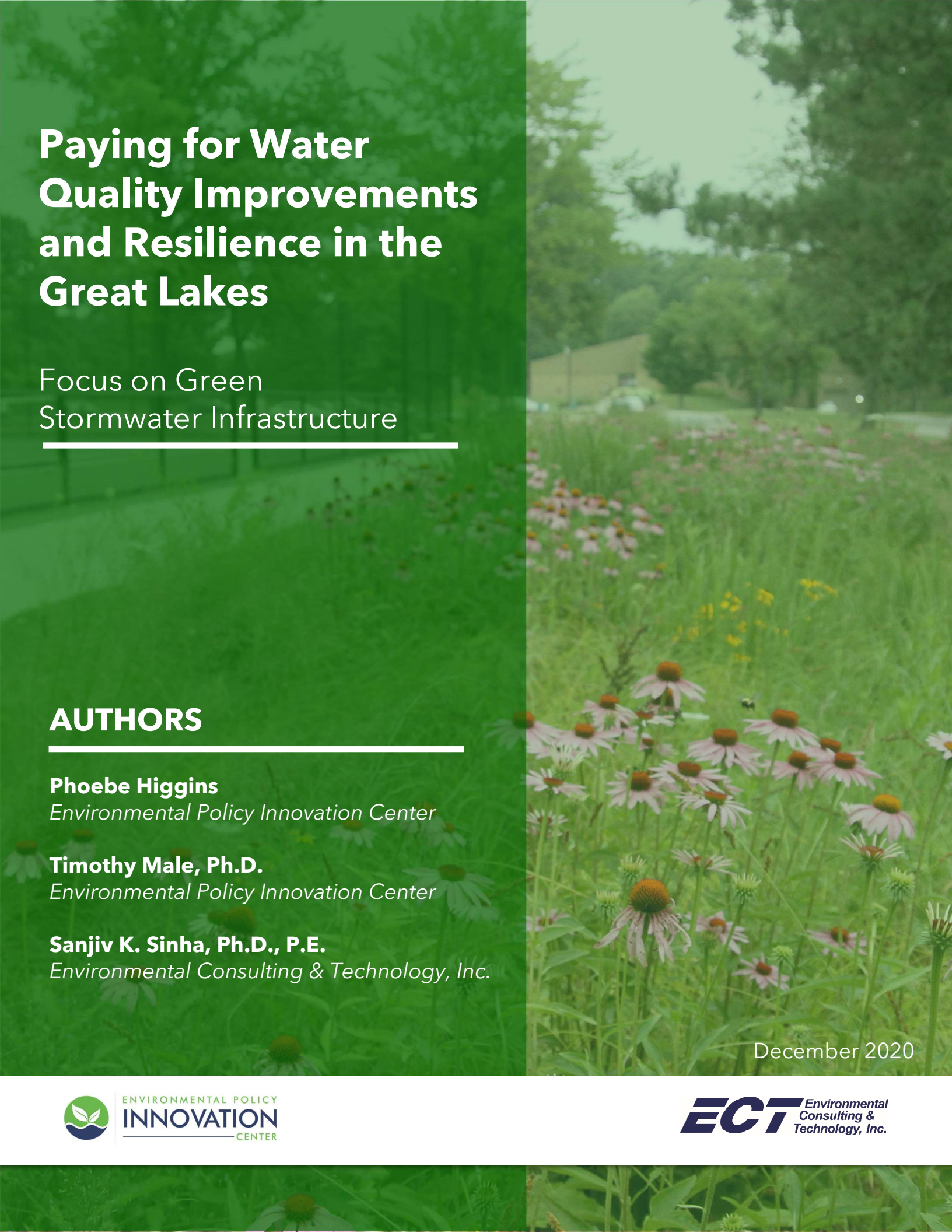

Paying for Water Quality Improvements and Resilience in the Great Lakes

Focus on Green Stormwater Infrastructure

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December 2020

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Acknowledgments

This toolkit was made possible with funding from the Great Lakes Protection Fund (GLPF). At GLPF, sincere thanks go to Shannon Donley, Steve Cole, and David Rankin, for their support and guidance. This report also relies on early valuable insight and support from the Sand County Foundation and research by Kristyn Abhold.

For purposes of citation of this report, please use the following:

> *"Paying for water quality improvements and resilience in the Great Lakes: A toolkit for green stormwater infrastructure", Phoebe Higgins, Timothy Male, and Sanjiv K. Sinha, Environmental Consulting & Technology, Inc., Report, 22 pp, December 2020.*

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1. Executive Summary

Our nation's water infrastructure is old and in a state of disrepair. A continued lack of funding and climate-related meteorological changes are further exacerbating this challenge. And in 2020, like so much else in the U.S. economy, water utilities have been affected by the COVID-19 pandemic. Due to the pandemic, the American Water Works Association (AWWA) and the Association of Metropolitan Water Agencies (AMWA) estimate that drinking water utilities will experience an aggregated financial loss of $13.9 billion of revenue—or 16.9 percent—by 2021, plus increased operational costs (AWWA 2020). The National Association of Clean Water Agencies (NACWA) estimates that the resulting financial impact on wastewater utilities will be around $16.8 billion, including a 20 percent drop in sewer revenues (NACWA 2020).

Old and broken water infrastructure contributes to health problems, disproportionate leakage of treated water and sewage water from systems, and service disruptions. Combined sewer and stormwater overflow systems, an outdated technology for wastewater and stormwater management, contribute significant amounts of pollution to our nation's waterways and exacerbate existing environmental justice impacts in communities where they overflow or back up.

New approaches are needed that include innovative leveraging of traditional funding and financing options as well as exploring new emerging options to support stormwater infrastructure replacement, repair, and maintenance. This paper focuses on funding and financing options for green stormwater infrastructure, which is already an accepted means of improving climate resilience. As much as possible the paper uses examples from the Great Lakes region, however, case studies from other regions are used where no regional examples exist. Note that findings presented herein are easily applicable elsewhere in the country.

The funding and financing options for green infrastructure highlighted in this report are not mutually exclusive. A municipality or other public utility should consider which combination of funding and financing approaches can best support its stormwater objectives at the lowest cost for its customers.

Section 2 of this paper summarizes climactic challenges in the Great Lakes region as well as the relevance and use of green stormwater infrastructure as a resilience measure. Section 3 presents a flow chart of decision steps that could help a utility or municipality decide among funding and financing options. Section 4 provides a summary of local funding options that include recurring, sustainable revenue sources, and intermittent funding sources. Section 5 provides a summary of public bonds and loans. Section 6 outlines private financing and procurement strategies, including community-based public private partnerships and environmental impact bonds. Finally, the last section of the report provides a short summary.

2. Introduction

Green stormwater infrastructure (GSI) has rapidly emerged as a critical component of any effort to restore the Great Lakes. Considered an effective method of combatting stormwater runoff and meeting regulatory compliance needs, GSI relies upon green spaces, parks, and pervious surfaces to filter water and increase water retention in soil and groundwater (Environmental Law & Policy Center, 2019). A recent survey of key stakeholders, including respondents from sectors such as the government, nonprofits, builders, and other experts, shows that they understand that the benefits of GSI outweigh its costs (see Figure 1).

Implementing a basin-wide GSI program could yield ecological benefits to the Great Lakes and would help address some of the significant nutrient loading challenges in the region. Unfortunately, between 1996-2010, Great Lakes coastal counties added more than 1,259 square miles of real estate development, an area larger than the cities of Chicago, Indianapolis, Detroit, Columbus, and Milwaukee combined (Great Lakes Regional Land Cover Change Report: 1996-2010). Much of this development utilized the same shortsighted design standards that currently drive water quality impairments in the Great Lakes; at the same time planning professionals have continued to reiterate that unmanaged urban sprawl is the greatest threat to water quality. During this period, the same Land Cover report indicated that the Great Lakes region also experienced a net loss of 1,735 square miles of forest cover. When combined with outdated hydrologic conveyance systems, these alterations to Great Lakes land cover, as well as continued changes in hydrologic patterns in the region, exacerbate the water quality impairments in all the Great Lakes urban areas.

Climate-related meteorological changes are also now well-researched and documented. In the Midwest, between 1951 and 2017, University of Michigan-based Great Lakes Integrated Sciences & Assessments Center estimates that the level of precipitation falling in the most extreme storms has increased by 35 percent. Another recent study in the journal *Science* (Sinha, Michalak, and Balaji, 2017) showed that increased rainfall in the coming decades will wash more agricultural nutrients and fertilizers – including nitrogen and phosphorus, the primary cause of algae growth – into the waterways.

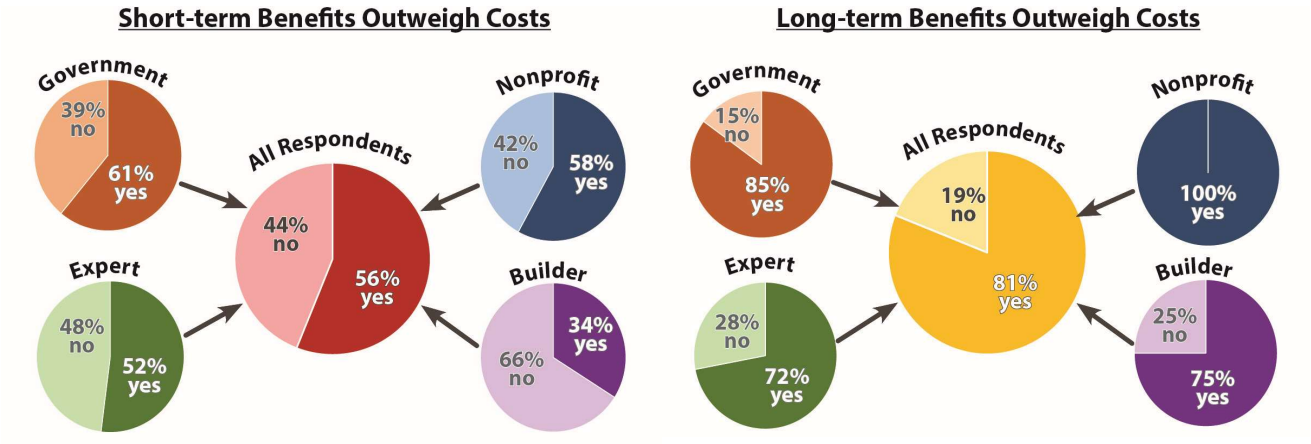
Defining Greening, Green Space, & GSI (Reproduced from Lichten et al 2017)

Greening describes efforts to increase the amount or quality of green space in a neighborhood landscape by planting or maintaining trees, shrubs, grass, or other vegetation. Vacant lot greening refers to planting and maintaining vegetation or structures (e.g., gardening beds, fences, or signs) on vacant lots.

Green space is land that is "partly or completely covered with...vegetation" (EPA 2016). While commonly given examples of urban green spaces include parks, gardens, cemeteries and playgrounds, the term may also refer to residential yards and other vegetated areas. Green space can occur on private or public land.

GSI refers to systems that use vegetation, soils, and other natural processes to retain, detain, infiltrate or evapotranspire stormwater at its source rather than removing runoff from the site through a municipal stormwater system (EPA 2016). By this definition, GSI may incorporate aspects of greening or green space, but it has a separate and distinct fundamental purpose: to manage stormwater.

Figure 1: Benefit-cost comparison for GSI
(adapted from Basu et al 2020)



Large-scale adoption of distributed GSI is a practical, logical path forward, but how much benefit could one expect? The short answer is a lot. For example, Prince George's County has taken a green streets approach to achieving the retrofit of 2,000-acres of impervious areas. At the end of the first three-year phase, the county has reduced stormwater runoff from 90 percent of storm events by capturing the first one inch of runoff and achieved pollution reductions of up to 50 percent of nitrogen, 40 percent of phosphorus, and 80 percent of sediment (US EPA, *Prince George's County Maryland clean water partnership*).

Economic benefits of GSI use are also well documented. Depending on the best practices used, GSI can cost less than conventional gray infrastructure, diversify a workforce with green jobs, and reduce municipal water usage and cooling costs. Within the Great Lakes, Milwaukee Metropolitan Sewerage District's 2035 vision plan to build GSI is expected to yield cost savings of over $44 million, to create 500 green jobs, and to increase property values by $667 million (Milwaukee Metropolitan Sewerage District, 2013).

Nationally, while cities have historically relied upon grey infrastructure to manage stormwater, GSI has become popular. The Great Lakes region is no exception. A recent report indicated that the market size for private finance investment in GSI across the Great Lakes is substantial, and the states of Ohio, Wisconsin, Minnesota, Illinois, and Indiana can support more than a billion dollars of GSI (Sinha et al., 2017). Based largely on revenues from stormwater utilities in these states, this estimate excluded New York, Pennsylvania, and Michigan, as these states have no or very few stormwater utilities in place.

This toolkit seeks to provide a summary of traditional funding and financing options, while presenting a set of newer business models that a) seek to aggregate projects to deliver them more cost-effectively, and b) seek to leverage the abundance of private finance. In addition, the toolkit seeks to memorialize the first few transactions that the Great Lakes has already established or seeks to establish in regions centered around Milwaukee, Buffalo, and Cleveland. They include Community-Based Public-Private Partnerships (CBP3s) and Environmental Impact Bonds (EIBs) that can result in aggregation-based cost savings and/or attract private financing for green infrastructure.

3. Deciding on a Funding and/or Financing Strategy for GSI

Borrowing money to build or improve a wastewater treatment plant is a familiar financing challenge for city leaders and finance directors – funding and financing options for GSI may be less so. The reality is that almost all the same tools and borrowing options that exist to fund traditional infrastructure also exist to fund GSI and related watershed approaches. Balancing the costs and benefits of each approach against the needs and priorities of the utility or community can help identify the best options. A creative combination of funding and financing from a variety of sources may offer the best of both worlds, helping to capture the maximum benefits for ratepayers at the lowest cost.

Presented below are eight parameters – and key questions to answer within each – that can help inform the best choice of a strategy to finance GSI:

Informing the best choice of a strategy to finance GSI can be facilitated by reviewing the following eight parameters:

1. *Size and scope of need*
2. *Regulatory environment*
3. *Existing funding capacity*
4. *Available grant opportunities*
5. *Applicability and feasibility of new funding sources*
6. *Availability of implementation partners*
7. *Financing costs and benefits*
8. *Risk management*

1. Size and Scope of Need

Your funding and finance strategy may vary depending on the scope of your undertaking. A small pilot project may be best suited for grant and/or same-year (Pay-Go) revenue streams, while a citywide program likely requires sustainable, multi-year funding. Borrowing is most appropriate where there is a benefit to building more infrastructure quickly to front-load the benefits or with high initial costs and lower annual maintenance and operations costs.

- Can you quantify the expected benefits and associated costs involved in pursuing a GSI solution?
- Do the benefits justify the costs?
- At what scale are you implementing your program? The scale will not only impact funding needs, but may necessitate engagement with multiple stakeholders, regulators, and others.

2. Regulatory Environment

Your current regulatory environment will shape the options available to you. State guidance on water quality trading, offsite offset allowances, National Pollutant Discharge Elimination System permit flexibility, and local procurement policy may limit the funding and financing strategies you can employ. You should engage with your state regulators to explore options.

- What compliance flexibilities are available to you?
- Does your state allow trading?
- Have you established or should/can you establish a stormwater utility?
- Are there restrictions around engaging in a public private partnership?

3. Existing Funding Capacity

Evaluate your existing funding sources to determine if they meet your needs:

- Do you already have existing funding sources supporting GSI?
- Are they successful or not?
- Are there ways to adjust/expand current sources without creating new ones?

- Can you leverage partners to increase investment from existing sources?
- What is the added value of new funding compared to what already exists?

4. Available Grant Opportunities

It is worth exploring available grant opportunities for project design and implementation. In March of 2020, the Environmental Financial Advisory Board (EFAB) Task Force recommended significantly expanding federal grants for stormwater infrastructure (Environmental Financial Advisory Board, 2020). While grants are often critical for early program development, they are not sustainable for long-term program implementation; a long-term revenue strategy should be explored as well.

- What project components are eligible for grant funding? Will the grant cover 100 percent of project costs?
- What planning and predevelopment grants are available to support the development of a GSI program?
- What resources exist for assistance in (1) raising awareness of grant programs, (2) providing matching or cost-share funding, and (3) providing technical assistance for submitting grant applications?

The Great Lakes Restoration Initiative (GLRI) offers grant funding to support stormwater management, including GSI

With support through more than a dozen federal agencies, the GLRI provides millions of grant dollars each year to cities in the region. In 2019, grants included $600,000 to the City of Milwaukee, WI, for a schoolyard stormwater sponges program, $336,500 to the City of Erie, PA, for GSI in downtown Erie and $400,000 to Michigan's Grand Traverse Bay Watershed Initiative for establishing GSI projects in Elk Rapids, MI. (U.S. EPA, 2019, EPA announces finalists for GLRI grants to address nutrients in the Great Lakes)

5. Applicability & Feasibility of New Funding Sources

If you determine your existing revenues are insufficient to meet your needs, you can explore alternative revenue-generating strategies:

- Is the new revenue source legally permissible? Is it likely to be challenged?
- Is it equitable? Is it politically feasible?
- Is it sufficient to meet anticipated costs? How stable is it as a source of revenue?
- How costly is it to administer during the initial set up and for ongoing oversight and maintenance (e.g., what are the data requirements, and how compatible is it with existing data processing systems)?
- How consistent is it with other local funding and rate policies?

6. Availability of Implementation Partners Especially on Private Land

Green stormwater planning and installation – especially if it will be installed on private land – requires a significant amount of relationship-building and planning.

- Identify internal and external resources available to undertake this effort. What internal capacity gaps can be filled by an implementation partner?
- Are there local implementation partners that have experience with municipal programs, public-private finance, and/or collaborative watershed planning and restoration?
- What additional sources of funding or financing can your implementation partner contribute to the effort? Often an implementation partner can leverage contributions with other public and private funding opportunities, thus reducing your cost burden.
- Who can help you support your business case for securing revenue or borrowing to support this work?

7. Financing Costs & Benefits

Accessing debt capital can help scale your program and spread the costs of implementation. Obtaining public financing can lengthen a project's timeline, yet it often offers the best financial terms. Private finance often carries a higher interest rate, but commercial lenders work more quickly.

- Do you have the capacity to take on additional debt?
- How much time do you have to commit to securing financing, reporting, etc.?
- Understand project and borrower eligibilities. Do they align with your program goals?
- Do the benefits of financing outweigh the costs?
- Do cost savings accrue due to aggregation?

8. Risk Management

When exploring different funding and financing approaches, consider how much performance risk you are willing to accept. You can transfer some or all performance risk by working with implementation partners, harnessing pay-for-success contracts or procurement mechanisms or engaging in water quality credit trading.

- What type of procurement mechanism do you want to use to manage performance risk?
- Does your procurement strategy use a pay-for-success model?
- Will risk-sharing help you secure the political support you need to implement your program?

A great example of a municipality that has leveraged a variety of funding sources is the city of Gary, Indiana

Gary, Indiana has been developing a GSI strategy for eight years that has included community and neighborhood outreach, demonstration projects, data analysis and the development of a GSI plan. Their work has been funded by the Great Lakes Protection Fund, U.S. Environmental Protection Agency's (EPA) Great Lakes Restoration Initiative, National Oceanic & Atmospheric Administration (NOAA), U.S. Geological Survey (USGS), and Indiana Department of Natural Resources' Lake Michigan Coastal Program.

Green Stormwater Infrastructure Project

Partners/Project Team – Green Urbanism & Environmental Affairs; Parks Department; Redevelopment Department; GNRI Planning Team; and Cleveland Botanical Gardens.

Cost and Leverage

- Chi-Cal Rivers Fund ($259,263)
- Great Lakes Protection Fund/CBG (Vacant to Vibrant Project in Gary, Cleveland, and Buffalo) ($902,000)
- EPA Great Lakes Shoreline Cities ($250,000)
- Gary Stormwater Management District ($250,000)
- Great Lakes Restoration Initiative ($351,000)
- Redevelopment Department ($6.645 million, Demolition & End Uses)
- Green Link – Phase 2 ($1.3 million)
- Urban Conservation Team (Annual Maintenance/Community Engagement)

Source: Scott Henry, B., 2016

4. Local Funding Strategies

Local Funding Through New or Existing Revenue Sources

Revenue is essential for any funding or financing strategy to support water quality projects. Whether a municipality decides to use Pay-Go or debt financing, revenue will be needed sooner or later. Table 1 below presents a summary of local funding sources.

Table 1: Local funding sources

Recurring, Sustainable Revenue Sources
General Fund Appropriations
General Fund revenues are the most common source of funding for ongoing operations and maintenance of water systems and infrastructure, including municipal stormwater programs. General Fund resources are usually subject to market values of taxable properties and economic conditions for income and general sales-based revenues.
New Taxes
Dedicated levies, based on property or sales taxes, are sometimes used to fund stormwater management programs or source water protection programs. Tax levies may be subject to the same limits on increase as are municipal taxes that support the general fund.
Stormwater Utility Fund/Enterprise Fund
There is a growing trend in the U.S. to establish stormwater utilities, which operate as dedicated enterprise funds. An enterprise fund is simply a government fund that has a dedicated revenue source to provide a service in a self-sustaining way. According to the Western Kentucky University Stormwater Utility Survey 2019, the eight Great Lakes states are home to 588 stormwater utilities; Ontario, Canada, has thirteen.
Special Purpose District
Special assessment or government districts--established by state or local governments or by voters through a ballot process--function as separate governmental entities that manage specific resources (e.g., watersheds, drainage areas, stormwater, etc.) within well-defined geographical areas. These entities are authorized to raise operating funds through taxes, fees, charges, or by issuing new debt (Mathieu, J. 2011). Districts can also establish credit and discount programs.
Intermittent Funding
Source Water or Watershed Protection Fees
Some water and wastewater utilities have created a source water or watershed protection fee or surcharge that is added to their customer's water bills (Earth Economics and U.S. Endowment for Forestry and Communities, 2012). Fees apply based on water usage or at a fixed rate per customer. These fees have historically funded source water protection, but some municipalities recently began using these types of fees to support their stormwater programs.
Permit Review, Development Inspection, and Other Special Fees
Permit review and other service-related fees apportion the costs only among those who require the service or contribute to the need for the regulatory measure (National Association of Flood and Stormwater Management Agencies, 2006).
Innovative Revenue Generating Approaches
The EPA highlights a number of innovative revenue-generating approaches municipalities can employ, such as leasing advertising space on water towers, selling grid service to a local electric utility, selling fertilizer made from sewage sludge, selling water and wastewater line protection, and offering consulting or system management expertise to other utilities (U.S. EPA and the Environmental Counsel of the States, 2017).

Stormwater utilities are one type of recurring, sustainable revenue source used by local governments. As of 2019, the Great Lakes states had 588 stormwater utilities – almost one of every three such utilities in the country are in these states. Minnesota (with 198) has the most and New York has the least (with just 1) (Campbell, 2019). Stormwater utilities charge fees, typically based on property type, area, or area of impervious surface, provide for regulatory compliance (municipal separate storm sewer systems or MS4, combined sewer overflows or CSO, total maximum daily loads or TMDLs, etc.), and operation and maintenance costs. Nationwide, the average monthly single-family residential fee in 2019 was $5.85, with fees ranging from zero up to $45 per month (Campbell, 2019).

Stormwater utility fees (SUFs) are charged to customers as flat fees or variable rates. There are also tiered fees, where all properties are categorized by use or size of the property and charged accordingly. For example, **Ann Arbor, Michigan** charges a quarterly fee—ranging from $31.55 to $165.66—across four tiers (city of Ann Arbor).

Income tax funding in Grand Rapids

In 2014, Grand Rapids, Michigan, initiated their "Vital Streets" program, funded by a 1.5 percent income tax passed by voters. The program prioritizes green infrastructure over grey infrastructure in all cases where it is viable from an engineering perspective. Now Grand Rapids is exploring adding a stormwater credit trading program to incentivize private landowners to make investments in green infrastructure. The city is receiving help from American Rivers via a Great Lakes Protection Fund-funded partnership with Corona Environmental Consulting and Water Environment Federation (Vande Bunte, 2014).

Drainage charge in Detroit

The city of Detroit assesses a Detroit Drainage Charge on all properties based upon multiplying the acreage of hard surface area, such as rooftops and driveways, by an "impervious acre rate" set by the Board of Water Commissioners each year. The 2020 impervious acre rate is $602. For residential properties, the drainage charge is offset by a 25 percent "Green Credit," which assumes that downspouts direct runoff into the lawn or yard, rather than the sewer. Non-residential properties are also eligible for Drainage Charge Credits for BMPs such as bioretention and removal of impervious cover. These fees flow into the City's GSI program (City of Detroit).

SUFs are often paired with credits or discounts that provide incentives to promote private stormwater management. Customers can receive discounts or credits through installation of BMPs that reduce stormwater runoff or improve water quality (U.S. EPA, 2014),[1] through providing education or taking on maintenance responsibility,[2] or purchasing stormwater credits through local stormwater credit trading markets.[3]

[1] The city of Minneapolis, MN offers up to 50 percent credit to customers that implement on-site stormwater management that improve water quality and 50 percent or 100 percent credit for practices that address stormwater quantity.
[2] The City of Urbana, IL offers credits to institutions that provide approved stormwater educational program for students ($5 credit per student—maximum 50 percent discount)
[3] Washington DC Stormwater Retention Trading Program: *https://doee.dc.gov/src*

5. Traditional Public Bonds and Loans

Municipalities have historically relied on a variety of bond and other borrowing to fund water programs. Taking on debt makes sense where the benefits of today's investment will also benefit future ratepayers and taxpayers. Borrowing is an attractive way to fund more work faster than can be financed through Pay-Go approaches alone. This is especially important for cases in which larger investments have direct and indirect benefits in reducing future costs. For example, using borrowing to pay for $10 million in stormwater and flood-reducing watershed projects in the short-term will reduce flooding risks throughout the next 50 years, whereas spending only $1 million per year is unlikely to lower flooding risks by much, missing perhaps a decade of benefits by funding work slowly. Table 2 presents a summary of traditional public financing pathways for infrastructure projects.

In 2000, Ohio EPA launched the Water Resource Restoration Sponsor Program (WRRSP)

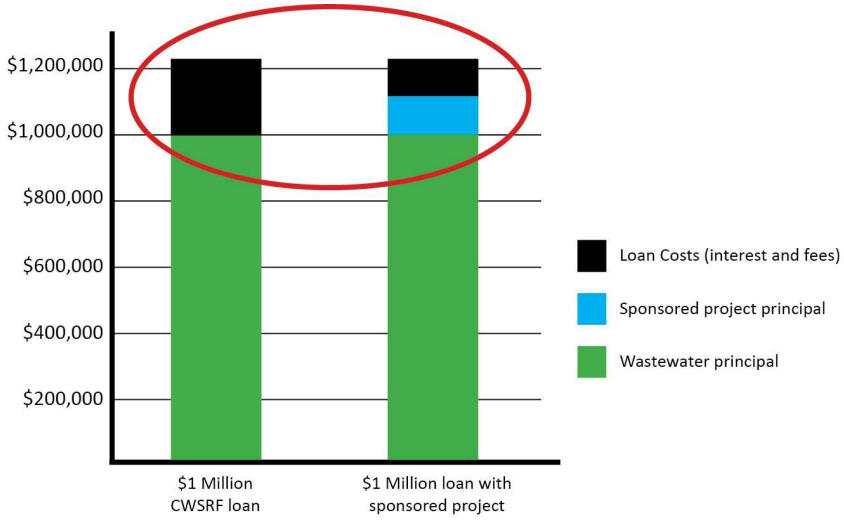
WRRSP is the nation's first sponsorship lending program for nonpoint source projects in the U.S. under which municipalities work with project implementation partners who complete wetland and stream restoration and protection of key water resources, and as the sponsor, the municipality borrows and repays the loan. (U.S. EPA, 2017, Financing Options for Nontraditional Eligibilities)

Governmental Accounting Standards Board (GASB) 62

In 2018, the GASB clarified that green and distributed infrastructure can be bond-financed using the Regulated Operations approach in GASB 62. This allows municipalities to treat natural infrastructure the same way as steel and concrete: as a capital asset. Many finance directors and CFOs remain unaware of this guidance, but despite that, stormwater projects on public or private land, including green infrastructure designs, could be financed with municipal bonds.

Learn more here: *Go Green: Muni Bond Financing for Consumer Rebates and Other Distributed Water Investments* by Earth Economics and WaterNow Alliance

The Environmental Finance Advisory Board's 2020 report *Evaluating Stormwater Infrastructure Funding and Financing* references an example of flexible use of the Clean Water State Revolving Funds (CWSRF) to fund GSI like bioswales, rain gardens, and permeable paving. Under Iowa's Water Resource Restoration Sponsored Projects program, a municipality or utility can retain one percent of the loan interest that would normally be paid to the CWSRF program, and redirect those dollars to fund nonpoint source projects, including GSI. This interest redirect means ratepayers pay no more than they otherwise would, but they see investment in both wastewater infrastructure and GSI.



Source: Environmental Finance Advisory Board, 2020

Table 2: Traditional Public Bonds and Loans

Bonds
Municipal Bonds[4]
A municipal bond is a debt obligation issued by a municipality, county, or state to finance its capital expenditures. Municipal bonds are basically loans made by investors to local governments for a defined period at a variable or fixed interest rate. The interest paid on municipal bonds is tax-exempt, making them an attractive, predictable, and low-risk source of low returns on investment.
Loans
Clean Water State Revolving Fund
The Clean Water State Revolving Fund (CWSRF) is the largest federal/state source of low-cost financing dedicated to a wide range of wastewater infrastructure projects. SRF programs are administered by states using federal grant money, matching state funds, and loan repayments that 'revolve' back into the state-held account to fund new projects. Like the DWSRF, congress appropriates funding into the programs, which is passed along to state revolving fund accounts, by a formula, matched with state funding, and then provided to jurisdictions in the form of loans. The CWSRF was established to fund water quality improvement projects and has traditionally been used to fund the construction of publicly owned wastewater treatment facilities. Many state funds have provided an even lower interest rate, and in some cases forgivable loans, for projects involving green infrastructure (U.S. EPA, *Sponsorship Lending and the Clean Water State Revolving Fund)*.
Drinking Water State Revolving Fund
The Drinking Water State Revolving Fund (DWSRF) is the second largest federal/state source of low-cost financing dedicated to a wide range of drinking water infrastructure projects and source water protection (that can include GSI as well). Congress appropriates funding into the programs, which is passed along to state revolving fund accounts, by a formula, matched with state funding, and then provided to jurisdictions in the form of loans. Financial assistance is available for project planning and construction, including source water protection, nonpoint source pollution prevention, and watershed remediation.
Water Infrastructure Finance Innovation Act (WIFIA)
WIFIA is a federal loan program established by Congress in 2014 and administered by the EPA. It is designed to issue long-term, low-interest loans or loan guarantees to a wide variety of water infrastructure projects. Eligible borrowers under WIFIA can include: the state revolving funds themselves, corporations, partnerships, joint ventures, trusts, and other government agencies. Generally, applicants must have better credit-worthiness for WIFIA loans compared to SRF programs. Projects must generally be at least $20 million to be eligible, but communities with fewer than 25,000 inhabitants can use the program for smaller projects (i.e., $5 million).
USDA Rural Development Water and Waste Disposal Loan & Grant Program
The Rural Development Water and Waste Disposal Loan and Grant program finances drinking water, stormwater drainage, and wastewater systems for rural communities with 10,000 or fewer residents (U.S. Dept of Agriculture). USDA adjusts interest rates depending on a community's financial hardship. For example, USDA reported rates between 2.5 percent and 4.25 percent in early 2019 (U.S. EPA and U.S. Dept of Agriculture, 2019). The program is administered by state USDA offices and applications are accepted year-round.

[4] The two most common bonds used by municipalities are general obligation bonds and revenue bonds. General obligation bonds are backed by the "full faith and credit" of the issuing agency. All revenues and resources of the entity, including various taxes, may be used to repay a general obligation debt. In contrast, revenue bonds are supported only by specified revenues. For example, creation of a separate fee or tax that is earmarked specifically for stormwater would allow a jurisdiction to sell revenue bonds and investors would only look at the ability of the dedicated revenue (e.g. a stormwater fee) to pay back the bond before investing.

6. Private Financing & Procurement Strategies

Government borrowing is a great source of low-cost capital; however, it currently cannot meet existing demand in the water sector (U.S. EPA Office of Water Office of Ground Water and Drinking Water, 2015). Private financing is often viewed as a viable alternative to fill this funding gap. Private finance can come from many sources, can drive innovation, and can help reduce performance risks (i.e., risks associated with whether water projects will or won't work in producing their intended outcomes).

One source of private capital that can be sought by the water sector is called "impact investment capital" (Schultz, 2019). Impact investors seek to provide capital to projects that will produce a measurable social or environmental impact that investors value, alongside a financial return. Institutional investors (e.g. Goldman Sachs), corporations, and philanthropists are examples of impact investors. Roughly $500 billion of impact capital has already been invested in projects around the globe. Unlike traditional private financing, impact investment rate terms range from below market-rate to market-rate, depending on the investing organization's strategic goals and the project's risk.

The focus on environmental impact and outcomes in private financing is also reflected in emerging procurement (municipal contracting or grants) models. Traditional procurement mechanisms familiar to municipal leaders reimburse for actions completed. For example, a city hires engineering and design contractors to plan a stormwater project's design and then hires a construction firm, supervised by a city or utility engineer, to build the stormwater project. The contractors are paid as they invoice for labor and materials on a monthly basis, and then they are paid when the construction is certified as complete.

New procurement models are embracing the concept of "pay-for-performance" or "pay-for-success," where reimbursement is based on measurable outcomes. For example, a Request for Proposals structured as pay-for-success procurement might pay based on gallons of stormwater captured by a project and the city would not make any payments until that outcome is measured. Alternatively, a contract might make payments only for fully completed projects that meet preset design characteristics, with the municipality effectively buying finished products much the way they purchase computers or vehicles.

We combine this discussion of private financing options with procurement approaches because there is an inherent synergy between the two. For example, private finance may be less expensive than bond funding because a procurement structure allows partners to find cost-effective techniques due to aggregation of projects or locations for projects that have lower real estate costs or restoration costs. If partners can save money on delivery costs compared to what a utility would have spent to plan and build the same project, they may effectively be offering a discount on the total budget for the project.

Note that more complex financing mechanisms may inherently have higher transactional costs associated with structuring deals that have a measurable impact on the return on investment or government costs, especially when several entities are involved. These high transactional costs could create natural barriers to smaller projects being funded. New governance structures are needed to aggregate systems and provide the rate base for large scale, private finance to become viable. However, if a complex funding mechanism is combined with a different procurement approach, the cost savings

from procurement improvements like Public-Private Partnerships (P3s) or Pay for Success can fully offset those additional structuring costs such that local government still sees a net cost savings.

Table 3: Private Financing & Procurement Strategies

CBP3s
CBP3s are enhanced P3s that focus on creating measurable local community benefits through payments for performance to reach benchmarks like local job creation, community outreach, and educational advancement for underserved communities
EIBs
Cities may choose to raise funds from private investors who receive repayment from the city upon successful achievement of outcomes delivered by a project partner and measured by a third-party verifier.
Pay-for-Success
In Pay-for-Success models, investors provide the upfront capital necessary to implement projects, and repayment levels are contingent upon actual project outcomes measured against clear goals.
Stormwater Credit Trading
Similar to nutrient credit trading systems, stormwater credit trading uses an open market in which developers are able to purchase off-site stormwater mitigation credits to achieve a high level of stormwater mitigation at the lowest cost possible.

Community-based Public Private Partnerships (CBP3s)

P3s are "performance-based" contracts that allocate risks more equally between contractors and municipalities and link public payments to contractual performance criteria set forth in the partnership documents and contracts (American Water Works Association and EY, 2019). Under a P3, presented in Table 4, a partner typically leads all phases of project development, from design through construction (often including long-term maintenance or operations).

Table 4: Types of Functions that Many P3s Execute (Adapted from *Public-private partnerships: reference guide version 2.0,* 2014)

Functions	Description
Design	Developing construction-ready design specifications using the project's initial concept and output requirements
Build	Constructing the designed specifications and installing equipment
Finance	Funding all or part of the project's capital expenditures
Operate	Operating the asset to continue providing services to either a government off-taker, direct users, or simply by providing technical support
Maintain	Maintaining the infrastructure asset up to a certain standard over the life of a contract
Transfer	Transferal of asset ownership from the private entity to the public agency after completion

A new P3 model known as CBP3 has emerged in the stormwater sector. This model incorporates more contract features aimed at building long-term trust and confidence between partners (Figure 2) (U.S. EPA, 2015). CBP3s also focus on creating measurable local community benefits through including metrics like local job creation, community outreach, and educational advancement for underserved communities (Ajami et al, 2018). The degree of performance risk can vary depending on the type of functions that a partnership is engaged in (see Figure 3).

Figure 2: Legal framework structure of a CBP3 partnership

Figure 3: Allocation of P3 Performance Risk

Source: American Water Works Association and EY, (2019). *To P3 or not to P3 A water industry view on the relevance of public-private partnership delivery models*

A municipality can fund or finance a P3 itself or require the private partner to provide financing. When the private partner is self-financed, it can drive better performance and innovation, and benefit both parties (U.S. EPA Water Infrastructure and Resiliency Finance Center, 2017). P3 contracts that are self-financed are often structured with public payments that reward subsequent performance, and these performance-based financial incentives can drive efficiency.

Milwaukee Metropolitan Sewerage District (MMSD) Leads Great Lakes Region's First Ever CBP3

MMSD reduced its sewer overflows from 50-60 per year in the early 1990s to just 2.3 in 2020 and established ambitious goals for the future that include zero overflows by 2035. In that same timeframe, it also aims to capture the first half-inch of rainfall on all impervious surfaces, the equivalent of 740 million gallons of stormwater. To meet its goals, MMSD needed to deploy a new framework to incentivize the implementation of GSI in its service area. Accordingly, in January 2020, the MMSD signed a long-term Fresh Coast Protection Partnership with Corvias, a private partner with a national portfolio of public infrastructure partnerships.

The Partnership's foundational goals include:

- *Help the District to achieve compliance with the GSI requirements in the District's current Wisconsin Pollutant Discharge Elimination System permit*
- *Help the District's participating municipalities meet current and future Municipal Separate Storm Sewer System permit requirements*
- *Minimize the cost per gallon of GSI storage*
- *Achieve a minimum of 20 million gallons of capture capacity in GSI*
- *Attain a minimum of 25percent participation goal for certified Small, Veteran, Women, and Minority Business Enterprises*
- *Partner with local workforce development programs*
- *Include mentorship of emerging businesses*
- *Identify non-traditional funding sources that could be considered or leveraged*
- *Develop a stakeholder and community engagement program*
- *Accelerate achievement of District goals by implementing GSI at scale*

Currently in its first year, MMSD staff are directly involved in oversight of the planning and design of all projects. Site analyses are being conducted using qualitative and quantitative Geographic Information Systems (GIS) analyses to determine and prioritize the most effective and efficient areas for GSI implementation within MMSD's service area. Additionally, minimum design standards are being developed to ensure performance.

The Partnership is also identifying viable locations and developing design standards, real estate processes, a socioeconomic plan, maintenance plan, and internal review processes. The partnership is testing these processes by designing the first one million gallons of capture and bringing them to construction in a "pay-for-performance" manner, which will allow MMSD to evaluate this approach with minimum risk and expense. For its part of the partnership, Corvias is providing its own at-risk private investment for the planning, design, procurement, construction, community engagement, subcontractor development, certification, and a two-year warranty/maintenance, all at a cost/gallon below the traditional approach.

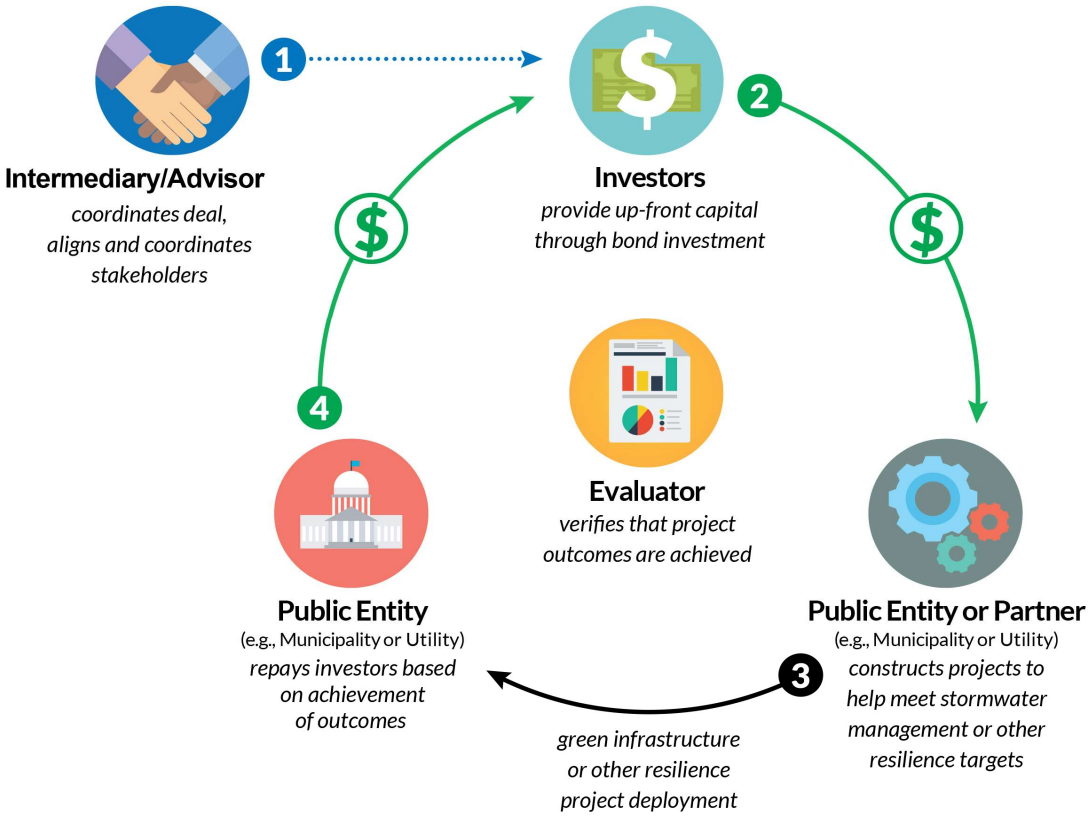
This is an impressive first-step by MMSD for many reasons. It establishes the first ever CBP3 model in the entire Great Lakes region. Their model provides an improvement in risk sharing with a private partner, delivery and cost surety for installation and maintenance of GSI; maximizes pricing efficiencies by combining economies of scale and increasing competition in the contractor marketplace; and ensures quality-certified projects by a contracted third-party. Finally, the model provides more attractive alternative financing structures and capital sources for investors looking for greater surety and predictability of their investment.

Pay-for-Success Contracts/Environmental Impact Bonds (EIBs)
Pay-for-Success contracts or EIBs are becoming a popular finance and/or procurement mechanism for those seeking more accountability and experimentation. Pay-for-Success models encourage risk-taking by the investors (rather than the government) as they provide the capital necessary to implement projects, and repayment levels are contingent upon actual project outcomes.

For Pay-for-Success models to be successful, municipalities need to set clear performance goals. Pay-for-Success models typically include an independent third-party evaluator that monitors performance against agreed-upon benchmarks. Environmental Incentives has developed a toolkit for municipalities pursuing this type of procurement model.

A municipality can decide to use Pay-for-Success to access private capital and implement the project itself (with a third party evaluator), or, it can contract with a company or service provider to implement the project as shown in Figure 4.

Figure 4: Overview of an EIB Transaction Structure (Reproduced from Sinha et al., 2018)



Buffalo Sewer Authority Plans for Great Lakes Region's First Ever and Nation's Largest EIB

In late 2020, the Buffalo Sewer Authority (BSA) plans to issue a $30 Million EIB to incentivize the installation of green infrastructure on private property throughout the city of Buffalo in New York. A special kind of municipal bond, an EIB focuses on the delivery of successful environmental outcomes and can include features that link effective investor returns to the achievement, or non-achievement, of those outcomes.

In Buffalo, proceeds from the EIB will fund the Rain Check 2.0 Grant Program – one component of their broader efforts to hold and control the flow of excess stormwater on-site, thus mitigating the negative impacts of combined sewer overflows and other stormwater-related challenges in the city. The grant program will incentivize green infrastructure on private property, with higher reimbursement rates for vegetated practices like rain gardens and tree plantings than non-vegetated practices. This approach aligns with BSA's desire to enable some of the economic, environmental, and health co-benefits associated with vegetated stormwater management practices.

BSA is working with a partner, Washington D.C.-based Quantified Ventures (working with Detroit-based Environmental Consulting & Technology, Inc.), to explore custom EIB structures that fit this unique program. Quantified Ventures has successfully structured EIBs in other cities, including Washington, D.C., and Atlanta, Georgia, but BSA's EIB will be its first application in the Great Lakes region. It will build on these previous examples, while tailoring the structure and outcomes metrics to the Buffalo context, ultimately benefiting the people, ecosystems, and water resources of the city.

In Buffalo, the team is considering how different tiers of performance may be set, and how different structures could incentivize exceeding the Authority's program goals. BSA has decided that it would issue a two-tiered EIB containing a positive incentive clause in the form of a coupon step-down after the evaluation year for the remainder of the tenor.

Overall, benefits of BSA's EIB include:

- *GSI installation program on private land*
- *Approximate savings of about $148,500 per acre stemming from the cost difference of implementing projects on private property as opposed to comparable costs for public projects in the right-of-way*
- *Savings from construction as well as avoided operations and maintenance costs due to aggregation of multiple projects*
- *Water and air quality benefits (for example, the vegetation in rain gardens managing one acre of impervious surface will sequester almost 12 tons of carbon per year) in addition to potential urban heat island mitigation benefits, depending on whether vegetated practices are centralized enough to make an impact.*
- *An ability to tie payments on financing to the actual achievement of these outcomes and cost savings, offering an efficient way to align incentives for the success of the grant program and contend with the uncertainty of demand from prospective grantee properties*

There are many similarities between MMSD 's CBP3 and BSA's EIB. These include improvement in risk sharing with a private partner, delivery and cost surety for installation and maintenance of GSI, including incentives only if performance goals are met, maximizing pricing efficiencies by combining economies of scale, and increasing competition in the contractor marketplace, as well as ensuring quality-certified projects by a contracted third-party. Overall, BSA's EIB will be designed to provide benefits to the city—by incentivizing overperformance of its grant program with a lower coupon rate-- and is a great model for future, similar initiatives across the Great Lakes region.

Stormwater Credit Trading

Credit trading 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 Chesapeake Bay watershed. This mechanism uses an open market in which developers can purchase off-site stormwater mitigation credits to achieve a high level of stormwater mitigation at the lowest cost possible.

As described above, implementation of a stormwater management ordinance with 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 also 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 be subject to stormwater retention requirements.

Metropolitan Water Reclamation District (MWRD) of Greater Chicago Attempts Great Lakes Region's First Ever Stormwater Credit Trading Pilot Project

In May 2019, and again in May 2020, the Board of Commissioners of the MWRD voted unanimously to update its Watershed Management Ordinance to establish a pilot project for stormwater trading. The Ordinance establishes flow rates for allowable runoff from newly developed property. The purpose of this regulatory structure is to minimize flooding. Under Ordinance Section 208, MWRD's Stormwater Committee directed the pilot project to demonstrate how a stormwater trading system could work, including the impacts of trading and flow rates on disproportionately impacted areas, the impact of climate change on flow rates, and the impact of flow rates on water quality. This new pilot program will run for five years.

7. Conclusion

Great Lakes municipalities suffer from years of infrastructure neglect and there is no guarantee they will have the financial resources to invest in green infrastructure. City funds for infrastructure investment are tight and billing increases can create affordability challenges, especially for low- and moderate-income households. However, with increasing pressure to comply with strict water quality benchmarks, and to protect the Great Lakes from the negative effects of polluted runoff, cities must adapt quickly, and GSI is a cost-effective and visually appealing solution.

The good news is that the current regulatory and financial landscape has evolved to enable more public and private funding alternatives for GSI implementation. With the expansion of grant opportunities, along with new sources of private capital, the time is ripe for municipalities to pursue solutions that address flooding and regulate water quality from runoff. While federal and state grant programs may be effective in supporting planning and development, pilot projects and outreach, they often are not sufficient to achieve full infrastructure projects and the ongoing management of green infrastructure. Municipalities pursuing GSI will need to develop sustainable funding and financing strategies to maintain program capacity and support ongoing outreach, management, and oversight.

The options highlighted in this report are not mutually exclusive; a municipality should consider which combination of funding and financing approaches can best support its stormwater objectives at the lowest cost for its customers.

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Supported by: Great Lakes Protection Fund

Project partners: ECT Environmental Consulting & Technology, Inc. · delta institute · CNT · HIP INVESTOR Human Impact + Profit · CDP DISCLOSURE INSIGHT ACTION · American Society of Adaptation Professionals