015).

- **A visioning process to identify goals associated with long-term investments:** Such a process can help answer:
  - ✓ How many acres should be addressed?
  - ✓ How many jobs to be created/supported? How many small businesses can be assisted?
  - ✓ 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)?
  - ✓ MMSD recently launched a Green Infrastructure Center of Excellence - can this CBP3 program be a research program as well and support the Center?

- **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.

- **Define revenue stream which could include dedicated fees, loans, grants, and hybrid funding combinations**: There are numerous public and private sector revenues/funding streams and opportunities that are available to MMSD including federal grants and local financial institution sources. All viable options and mix of predictable and dedicated funding streams should be considered for the program in both short-and long-term.

- **Seek approval from 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 that the contract language and monitoring/reporting methods will fulfill the regulatory requirements, are transparent and scientifically sound, and can be reviewed and reported to the public as efficiently as possible.

- **Reach out to similar communities in size and resources that have adopted a CBP3 approach**: A discussions with communities such as Prince George's County would be useful to MMSD so their contract and procurement language workshops on progress, training, local products; and monitoring resources can be reviewed and shared in advance.

- **Evaluate and/or develop internal capacity staffing, outside training, and resource needs**: The transition from the MMSD's conventional program approach to a true partnership with the CBP3 contractor may require a modification to the resource and capacity plan. If done early in the process, MMSD will ensure that the contract can be properly managed and that the overall governance goals and requirements of the local government infrastructure needs are met.

- **Assess cost saving, program efficiencies, and the 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 benefits, and community development benefits), should be determined and demonstrated to the public and property owners in the community.

- **Build community trust through stakeholders and interested parties workshops**: A strong partnership can be established outside of the agreements between the local government and the contractor. The long- term commitment to the community is best served through the identification of key stake-holders such as property owners, local businesses, developers, and other parties. The involvement and interest of these groups may be very dynamic so there needs to be an open and continuous process for communication that is accessible to all groups.

- **Develop an RFI/RFQ to evaluate the capacity and track record of interested contractors**: The RFI/RFQ process, if properly crafted, will allow for an evaluation of the capacity, previous success, and commitment of potential contractors to the community. It can also allow for an open dialogue to help the community to begin the procurement and contract process. Samples of RFQs are available from recent CBP3 bids for the City of Chester in Pennsylvania and for Prince George's County in Maryland.

- **Negotiate with contractor**: This contract will be complicated and different from previous contracts with MMSD. 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 while preserving and protecting the value to the MMSD rate payers.

- **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. Well-performing projects should be rewarded and poorly performing projects should be reconsidered. Over time, the technical and financial performance will improve.

- **Develop a comprehensive reporting system that allows for stakeholder input**: The progress on compliance, costs, community development, job creation, and financial benefits to the community should be reported to all vested partners and stakeholders. This will allow for continued input, buy- in, and improvement in the program over the contract period.

5.3 STEPS TO ISSUING AN EIB

Similar to steps outlined for CBP3s in Section 5.2, listed below are a set of key steps that must be undertaken to support the use of an EIB. The first four steps are similar to that for a CBP3, while the remaining steps focus on EIBs:

1. Host a visioning process to identify goals associated with long-term investments.
2. Develop procurement processes that are suitable for an EIB.
3. Assess revenues and funding streams.
4. Engage with financial stakeholders.
5. Agree on outcome metrics to measure performance of the green infrastructure projects.
6. Define the financial flows and structure of the transaction.
7. Draft issuance documents and legal paperwork.
8. Engage with investors, and finally issue the debt .

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APPENDIX A: MMSD AND GREEN INFRASTRUCTURE

A.1 BACKGROUND

MMSD is a state-chartered, governmental agency, providing wastewater collection, conveyance, storage, and treatment services for 1.1 million people in the 28 municipalities within Milwaukee County and portions of the surrounding counties. MMSD serves 411 square miles covering all, or portions of, six watersheds (Figure A-1). MMSD collects, treats, and discharges the largest volume of wastewater of any entity in the State of Wisconsin.

MMSD's service area is largely developed with correspondingly high levels of impervious surfaces. Nearly half of the area is greater than 20 percent impervious (Figures A-2, A-3, and A-4). A summary of the land use type in the developed areas is presented in Figure A-3, that shows nearly 60 percent of the land area is privately owned.

MMSD operates the only combined sewage system in Wisconsin on Lake Michigan. Currently, the volumes and frequency of MMSD's combined sewer overflows (CSOs) are smaller than those of other cities on the Great Lakes, including Cleveland and Detroit, and are similar to that of the smaller city of Grand Rapids, Michigan. It is

Figure A-1: MMSD's planning area watersheds

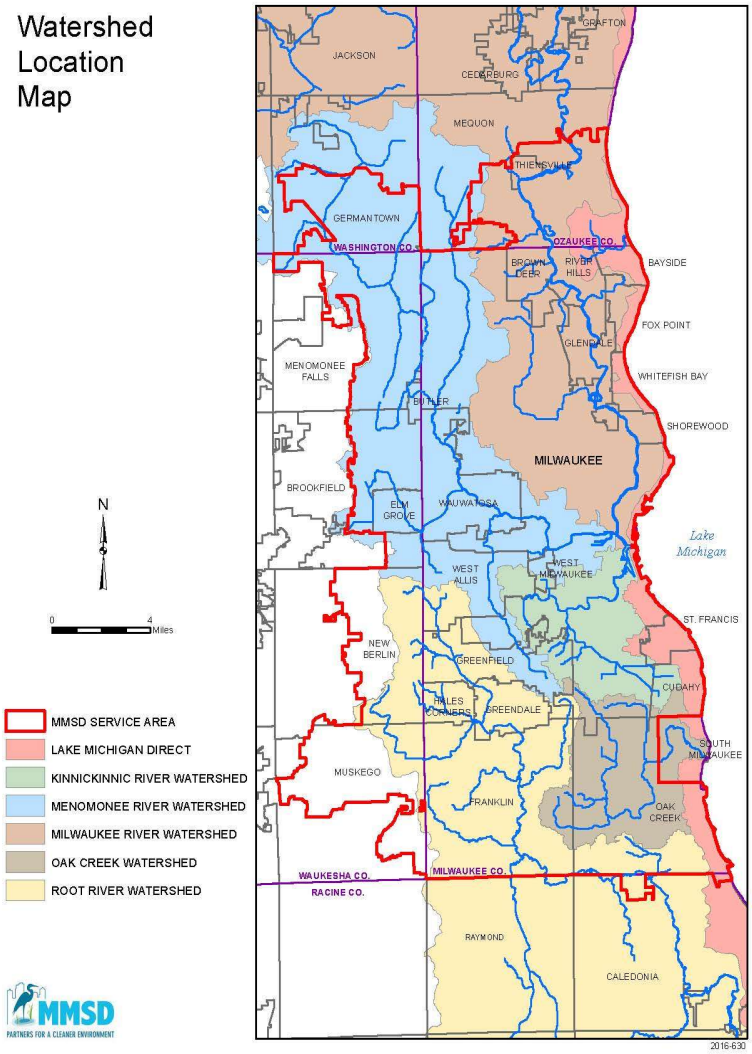


Figure A-2: Distribution of land use in MMSD service area (HOMER et al 2015 data, and ECT analyses)

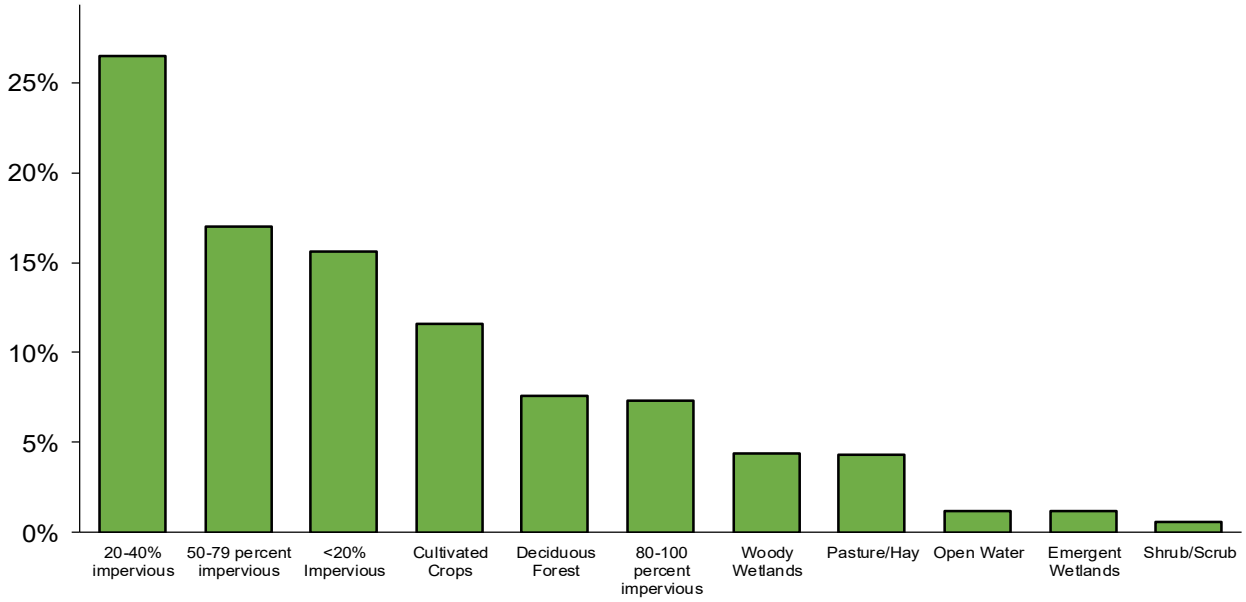


Figure A-3: Impervious area by type and ownership in MMSD service area (MMSD 2013)

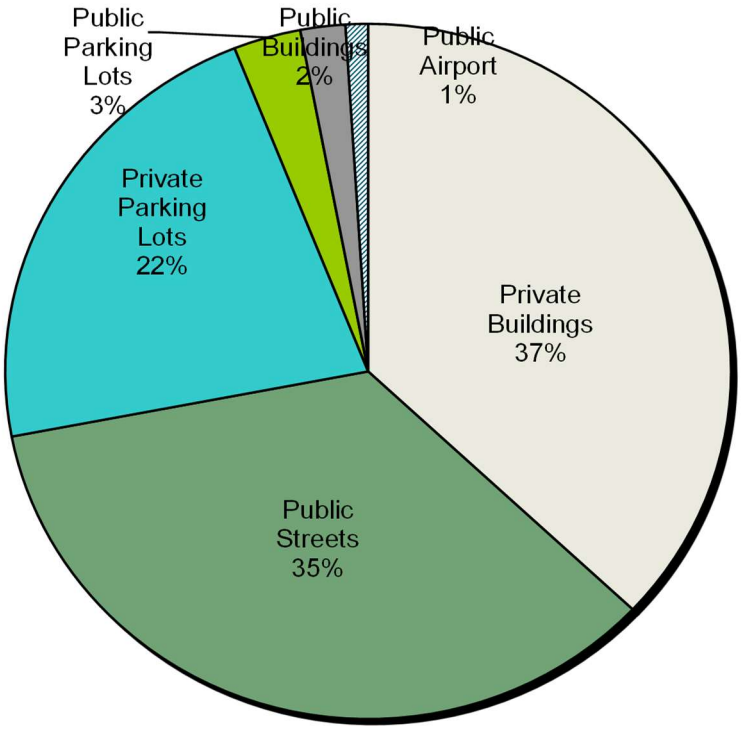
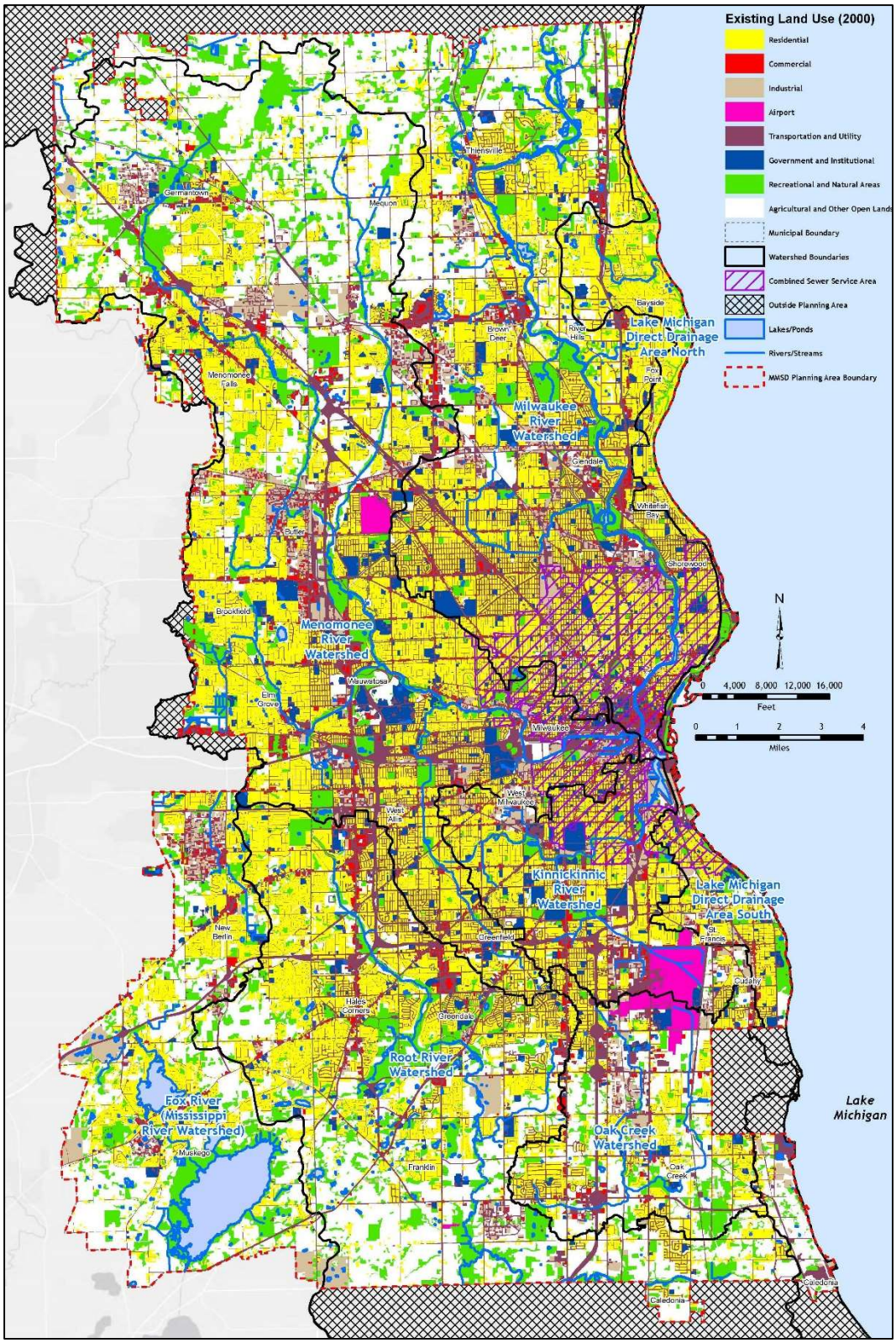


Figure A-4: Impervious area by type and ownership in MMSD planning area (MMSD 2013)



partly because MMSD has invested over $1 billion to implement their overflow reduction plan, which was completed in 2010. That effort led to two additions to the deep tunnel system that currently stores 521 million gallons and stretches 28.5 miles long. Overall, since 1994, MMSD has captured and treated more than 98 percent of all stormwater and wastewater entering the regional sewer system, well in excess of the national goal of 85 percent.

A.2 DEFINITION OF GREEN INFRASTRUCTURE AT MMSD

Most people are familiar with "gray" water infrastructure — the hard, concrete and metal pipes, holding tanks, pumps, water tunnels, and treatment plants. These systems play a key role in managing drinking water, wastewater and combined-sewer systems.

In November of 2015, MMSD adopted a policy to consider green infrastructure as infrastructure. For purposes of this policy, green infrastructure is defined as an approach to wet weather management that is cost-effective, sustainable, and environment-friendly, that helps restore natural hydrology and also provides additional non-stormwater benefits (USEPA 2014).

At MMSD, green infrastructure strategies include the following practices: green ways, rain gardens, wetlands, trees, green roofs, bio-swales, porous pavement, native landscaping, rainwater catchment, green alleys/streets/parking lots, soil amendments, and removal of structures/parking. In addition to these strategies, MMSD also includes other practices that have similar properties for managing stormwater in a cost-effective, sustainable, and environmentally-beneficial manner.

The Wisconsin DNR, with input from municipalities in the MMSD's service area are currently in the process of establishing four TMDLs, all of which include recommendations to use green infrastructure. Once approved and implemented, the TMDLs could be a key regulatory driver for the region to promote green infrastructure.

A.3 MMSD'S MEMBER & NON-MEMBER COMMUNITIES

MMSD provides sewage treatment services for the 18 cities and villages within the District's legal boundaries. In addition, the District is authorized under the state statutes to provide wastewater treatment service to the areas beyond its legal boundary but within the portion of the multi-county drainage basin delineated in the Water Quality Management Plan developed by the Southeastern Wisconsin Regional Planning Commission. This area includes all or parts of 10 municipalities outside Milwaukee County.

Of the 18-member communities, 15 have stormwater utilities in place. Of the 10 non-member communities, five have stormwater utilities in place (Table A-1).

Among member municipalities, the city of Milwaukee paid the largest user charges ($40.2 million in 2014) while the village of River Hills paid the lowest user charges ($84,893 in 2014). Among non-member municipalities, the largest user charges were paid by city of New Berlin ($1.86

Table A-1: A listing of MMSD's member and non-member communities and their stormwater utilities

	Member Communities	Non-Member Communities
With stormwater utility	City of Cudahy City of Franklin City of Glendale City of Greenfield City of Milwaukee City of Oak Creek City of St. Francis City of Wauwasota City of West Allis Village of Bayside Village of Brown Deer Village of Fox Point Village of Greendale Village of West Milwaukee Village of Hale Corners	City of New Berlin Village of Menomonee Falls Village of Butler Village of Elm Grove City of South Milwaukee
Without stormwater utility	Village of River Hills Village of Shorewood Village of Whitefish Bay	City of Muskego City of Mequon Village of Thiensville Village of Germantown Village of Caledonia City of Brookfield

million in 2014) while the lowest charges were paid by the village of Caledonia ($30,496 in 2014).

A key difference between the member and non-member municipalities is that the latter pays for flood management and watercourse work in a watershed only if they are a tributary to it. In September 2017, MMSD adopted an amendment to its green infrastructure policy that allows non-member communities to opt out of green infrastructure programs, and eight communities had opted out as of December 2017.

Within MMSD's service area, four total maximum daily loads (TMDLs) are in process of being established. These include TMDLs for Kinnickinnic, Menomonee, and Milwaukee River watersheds, and the Milwaukee Estuary. All include reduction goals for TSS, phosphorus, and fecal coliform bacteria needed to meet water quality standards. These requirements may eventually be incorporated in future WPDES permits. TMDL implementation measures may include recommendations made as part of the Water Quality Initiative, such as green infrastructure and pollutant trading. A schedule of compliance may provide added incentives for both member and non-member municipalities to focus upon green infrastructure and pollutant trading. However, as of May 2017, final TMDLs were not in place and thus no specific comments can be made about any compliance schedule related drivers.

Currently, MMSD is assessing its revenue options for funding existing and future green infrastructure costs. It is noted that

MMSD's relationship with member and non-members is complex and differing levels of revenues, engagements, and acceptance of green infrastructure varies. Since the municipalities currently coordinate payments and regulate developments, MMSD staff believe any future fee collection is likely best managed through this existing arrangement. The hurdle is whether implementing green infrastructure can and should follow the same provisions and rules as grey infrastructure, where revenues are spent on placing BMPs where they are most impactful, regardless of community boundaries. Grey infrastructure is currently constructed after extensive planning, and based on a number of factors including capacity, age, and amount of volume reduction. Aside from non-members who are exempted from some specific efforts based on whether it impacts a watershed where their fees are collected, grey infrastructure is not constructed based on the amount of fee raised in a specific community.

Finally, to maximize the cost efficiencies and effectiveness of MMSD's GI program, it is recommended that MMSD retain as much flexibility in implementation.

A.4 WORK WITHIN THE REGION

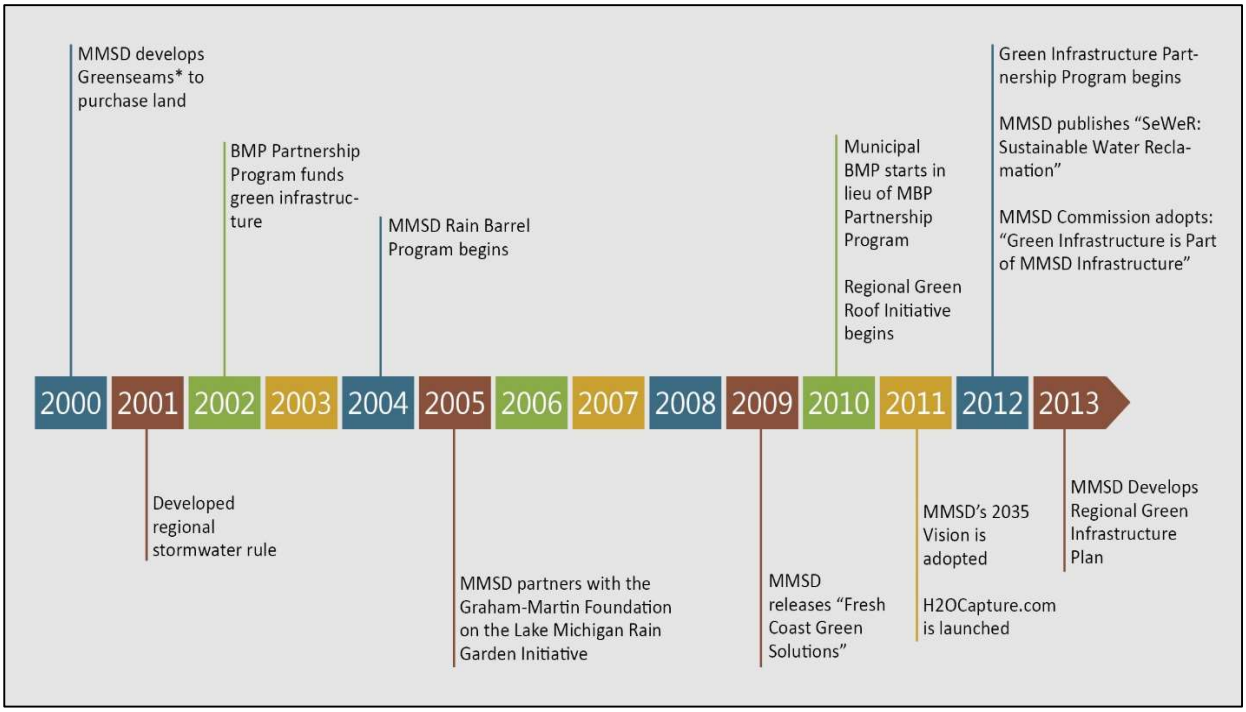
MMSD's environmental stewardship goes back nearly a century, to 1925, when the organization began sampling regional waterways to quantify water health (MMSD 2012, see Figure A-5). The very next year saw the inception of MMSD's *Milorganite* program that converts solids from sewerage processing into fertilizer (MMSD 2012).

MMSD has also been an early adopter of green infrastructure. The "Greenseams" program was initiated in 2000 (MMSD 2013) to maintain downstream flood management features and allow water to stay where it fell. Through this effort, MMSD purchased lands in areas expected to be under pressure from future development, especially locations along stream or riverine corridors, to preserve open spaces and encourage infiltration in areas that could otherwise be converted to impervious surfaces. The purchased lands are protected from development to improve long-term flood management and lessen the grey infrastructure commitments associated with rapid construction and development. The program has set aside over 3,057 acres of green space as of 2014. MMSD's goal is to conserve 10,000 acres by 2035 (MMSD 2013).

In 2001, MMSD took additional steps to better manage regional flooding by passing its regional stormwater rule. The 28-member communities of MMSD represent all of Milwaukee County and a substantial portion of surrounding counties. This rule, Chapter 13 of MMSD's regulations, was designed to protect downstream communities from flooding caused by upstream communities with less stringent stormwater regulations. The legislation provides equitable stormwater management across the whole District by providing baseline requirements specifically for construction activities within the service area (Hickock-Wall 2001).

The Best Management Practices (BMPs) Partnership Program was initiated in 2002 allowing the District to fund some of the first green infrastructure installations in the MMSD service area (MMSD 2013). With supportive, regulatory framework established and available existing green

Figure A-5: Timeline of MMSD's green infrastructure leadership



areas, the District was able to implement multiple green infrastructure installations in MMSD's service area.

MMSD initiated its rain barrel program in 2004 in an effort to involve the entire region in green infrastructure initiatives (MMSD 2013). The program partnered with the non-profit Milwaukee Community Service Corps to retrofit, sell, and distribute recycled, food-grade, 55-gallon drums to be used as rain barrels. Over the last decade, the program has expanded and now includes multiple distributors. Workshops on installation and tips for how to decorate the barrels are also provided. The program has installed 22,000 barrels as of 2015 and has made significant progress towards the ultimate goal of installing over 150,000 barrels throughout MMSD's service area (MMSD 2013). The Lake Michigan Rain Gardens Initiative was established in 2005 to install rain gardens as replacements of grass areas near downspouts (MMSD 2013). The program provides wholesale-price plants to the public, and MMSD reports it has sold over 40,050 plants through 2016. This program was a product of a cooperative relationship between the Graham-Martin Foundation and MMSD.

In 2010, MMSD instituted the Regional Green Roof Initiative and offers grants and other incentives to encourage the installation of these technologies in urban areas. To date, this program has funded nine acres of green roofs in MMSD's service area (MMSD 2013). MMSD has also developed prioritization and categorization maps for the city showing which buildings are prime candidates for green roof installations (MMSD 2013).

The Green Infrastructure Partnership Program was established in 2012 allowing MMSD to fund demonstration projects to publicly document the myriad benefits of green infrastructure (MMSD 2013). Under

this program, funding is provided to communities and organizations for green infrastructure projects but requires that they provide educational outreach to accelerate public acceptance and adoption. Finally, as mentioned previously, MMSD's board of commissioners voted to formally adopt green infrastructure in 2012 as part of MMSD's stormwater infrastructure (MMSD 2013).

MMSD produced "Fresh Coast, Green Solutions" in 2009 illustrating actions communities could take to enhance the effectiveness of green solutions to stormwater problems. Two years later, MMSD launched the website www.H20capture.com (now www.Freshcoast740.com) to provide member communities information on MMSD's green infrastructure efforts. Simultaneously, MMSD released its 2035 Vision report to outline its goals for the region and provide a roadmap for proposed green infrastructure programs. MMSD developed the Regional Green Infrastructure Plan in 2013 to serve as a comprehensive synthesis of past efforts, future goals, and actions needed to achieve those goals (MMSD 2013).

A.5 EXISTING PERMITS & OTHER DRIVERS

Communities served by MMSD span across several counties with a diverse set of permitting schemes and drivers. Municipal separate stormwater sewer system (MS4) communities, CSO communities, and TMDLs, all provide regulatory drivers and constraints within the region. MMSD has supported the development of the permit that applies to its discharges and has incorporated green infrastructure obligations under each re-issued permit.

Noting 70-to-30 private-to-public space availability for green infrastructure, any P3 option to meet MMSD's 2035 Vision needs to ensure its relevance to work on private properties.

Upon the reissuance of its discharge permit, including its combined sewer system in 2012, MMSD negotiated with the Wisconsin Department of Natural Resources (WDNR) to specify the amount of green infrastructure to be installed annually under its permit. MMSD also established quantifiable, environmentally-sensitive performance metrics by requesting that its permit require a certain amount of storage (one million gallons) be derived from new green infrastructure installation annually (Behm 2012). Through its many green infrastructure programs, MMSD has made significant strides in continually meeting this goal, and, in 2013, surpassed this requirement by installing four times the state-mandated volume storage goal (Behm 2014).

New drivers are gaining acceptance throughout the region as well. MMSD has been involved with the development of four TMDLs within its service area that will limit volumes and improve water quality into the affected watersheds. MMSD expects that once these TMDLs are in place, many of the flow-contributing communities may need to make significant investments in green infrastructure to provide the least-cost compliance with the new requirements (MMSD 2013).

A.6 OVERALL BIG PICTURE CHARACTERISTICS

MMSD established a milestone for meeting the 2035 Vision by proposing to capture the first 0.5 inch of rainfall on impervious surfaces (equivalent to 740 million gallons of stormwater storage for each storm), which more than doubles its current detention capacity. Current grey infrastructure within MMSD's service area captures about 521 million gallons of water at any one time. Table A-2 below showcases the quantity of green infrastructure needed to achieve the 740 million-gallon stormwater storage target.

A summary of stormwater captured by green infrastructure strategy is articulated in Figure A-6, and shows significant reliance on native landscaping, soil amendments, and porous pavements.

According to MMSD (2013), there are approximately 107,000 acres available for green infrastructure that comprise 70 percent of private and 30 percent of public land. Of these, to achieve the 2035 Vision goals, green infrastructure is needed on 42,000 acres (68 percent private and 32 percent public). A possible distribution of desired green infrastructure on those 42,000 acres is presented in Figure A-7.

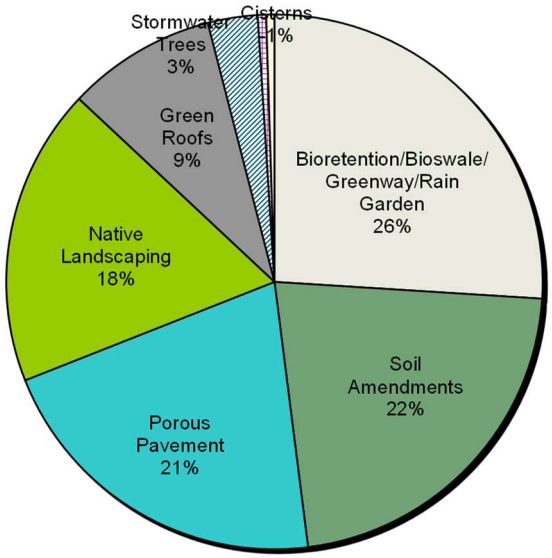
Table A-2: MMSD's 2035 regional vision to achieve the 740 million gallons per storm target (MMSD 2013)

GI STRATEGY	QUANTITY	DESCRIPTION
Green roofs	1,490 acres	Equivalent to 13,000 buildings with new green roofs (assumes 5,000 square feet per roof)
Bioretention/ bioswales/ greenways/ rain gardens	650 acres	Equivalent to 189,000 rain gardens (10 feet by 15 feet each)
Stormwater trees	738,000	Equivalent to nine new trees per average city block
Native landscaping	8,600 acres	Equivalent to 1,700 average city blocks with native landscaping
Porous paving	1,190 acres	Equivalent to 10,300 average city blocks having 25 percent porous pavement
Rain barrels	152,000	Equivalent to 152,000 homes with one rain barrel each
Cisterns	2,020	Equivalent to 2,020 larger buildings with a cistern (assumes minimum 6,500 square foot roof)
Soil amendments	15,200 acres	Equivalent to 2,900 average city blocks with soil amendments

Lastly, MMSD (2013) presents the following objectives of its regional green infrastructure plan:

- Capture the equivalent of the first 0.5-inch rainfall from impervious surfaces with green infrastructure.
- Strive towards the 2035 Vision rainwater harvest goal of first 0.25 gallon per square foot of area of rainfall for reuse.
- Complement MMSD's Private Property I&I Reduction Program and Integrated Regional Stormwater Management Program.
- Help meet receiving water quality standards by acknowledging

Figure A-6: Storage percentage by green infrastructure strategy (MMSD 2013)



Watershed Restoration Plan recommendations for the Menomonee and Kinnickinnic rivers.

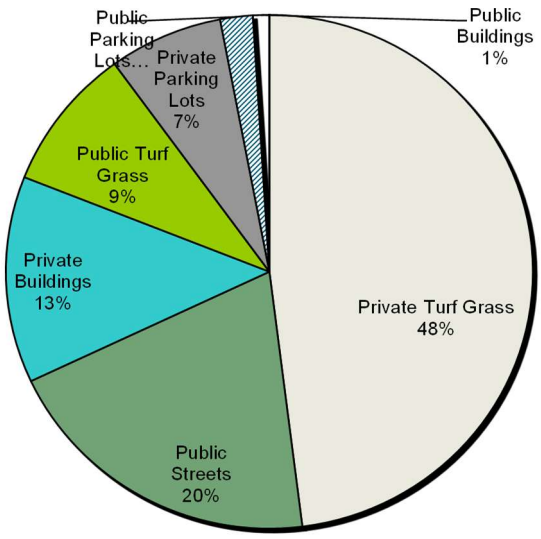
- Help municipalities and other entities prioritize green infrastructure actions.
- Meet MMSD's WPDES discharge permit requirement by installing green infrastructure volume capture within the MMSD service area.

A.6.1 ENVIRONMENTAL BENEFITS

Green infrastructure's targeted environmental benefits can be divided into five primary categories (MMSD 2013):

- ***Captured stormwater volume***: Increased storage volume of 740 million gallons per storm event (14.8 billion gallons of storage annually) to reduce sewer overflow incidents.
- ***Reduced pollutant loading***: Capture 15 million pounds of TSS and 54,000 pounds of total phosphorus annually.
- ***Groundwater recharge benefits:*** Infiltrate an additional four billion gallons per year into the groundwater system.
- ***Air quality related benefits***: Annually reduce carbon monoxide by eight tons, nitrogen dioxide by 103 tons, ozone by 403 tons, particulate matter by 190 tons, and sulfur dioxide by 61 tons.
- ***Carbon reduction benefits***: Annually reduce carbon dioxide by up to 59,000 tons from photosynthetic removal and thus lowering the temperature in cities (known as the urban heat island effect). This reduces the need to run cooling systems and would result in an additional 14,000 tons of carbon dioxide removed through avoided energy use.
- ***Air quality related benefits***: Annually reduce carbon monoxide by eight tons, nitrogen dioxide by 103 tons, ozone by 403 tons, particulate matter by 190 tons, and sulfur dioxide by 61 tons.

Figure A-7: The possible distribution of green infrastructure practices recommended to achieve the 0.5-inch capture goal over 42,000 acres needed to meet 2035 vision



A.6.2 ECONOMIC BENEFITS

MMSD (2013) showcases a set of economic benefits by implementing 2035 Vision summarized below:

- ***Infrastructure savings***: Green infrastructure will save $44 million in infrastructure costs in the combined sewer area compared to constructing more deep-tunnel storage.
- ***Green jobs***: 42,000 acres of green infrastructure are expected to generate 500 green jobs at full implementation, and nearly 160 construction jobs on average between now and 2035.
- ***Property values***: Property values in its service area are estimated to increase

by an estimated $667 million due to greening of the region.

A.6.3 SOCIAL BENEFITS

MMSD (2013) articulates enhanced connection between residents and the natural environment will improve the quality of life and aesthetics, lower crime rates, reduce stress, and vastly increase green space for recreational enjoyment.

A.7 MAINTENANCE OF GREEN VERSUS GREY INFRASTRUCTURE

All infrastructure requires maintenance to assure long-term performance and to avoid premature failure. This is true for green infrastructure as well. Green infrastructure, if properly chosen and sited, will typically require less capital investment than grey infrastructure to address the same challenge (Sinha et al 2017). If properly maintained, green infrastructure is also attractive and provides residents increased quality of life and property value. However, consistence performance requires ongoing maintenance – often more frequent than grey infrastructure solutions. Typically, green infrastructure maintenance programs should:

- **Maintain capture volume** – this would include removing sediment from fore-

Table A-3: Differences in grey and green infrastructure for budgeting considerations (Berahzer 2014)

FACTOR	GREY	GREEN
Initial capital costs	Variable	Variable – Depends on the type of GI (e.g., green roof installation tends to be much higher than traditional roof; porous pavement can be more comparable to cost of traditional roads).
Frequency of O&M	Usually less	Usually more
Intensity of O&M	Usually more	Usually less
How standard is O&M regime?	Generally more routine and based on manufacturer's guidelines; less variability	May need to adapt to growth rate, weather, soil conditions, etc.
Precedence on O&M	Long history of O&M data to draw on	Limited long-term data on O&M costs
Level of skills involved in O&M	More specific skills may be necessary for maintenance	Usually more general skills, can even include community involvement in maintenance
Lifecycle costs	Usually higher	Usually lower
Design contingency costs	Tend to be lower	Tend to be higher
Construction contingency costs	Tend to be higher	Tend to be lower
Community willingness to pay	Usually lower	Usually community more willing to pay for maintenance
External costs to consider	More salting and plowing on traditional roads	Permeable pavements reduce public road maintenance expenses
Eliminates need for other infrastructure line items in budget?	Most often does not reduce need/cost for other types of grey infrastructure	Often eliminates need for other "gray" costs such as curbs, drains and stormwater conveyance tanks, pipes etc.
Triple bottom line benefits – social and recreational	Limited or no social and recreational benefits	While some costs can be quantified more easily (e.g., reduction in capital and O&M costs, or reduced fines for CSOs) there are also social and recreational benefits that are less easy to quantify, but may be worth considering.
Triple bottom line benefits – environmental and long-term financial benefits		Potential avoided capital costs for treatment processes like flocculation and sedimentation, membrane filtration, etc. based on enhanced source water quality. Ernst (2004) found that water treatment costs for utilities decrease by approximately 20 percent for every 10 percent increase in forest cover across a watershed.

bays and contributing catch basins. The frequency will vary on the areas feeding the green infrastructure ranging from once every two years for industrial areas, to every ten years for residential areas.

- **Maintain plant species and diversity** – this will entail removing and destroying invasive species including species like Phragmites, Purple Loosestrife, and Garlic Mustard.
- **Maintain the capacity of the outlet structure** – this requires regular (no less than once per year) removal of trash and natural solids that can impair the effectiveness of the outlet structure.

Note that, grey infrastructure also usually requires more Operations and Maintenance (O&M) as age increases. Conversely, as the vegetation involved with green infrastructure matures, there tends to be increased resilience and function. Generally, in new developments, green infrastructure costs are less than retrofitting already developed urban areas. This is especially true for individual, small-scale retrofit projects. Table A-3 captures some of the main considerations for budgeting for green infrastructure projects compared to grey ones (McMullen and Reich 2007, Berahzer 2014).

A.8 EXISTING CODES/REQUIREMENTS FOR/AGAINST GREEN INFRASTRUCTURE

MMSD has significant ability to influence policy within its service area because of its ability to set its own rate structure/fees subject to statutory limits and requirements. At the same time, each municipality within the MMSD has the ability to pass its own ordinances. As a service provider, however, MMSD retains responsibility for administering the regional stormwater ordinance that applies to any new development or redevelopment that increases impervious surfaces by one-half acres or more.

Birchlline (2013) reports that implementing green infrastructure on a site-by-site basis in the region was driven by four forces: 1) individual site constraints, particularly for redevelopment; 2) zoning and other local code requirements for landscaping, streets, infrastructure, and parking; 3) the thresholds and standards in MMSD's Chapter 13 rule; and 4) locally-adopted stormwater management requirements, particularly related to design storms and other sizing criteria.

In 2011, MMSD commissioned an extensive survey to examine the codes and ordinances for nine communities in the Menomonee Watershed (Birchline 2013, carried out as a part of study led by 1000 Friends of Wisconsin) to identify progress in reducing barriers to green infrastructure implementation, specifically in municipal codes, ordinances, and the local land use approval process. It was a follow up to some earlier work on the subject, which allowed the MMSD to evaluate the progress made in eliminating these obstructions. Its charge was to: 1) identify key barriers, 2) develop recommended changes to municipal codes, and 3) implement recommended actions.

The study recognized the City of Milwaukee for progress on lowering barriers to widespread green infrastructure adoption. It also surveyed nine contributing communities that had mixed success rates. It concluded with the statement (Birchline 2013):

> *"Put more simply, green infrastructure is not the stormwater management approach of first resort in the*

Menomonee Watershed at this time; it is an emerging practice that is used to overcome technical constraints, rather than a preferred approach."

In particular, Milwaukee removed older municipal ordinances that were serving as barriers to green infrastructure adoption. The progress has not been universal, however, and certain types of green infrastructure still face significant regulatory hurdles to implement. Three major areas where little progress was observed in Milwaukee include using drain restrictors to turn streets into temporary storage areas during large storm events, inspecting sewer laterals on property transfers (not allowed in Wisconsin, as of 2016), and, last but not the least, use of permeable pavers. The city has implemented broader legislation for permeable pavers, and has also moved to allow for drain restrictors. As of 2015, however, Milwaukee hasn't been able to pass widespread lateral inspection prior to property transfer.

The study also found that implementing green infrastructure on a site-by-site basis was driven by four forces: 1) individual site constraints, particularly for redevelopment; 2) zoning and other local code requirements for landscaping, streets, infrastructure, and parking; 3) the thresholds and standards in MMSD's Chapter 13 rule; and 4) locally-adopted stormwater management requirements, particularly related to design storms and other sizing criteria.

One major concern was whether current thresholds for stormwater management plans are capturing enough of the development and land use change in the watershed to be effective.

"*Municipal staff throughout the watershed reports that the percentage of projects and land use changes subject to Chapter 13 represent* ***a very small share of the total****. Moreover,* ***only a handful of development projects that fall below the threshold*** *for the application of Chapter 13 requirements are subject to local stormwater management requirements. … it appears that* ***a substantial share of land development*** *and investment in the watershed* ***is not subject to any stormwater treatment and control requirements****."* (Emphasis added, excerpt from Birchline 2013)

Clearly, "*changing municipal codes and ordinances is a challenging, politically fraught, and expensive process*" (excerpt from Birchline 2013). Aggressive stormwater management implementation is viewed as an increased cost to residents and/or a deterrent to development/redevelopment (Birchline 2013). Thus, any proposed change to local requirements must be shown to be cost effective and equitable.

The Menomonee report identified the following four critical challenges to a rapid implementation of green infrastructure:

- The current threshold for triggering the need to comply with stormwater requirements,
- An existing fear of using permeable paving and surfacing materials,
- A municipality's exposure to maintenance complexity and expense, and
- The interaction with, and the over-riding role of the Wisconsin Division of Safety & Buildings in approving

graywater and rainwater harvesting systems.

The report documented that the ordinances initially implemented in the 1960s were most problematic and least sensitive to green solutions. *"Few if any of these provisions were specifically written to protect water quality."* The requirements expect drainage programs to rapidly transport stormwater off-site using grey infrastructure.

However, since the initial 2005 survey, there have been successes.

> *"On the whole, there is a far more level playing field for stormwater management regulation among the Menomonee River Watershed's municipalities in 2013 than there was in 2005, since all nine communities now have updated construction-phase standards, and projects meeting MMSD Chapter 13 thresholds all involve stormwater treatment and control approvals. Several communities, notably the cities of Wauwatosa and Milwaukee, have undertaken zoning amendments to modernize parking, roadway, and landscaping requirements to facilitate the potential for green infrastructure implementation. Others such as Greenfield and Menomonee Falls have implemented community-wide environmental initiatives, including tree planting, foundation drain disconnection, and rain barrel programs, that help make green infrastructure practices a norm rather than an exception."* (Excerpt from Birchline 2013)

So far as mixed successes, paved surface – roadways and parking – are strongly regulated and reducing either is often in direct conflict with local ordinances. These have improved since the 2005 survey.

> "*Generally, about one-half of the municipalities in the Menomonee watershed have minimum parking requirements that exceed contemporary standards, do not use parking waivers regularly, and do not allow off-site parking. The others have put considerable effort into modernizing parking standards and use multiple methods to reduce parking area. Communities that have modernized and updated parking standards typically have done a comprehensive update covering parking ratios, shared parking, and waiver provisions.*
>
> *"Generally, most of the participating municipalities do allow reduced street widths on private streets, and all nine allow swale drainage or other alternative street edges in at least some circumstances. In the municipal interview process, a number of planning, public works, and engineering staff members expressed a common interest in using green infrastructure practices within the right of way, while continuing to maintain typical travel lane widths and curbed roadway edges in more dense and heavily-traveled areas. On the whole there is much greater interest in and support for incorporating green infrastructure into curb bump-outs or traffic calming areas, permeable parking lanes, tree lawns, cul-de-sac islands,*

or other roadway features than in using narrow, curbless streets as the standard approach." (Excerpts from Birchline 2013)

Finally, the report recommended a concentrated effort on four major areas:

1) Affirmative allowances for soil amendment and for native planting in lieu of turfgrass
2) Code language promoting the use of better turfgrass
3) Defining a clear approval process for use of native plantings in lieu of turfgrass
4) Revisiting parking requirements – Adopting shared parking and standard agreements
    a. Minimum (or maximum) parking requirements and waivers
    b. Incentives for off-site, structured, or municipal parking
    c. Compact or reduced-size spaces

A.9 CAPITAL & OPERATING COSTS

Revenue for the MMSD operations/maintenance and capital budgets derives from separate sources. The operations and maintenance budget primarily derives from (in greatest-to-least order): a) user charges, b) industrial waste surcharges, c) household hazardous waste fees, d) Milorganite sales, and e) interest/other income (MMSD 2014, 2015). The capital budget is primarily funded through a) tax levies, b) non-member billings, c) state loans, d) federal and state aid, e) interest income, and f) direct issue obligation bonds.

Within MMSD, both capital and operations/maintenance budgets have provisions that allow for green infrastructure to be financed directly, however, the requirements are slightly different depending on the funding source. The capital budget financing has more stringent requirements. To use capital financing for green infrastructure, the project has to meet two criteria: 1) a minimum 10-year easement to MMSD must be granted, and 2) a project must exceed $25,000 in project costs. These requirements are not placed on operations/maintenance-funded green infrastructure projects.

A.10 CONSTRUCTION ON PRIVATE PROPERTIES

MMSD's regional green vision specifies roughly a 70/30, private-public property split for implementation. Further noting that the municipalities connect with private property owners, and not MMSD, any CBP3 framework must account for that separation.

Another alternative, although also needing a state statute amendment, which may simplify MMSD's green infrastructure work on private property, would be a stormwater bank. In this scenario, MMSD would award development of a bank to one or more private developers and would specify or work collaboratively with those developers to identify high impact sites most efficient for managing stormwater. These sites would become off-site collection areas for stormwater where credit for retention could be purchased by private developers

MMSD's 2035 regional green vision specifies roughly a 70/30, private-public property split for implementation. The caveat with private property is that MMSD will need to have an easement to fund a project with capital funds in accordance with their policy.

subject to Chapter 13 regulation through payment of an in-lieu fee. If capital dollars were required, easements could be concentrated in areas dedicated to stormwater management, reducing administrative and implementation costs.

A.11 WORKFORCE DEVELOPMENT INITIATIVES

MMSD has a comprehensive Workforce and Business Development Resource Program (MMSD 2015) to help achieve social responsibility goals by building the capacity of consultants, contractors, vendors, and local workers to compete for and succeed on District projects. The program offers apprentice readiness preparation, college internships, business seminars, business coaching, and networking opportunities. Three key aspects of this program are outlined below:

- MMSD maintains an active list of consultants that can assist businesses with various aspects of its Workforce and Business Development Resource Program. Together, MMSD provides business capacity development and one-on-one coaching to build the capacity and capabilities of small, veteran, women, minority, emerging, and disadvantaged enterprises so that they may better compete for and successfully complete MMSD contracts and projects.
- Regional Internships in Science and Engineering (RISE) is a MMSD career and professional development program providing meaningful work experience and professional relationships with local construction and engineering firms, consultants, and planners.
- Finally, MMSD also offers the Apprentice Readiness Program (ARP) to assist economically-disadvantaged minorities, women, and youth (primarily from the central-city) develop the skills needed to participate meaningfully in the workforce and share in the area economy.

In addition to the above, all procurement opportunities from MMSD include a provision establishing a goal of 20 percent of the contract work awarded to small or women-owned enterprises. MMSD invests several hundred thousands of dollars through its capital budget to pay for the Workforce and Business Development Resource Program.

In recent years, specific focus has been put on green infrastructure, and the district's Workforce and Business Development Program directly addresses incorporating resources to help develop related installation and maintenance services and the labor market associated with green infrastructure work. MMSD formed a coalition with the Water Environment Federation and the District of Columbia Water and Sewer Authority to develop a National Green Infrastructure Certification Program aimed at promoting skilled individuals who will install, inspect, and maintain green infrastructure systems (WEF 2016).

Overall, MMSD's Workforce and Business Development Resource Program lends itself well to a CBP3 execution as so many facets

MMSD's Workforce and Business Development Resource Program lends itself well to public-private partnerships as so many facets of its existing program are aligned with the intent of a community-based partnership.

of its existing program are aligned with the intent of a community-based partnership. A hybrid use of an EIB to establish baseline metrics for workforce development, which would then be a fee-based performance metric under a CBP3, may best allow these important metrics to be expanded for even greater impact and results.

APPENDIX B: ADDITIONAL FUNDING OPTIONS TO BE EXPLORED WITHIN THE FRAMEWORK OF THE COMMUNITIES

B.*1 Establishing Service Fees (Including Stormwater Utilities)*

Imposing or increasing service fees provides a revenue source that can be used to pay for projects and their long-term operations directly, to pay debt service, or to pay a public sponsor's contribution to a P3. Stormwater fees vary from community to community and are typically based on property type or area. The fees are established to provide funding for regulatory compliance and long-term operation/maintenance costs. However, basis of these fees often do little to affect stormwater management on private property. Some communities include stormwater management costs within their water or sanitary sewer system budgets, often basing fees on metered water flow. However, a property's metered water flow bears no relationship to the stormwater runoff it generates. For example, the stormwater runoff from the impervious area of a shopping center's buildings and parking lots is significant, but its use of metered water is relatively small.

B.*2 Property Taxes/General Fund*

Many communities fund stormwater management through property taxes paid into their general funds. This source of funding has been found to be unreliable. In the competition for general fund dollars, stormwater management improvements are typically considered low priority and obtaining a dedicated, long-term commitment of property tax or general fund dollars to stormwater is a challenge. In addition, this system does not generate funding proportional to flow contributions because the basis for determining property taxes (assessed property value) is irrelevant to the cost of stormwater management for that property. Finally, under this option tax-exempt properties, including governmental properties, schools, colleges, and universities, do not support the cost of stormwater management although many of them can be major contributors of stormwater runoff.

One advantage, however, of using tax revenue to fund stormwater projects is that such revenues are perceived as the highest quality form of public dollars. Municipalities that successfully allocate a portion of these funds to green infrastructure projects will enjoy the lowest financing cost for these projects. This is because borrowers are often willing to lend against a "general obligation" project at a lower interest rate than to a "revenue" project, such as those supported by service fees. This is due to the relative stability of property taxes over the long term in comparison to the variability in revenues from user fees.

B.*3 System Development Charges (SDCs)*

Municipalities could develop stormwater SDCs (also known as connection fees or tie-in charges). These one-time fees are commonly charged to new customers connecting to a water or sanitary sewer system. In this way, new customers buy into the existing infrastructure, and/or the infrastructure expansion necessary to serve them. The amount of the new customer's SDC is typically based on the customer's estimated water demand.

B.*4 TIFs or linkage fees*

If the location of the project(s) that will be funded is known, then the issuer could use tax increment financing (TIFs) to assess a fee on real estate owners in the area. TIFs assume that the investment will increase property values in the area that will generate additional tax revenue for the city.

In this case, the repayments would be drawn from this stream of future tax revenue cash flows. Similarly, the city could establish a linkage fee that would assess a fee on developers who were developing new properties in the area or were significantly redeveloping existing buildings. This linkage fee would be used for repayment under the assumption that there is a connection between the new development and its impacts on infrastructure – including stormwater management – in the area.

APPENDIX C: MILWAUKEE METROPOLITAN SEWERAGE DISTRICT COMMENTS ON REVIEW OF FIRST DRAFT OF THE REPORT

MMSD

PARTNERS FOR A CLEANER ENVIRONMENT

Kevin L. Shafer, P.E.
Executive Director

October 20, 2016

Sanjiv K. Sinha, Ph.D.
Vice President
Environmental Consulting & Technology, Inc.
2200 Commonwealth Boulevard, Suite 300
Ann Arbor, MI 48105

Re: "A Public-Private Engagement Business Plan to Implement Green Infrastructure by the Milwaukee Metropolitan Sewerage District" (Draft dated March 2016)

Dear Dr. Sinha:

Thanks for the opportunity to review and comment on your draft Plan. As you know, MMSD is very strongly committed to implementation of its Regional Green Infrastructure (GI) Plan and we appreciate your work in supporting that goal.

The purpose of this letter is to provide you some of the key reactions and comments from our staff. We have also been working with MMSD bond counsel to evaluate some of the funding alternatives that you describe. In general, MMSD does its financial planning on a six-year horizon, considering its outstanding debt, construction needs, and borrowing needs. This financial planning is an integral part of MMSD operations and is a key factor in maintaining MMSD's outstanding credit rating and exemplary environmental performance. In addition, we are currently engaged in our overall facilities planning for the 2050 horizon year, which will include our long-range plan for GI. Because we are doing these two types of comprehensive planning, we would prefer that you re-title your report "A Public-Private Engagement 'Options' to Implement …." Because your document does not include discussion of key factors, such as the possible applicable constitutional debt limitations, MMSD's current debt load, current cost of borrowing, presence or absence of statutory authority for certain types of borrowing (i.e., Environmental Impact Bonds (EIBs)), and many other financial and legal issues, we do not believe that it realistically constitutes a "plan", but is more in the nature of a survey of possible options. We would prefer to avoid any confusion that might result from the current draft title.

We should note at the outset that traditional tax-exempt government bonds appear to be the lowest cost option to finance at least some of MMSD's GI. However, in order to scale up GI efforts to meet our ambitious goals, we also need expedited delivery mechanisms that include staff and streamlined processes. Minimizing the cost of money is one top goal, but that will be

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balanced with the other need to facilitate project delivery. Thus, we may use some of your financing options in our long-term planning, to create the needed balance.

Of the four types of private investment options that you describe, our bond counsel advises that they think that MMSD may not have clear statutory authority to issue EIBs. However, the legal authority for EIBs is evaluated in the same manner as would be public-private partnership agreements. In general, bond counsel advises that public-private partnership agreements should not be structured in a manner that raises possible questions as to whether MMSD's obligations would be treated as its indebtedness. They note, however, that providing at least some funding of GI by means of indebtedness may have benefits to MMSD. Accordingly, the best mix of funding through indebtedness and other alternative means should be considered, i.e., issuing traditional tax-exempt bonds for GI involving acquisitions of property interests, and other alternative arrangements for other types of GI.

The two other types of private financing that your report describes are stormwater credit trading and stormwater banking. As your report notes, these two types of financing (as you propose them) would require statutory and policy changes, including the shifting of stormwater management fees to MMSD. We do not believe that this statutory/policy change is likely to occur. The stormwater systems are owned by the local municipalities, not the MMSD. A shift of ownership and management fee collection would be a major change that would be difficult to achieve. We also believe that state statutes would require amendment in order for MMSD to establish a stormwater banking program. However, this approach may have merit if implemented by the municipalities.

On a brighter note, we are currently looking at strategies to implement the requirements of the TMDL for the Milwaukee River watershed that could be tied to GI, and may result in some form of credit trading. Also, just as a note, MMSD currently has rules that require developers to retain certain amounts of stormwater on site, and allow, on a case-by-case basis, for credit to be purchased off site.

We continue to evaluate possibilities, and your report has caused us to research some new financing options (including those you propose) so that we are better prepared to fold some of these into our long-range financial and facilities planning, moving us closer to our GI goal. We'd be happy to share our bond counsel opinion if you wish; please advise.

Thank you for your report.

Sincerely,

Kevin L. Shafer, P.E.
Executive Director
Milwaukee Metropolitan Sewerage District

c: Karen Sands
Susan Anthony

APPENDIX D: A PRIMER ON IN-LIEU FEE CALCULATION IN WASHINGTON, D.C.

In 2013, Washington, D.C., unveiled an innovative stormwater retention credit trading program that allows real estate developers to purchase up to 50 percent of their stormwater retention requirement off-site, either by purchasing Stormwater Retention Credits (SRCs) from private sellers or by paying an in-lieu fee to the Department of Energy and the Environment (DOEE). Developers must still build a minimum of 50 percent of their stormwater requirement on-site, but the off-site allowance can give developers a lower cost of compliance and design flexibility. The in-lieu fee is a necessary part of this flexibility as it allows developers to rely on DOEE to provide compliance mitigation in the event that the private market does not offer a sufficient number of tradable credits.

DOEE charges developers the in-lieu fee as a cost of one gallon of retention for one year, similar to the SRCs that are traded on the market. This allows developers to compare prices accurately, and leaves DOEE's in-lieu fee as a ceiling on the market price, since no trades will take place above that price. With this price information, developers can make informed decisions in comparison to their onsite mitigation costs. Additionally, developers can bank credits from either the in-lieu fee or SRCs traded on DOEE's marketplace indefinitely, meaning that a developer can achieve compliance for the life of its building with the purchase of a sufficient number of SRCs or by paying for an equivalent number of gallons via the in-lieu fee.

By charging developers the in-lieu fee, the District commits itself to build green infrastructure for the real estate developer's project (Table D-1). To ensure its ability to construct the necessary green infrastructure, the District set an initial price of $3.50 per gallon retained and plans to inflate the cost annually. DOEE set this price by calculating a weighted average cost of the expensive range of all best management practices (BMPs) available for DOEE to develop in the district. The types of BMPs available for DOEE to develop are somewhat constrained due to the availability of public right-of-way. Additionally, DOEE chose to include only the more expensive cost per gallon estimates of the BMPs available to them to ensure that they are able to build the required green infrastructure fully regardless of which BMP types they are able to construct at the time someone pays the in-lieu fee.

Table D-1: DDOE Calculation of In-Lieu Fee Corresponding to One Gallon of Retention for One Year

(Based on Cost Data from DDOE Programs to Install Retention Best Management Practices or BMPs)

	Green Roofs[1]	Bio-retention	RiverSmart-Bioretention, Bayscaping, Tree Planting[2]	RiverSmart-All other BMPs[3]	Harvest for Non-Potable Use	Green Alleys
Capital cost for one BMP life cycle ($/gal)[4]	$16.00	$15.98	$6.67	$9.76	$99.87	$122.29
Construction management for one BMP lifecycle[5]	$3.20	$3.20	$1.33	$1.95	$19.97	$24.46
DDOE program management costs for one BMP lifecycle[6]	$1.60	$1.60	$0.67	$0.98	$9.99	$12.23
Value of land committed to BMP installation (SF/gal)[7]	$0.00	$17.46	$41.91	$0.00	$0.00	$0.00
Total of above costs	**$20.80**	**$38.24**	**$50.59**	**$12.69**	**$129.83**	**$158.98**
Annualized payment for above costs	$1.99	$3.65	$4.83	$1.21	$12.41	$15.19
Annual maintenance cost	$0.80	$0.80	$0.33	$0.49	$4.99	$6.11
Total annual payment	**$2.79**	**$4.45**	**$5.17**	**$1.70**	**$17.40**	**$21.31**
Total gallons retained by the BMPs	543,515	81,512	347,600	336,740	13,868	6,798
Weighted average of total annual payments for BMPs	**$3.48**					
In Lieu Fee as rounded weighted average of total annual payments for BMPS	**$3.50 per gallon per year**					

Assumptions Used in Calculation:

Interest rate[8]	0.0716
Years in BMP life cycle/Time period over which costs are annualized[9]	20
Construction management costs per BMP life cycle as percent of capital cost	0.20
DDOE program management costs per BMP lifecycle as percent of capital cost[10]	0.10
Maintenance cost per year as percent of capital cost[11]	0.05
Land value ($/sf)[12]	$116.43

[1]Includes data from both partial and full subsidy programs for installation of green roofs. For partial subsidy program, the value of $10 per SF is used, based on program experience and expectation of subsidy required to achieve participation.

[2]Includes data from rain garden and bayscaping installation and tree planting for RiverSmart Homes, RiverSmart Communities, and RiverSmart Washington. RiverSmart Washington data based on 90% design.

[3]Includes data from permeable pavement and rain barrel installation for RiverSmart Homes, RiverSmart Communities, and RiverSmart Washington. RiverSmart Washington data based on 90% design.

[4]Capital cost per gallon for each BMP category is based on weighted average of BMP installations by DDOE, including design costs.

[5]Construction management costs include cost of management by partnering sister agencies and non-profits. Does not include DDOE costs.

[6]Covers DDOE program management costs.

[7]Though DDOE currently does not buy or lease land to install retention capacity, this could become necessary if the Department needed to dramatically scale up its programs in response to the use of In Lieu Fee (ILF) by major regulated projects. In addition, from an economic and practical perspective, the value of land being prevented from being used for alternative uses is a real cost that impacts the willingness of property owners to participate in DDOE BMP installation programs. DDOE expects that over time it will be necessary to increase the subsidy it provides to property owners to incentivize BMP installation. For this calculation, DDOE assumes that green roofs, stormwater harvest systems (including rain barrels), and permeable pavement do not prevent other uses of the underlying land and so have no cost in terms of land value. By contrast, based on its project data, DDOE calculated that bioretention uses .15 SF per gallon of bioretention, as a weighted average from multiple BMP installations. Similarly, DDOE calculated that .36 SF of land is used per gallon of retention achieved by the RiverSmart programs installing rain gardens and bayscaping and planting trees.

[8]The interest rate used in the calculation is the inflation-adjusted, compound annual growth rate for the S&P 500 from 1920-2010 (calculated at www.moneychimp.com/features/market_cagr.htm). In effect, the annual ILF payment is paying the District back over time for an up-front capital investment in retention capacity and the ongoing maintenance costs associated with it, when a regulated project opts to use ILF. Similar to a mortgage payment that includes both principal and interest, the calculation of the ILF payment should reflect the up-front capital investment that the District must make and also the value, over time, of the District funds committed, represented as interest. DDOE chose this S&P rate as a reasonable approximation of the alternative use that the District could, theoretically, make with the public funds it would use to make this capital investment.

[9]20 years is in the range of lifecycle time periods used by other jurisdictions and in the literature when making similar calculations.

[10]Though DDOE program management costs vary among programs, 10% is a reasonable approximation, and it is the rate at which DDOE reimburses grant recipients for administrative overhead costs.

[11]This is in the range of values used in the literature on maintenance of retention BMPs.

[12]This land value is an average of the average land value in each of the District's eight wards, based on 2011 assessed land values. It is important for DDOE to be able to install ILF retention BMPs in any of the District's watersheds to offset stormwater impacts from projects located in those watersheds. Though land costs are significantly higher than the average in some wards, they are also significantly lower in others. DDOE believes this average land value serves as a reasonable estimate of the value of land for this purpose.

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