

SUSTAINABLY MANAGING STORMWATER IN GRAND RAPIDS

A Report of the Grand Rapids Community Based
Stormwater Planning Initiative

August 2012



West Michigan Environmental Action Council

West Michigan Environmental Action Council (WMEAC) is a non-profit, 501C3 organization working to protect and enhance West Michigan's natural and human environments by translating the concerns of people into positive action. WMEAC has been delivering environmental education and advocacy to the West Michigan community for nearly 40 years. Since 1968, WMEAC has served as West Michigan's leading voice for environmental protection. WMEAC is committed to empowering West Michigan's citizens, businesses, institutions and organizations with the tools they need to become better stewards of our environment.

Key Focus Areas are

- Building environmentally sustainable communities
- Protecting water resources

Leading environmental protection in West Michigan by inspiring action.



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Executive Summary

Stormwater Runoff Management is Now The Front Line of Water Pollution Prevention in West Michigan

The City has spent hundreds of millions of dollars separating sanitary and stormwater systems - all but eliminating sewage overflows into the Grand River. This is a success story and has improved the water quality of the Grand River and Lake Michigan. However, much more work remains. The Grand River and Plaster Creek are listed as impaired waterways under the Clean Water Act. Plaster Creek is contaminated to the point that human body contact restrictions have been put in place. Grand Rapids can continue the positive momentum generated by the Combined Sewer Overflow (CSO) separation and protect that large investment in the infrastructure by turning our attention to the stormwater system. Despite the significant work separating and updating the storm and sewer systems, 93% of stormwater pipes pre-date the CSO separation and 164 miles of those pipes are more than 50 years old. (52.8 new stormwater pipe miles have been installed since 1981, out of 730 miles total.)

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A Decade of Stagnant City Revenues

Due to the prolonged economic downturn, declining State revenue, and myriad other factors the funding to adequately maintain stormwater management in Grand Rapids does not exist. We simply do not have the manpower to maintain the infrastructure and respond to problems on a complaint/crisis basis. There is no capital asset management plan to prioritize infrastructure maintenance and replacement, and there is no available funding to replace and upgrade the infrastructure to equal the rate at which it is declining.

Stricter Regulations Compel Action

The City of Grand Rapids has been working towards improving stormwater management and finding a sustainable funding source for two decades; the issue will not go away. Even if we choose to temporarily defer taking action, the state and federal government eventually will compel it, giving us less time and flexibility in finding innovative and smart solutions. In the latest round of stormwater activity, public education and stakeholder outreach have been central in finding and refining potential sustainable community solutions. Inherent in the nature of non-point source pollution, such as urban stormwater runoff, is the idea that the entire community contributes to this growing problem. Likewise, to find an effective and equitable solution, the involvement and support of our community is necessary.

Executive Summary

Stormwater Management is an Economic Development Opportunity

Stormwater management best practices include green infrastructure tools designed to mimic pre-development natural systems. Trees, rain gardens, green roofs, and porous pavement are just a few examples. Investments in green spaces and infrastructure will add vitality and beauty to urban and suburban spaces while making downtowns and business districts more attractive.

The economic benefit of these tools becomes direct when a new stormwater system or improvement is being installed. In a December 2007 EPA Report, early adopters have shown many green stormwater features to generally be cheaper to build and maintain than corresponding “grey” infrastructure - costs can be reduced through site grading and preparation, paving, landscaping, and altogether avoiding the need for new grey infrastructure.

Recommendations

1. The City of Grand Rapids needs to improve management of its stormwater assets; accomplishing this will require increased resources and investment.
2. The City of Grand Rapids should establish an asset management plan for the stormwater system complete with a list of projects needed to maintain a well-functioning system – project details should include typical planning features such as timeline, cost/benefit, and operational savings.
3. Stormwater Stakeholder group participants support a funding mechanism that equitably and sustainably funds stormwater services. There is strong interest in a system that provides incentives for property owners to install green infrastructure and manage stormwater on-site while creating opportunities to mitigate stormwater costs and/or fees. Future work is required to determine the actual outcomes to be achieved.
4. A Stormwater Exploratory Group should be established and appointed by the City Commission to make recommendations on still outstanding decisions.
5. Community stormwater education should continue. Stakeholders provided mixed reviews on the level of public knowledge of stormwater issues.

Introduction

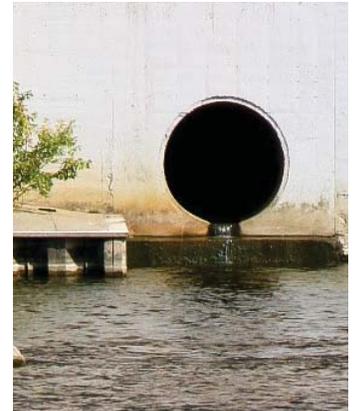
Stormwater management is a critical service provided by municipal governments. Stormwater must be managed to sustain public health and safety, to protect property and infrastructure, and to maintain water quality. The City of Grand Rapids is required to manage stormwater by participating in the U.S. Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES) Stormwater Program.

Available funding for municipal services has stagnated over the last decade, while the prolonged economic downturn caused a real decline in taxable income and property values; stormwater services have strongly felt this pressure. Funding has not kept pace with maintenance, operations, or capital needs, leaving Grand Rapids stormwater management in a reactionary posture, addressing most needs on a complaint/crisis basis. Continuing this approach will further degrade Grand Rapids' stormwater infrastructure and will greatly increase maintenance and capital costs in the long run, thus putting citizens at higher risk of unmanaged flooding, infrastructure failure and public health impacts and even more expensive solutions. Additionally, the state and federal governments are poised to issue new stormwater regulations that will compel Grand Rapids to take action. Unfortunately, these new regulations will not be accompanied by sufficient resources to achieve compliance. The state and federal governments continue to under-invest in critical municipal infrastructure.

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Also, climate change is anticipated to have a serious impact on stormwater management in the Midwest. According to the U.S. Global Change Research Program, a research collaboration including 13 U.S. federal agencies, "increasing precipitation in winter and spring and heavy downpours is expected to lead to more frequent flooding, increasing infrastructure damage, and impacts on human health. Heavy downpours have the potential to overload drainage systems and water treatment facilities, increasing the risk of waterborne diseases." Decreased groundwater recharge and the degradation of wetlands' flood-absorbing capacity are two additional impacts of climate change on the water cycle and stormwater in Michigan.

In response to these issues, Grand Rapids is working with stakeholders, experts, and the community to try to design a system that will sustain these services into the future. These sustainable stormwater services represent a dynamic opportunity to support the city's continuing efforts to transform and balance the city budget.



Introduction

Controlling stormwater and protecting water quality benefits the environment and improves quality of life. Maintaining high water quality is a basic requirement for successful recreation programs and is also a major contributor to public health and safety. Additionally, stormwater management is vital to long-term economic growth and stability in Grand Rapids as it protects infrastructure, private and public property, and contributes to the attraction and retention of talent and capital.

It is difficult to quantify the value of the Grand River and the Great Lakes to our city and region. By any measure, they are vital to our community. Grand Rapids has historically been defined by the Grand River. It was what initially attracted settlers to the region and was the force behind our first century of industrial investment. Today it remains the most photographed feature in our community and a critical part of our downtown revitalization. Recent landmark investments such as DeVos Place, Bridgewater Place and the J.W. Marriott Hotel all integrate the river. In fact, there are significant efforts underway to rehabilitate and improve the Grand River for purposes of increased recreation and tourism. Adequate stormwater management is necessary to these investments.

Likewise, the Lakeshore defines our region as whole. West Michigan's economy needs a clean and accessible Lake Michigan to ensure consistent tourism revenue. Lake Michigan is also the largest source of drinking water in Grand Rapids. On a larger scale, the Great Lakes account for some 20% of all the fresh surface water on the planet. We have a special responsibility to steward that enormous resource for future generations.



Introduction

This is not the first time a comprehensive solution to stormwater management has been discussed. In 1993 a stormwater utility was proposed and heavily promoted by Mayor John Logie in response to federal regulations that required cities of at least 100,000 residents to adopt plans to monitor and reduce stormwater pollution. The city was required to make the minimum changes to its stormwater system or face a \$25,000 fee for every day it failed to comply. The federally mandated cleanup of polluted stormwater cost \$3.5 million, and another \$37 million was proposed for additional upgrades to the city stormwater management system. These additional costs would cover repairs on the Silver Creek drain, Grand River flood walls, and the Plaster Creek drain. The City Commission approved the utility in a 4-3 vote. It was overturned via referendum later that year.

Combined Sewer Overflow

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For decades, Combined Sewer Overflow (CSO) discharges were a common occurrence in Grand Rapids. Many local residents were raised to expect sewage overflows during any significant rain event and historically have linked this to negative perceptions of water quality in the Grand River. But in truth, overflow events are remarkably rare in Grand Rapids today, with discharges now a fraction of previous local highs and the current levels in certain comparable Michigan municipalities.

In 1988, the city began working with state regulators on a voluntary program to eliminate Combined Sewer Overflow discharges. The elimination of CSO discharges has now become a point of pride for city leaders in sustainability discussions: Some 99.98% of the discharge has been removed at a cost of over \$250 million. There are only five of an original 59 potential overflow locations still remaining in the city, with all of those scheduled for completion by the middle of this decade, well ahead of the city's 30-year separation plan. In fact, the most significant overflow source remaining and largest obstacle to complete separation, the Market Avenue Retention Basin, actually produces "partially-treated" water that is comparable in quality to water discharged from the city's waste water treatment plant.

Introduction

Best Practice Stormwater Management Sustains the Triple Bottom Line

Quality of Life (people)

- Attractive, green public spaces and infrastructure
- Enhanced recreation
- Public health & safety maintained
- More trees and cleaner streets

Economic (profits)

- Infrastructure investments protected; reduced maintenance & replacement costs
- Private and public property is protected from flooding and stormwater nuisance
- Local job growth
- Talent retention and attraction

Environmental (planet)

- Improved water quality
- Ecological habitats restored and preserved
- Stream stability
- Biodiversity



Stormwater and Water Quality Impairments in Grand Rapids

Stormwater runoff is the leading source of water pollution in West Michigan. In Grand Rapids, it takes roughly 15 to 30 minutes for stormwater to drain from urbanized areas into the Grand River. During a major rain event, the impervious surfaces of urban centers send stormwater into surface water bodies at an unnatural rate and volume. This runoff alters a stream's hydraulics, changing its shape, size and temperature. The runoff also brings with it the many contaminants and pollutants that reside on roads, parking lots, industrial sites, roofs and even the dense, impervious soil of our lawns and athletic fields. These pollutants include, but are not limited to oils, heavy metals, salts, fertilizers, pesticides, plastics, pathogens and suspended particulates.

Though not the sole contributor, urban stormwater runoff has significantly impacted our major waterways. Within Grand Rapids city limits, both the Grand River and Plaster Creek have been identified as impaired waters under section 309(d) of the Clean Water Act. The Michigan Department of Natural Resources (DNR) recommends that women and children refrain from eating most species of fish more than once per month from the Grand River. E. coli levels have been found in such high concentrations in Plaster Creek that the waters have been deemed unsafe for total or partial human contact, and for aquatic life.

In general, Grand Rapids has made significant progress regarding its water quality, but serious issues remain. These issues include E. coli and bio-accumulates such as mercury, PCBs, and deleterious processes such as sedimentation and siltation. These pollutants continue to restrict the health, quantity, and diversity of aquatic life and the uses of these water bodies by the community for such basic activities as wading, swimming, and the consumption of fish.



New Regulatory Compliance Requires Increased Stormwater Funds

Municipal Separate Storm Sewer Systems (MS4s) servicing a population greater than 100,000 (Ann Arbor, Flint, Grand Rapids, etc.) are required to obtain a permit from the Michigan Department of Environmental Quality (DEQ) in order to discharge stormwater.



The originally proposed 2008 State of Michigan MS4 stormwater permit was withdrawn due to litigation from many Michigan municipalities, leaving Grand Rapids and other MS4 communities to continue operating under the 2003 permit. Litigation remains unresolved, but the State has been working with stakeholders on a new permit. Considerable progress has been made on sections of the permit, including community stormwater education, but work still needs to be done on other major issues including: effluent limitations and monitoring requirements, program assessments and reporting, construction and post-construction stormwater control, and pollution prevention for municipal operations. The new permit will be issued in 2012 and is due in 2013 for several Michigan watersheds, but the LGROW watershed - which includes the City of Grand Rapids - will not be due until 2016.

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New EPA Rules - The latest federal stormwater draft rules are scheduled for release in 2012. The rules have been delayed before and there is no guarantee this will not happen again. However, we can count on the rules being issued in the near term and they will come with stricter standards and greater compliance costs.

Declining Revenue Streams

A Decade of Stagnant Revenues

Over the last decade income and property tax revenues have been negatively impacted by the struggling economy (together these represent 33% of total city revenues). General Operating Fund Income Tax Revenues reached \$46.7 million in 1997 and increased to just \$52.6 million in 2010. Although this nominal increase appears substantial, it is actually a significant cut in real dollars when adjusted for inflation.

Grand Rapids residents approved a five-year temporary tax increase to support public safety services and transformational activities – including the identification of a long-term solution for stormwater management funding. This temporary tax increase enabled the city to raise \$63.8 million for the General Operating Fund in 2011; however, this tax will expire at the end of FY 2015.

A large portion of stormwater investment comes out of the City's general operating fund. This important fund receives the majority of its revenues from income and property taxes: \$70.7 million or 61% in FY 2013 . Any impact to this fund affects the ability of the city to fund stormwater management.

Large Cuts to State Funding

The state has steadily reduced shared revenue payments to city governments over the previous decade. For budgeting purposes, the City has eliminated state shared revenue from the General Operating Fund budget. As part of the new competitive program, Grand Rapids will receive \$4.5 million in Economic Vitality Incentive Program payments from the state that will be deposited into the Transformation Fund, this compared to \$14 million in state shared revenues received in 2002.



Examples of Declining City Revenues Impacting Stormwater Funding Sources

Major and Local Street Funds



Gas and Weight Taxes are excise taxes based on the number of gallons sold. Michigan residents are buying less gasoline due to increases in fuel costs and the availability of more fuel efficient vehicles. These tax revenues are now insufficient to adequately fund and maintain major and local streets. The General Operating Fund can no longer supplement the Streets Capital Fund. The Fiscal Year 2011 Fiscal Plan allocated \$3,769,000 of General Operating Fund revenues to Streets Capital and no money for the Major Streets Fund debt service obligations. This is the minimum amount necessary to match available grants. Fiscal Year 2012 was capped at \$3 million. **No General Operating Fund money is available for years after FY 2012.**

Stormwater Infrastructure (Capital Reserve Fund)

The City maintains a Capital Reserve Fund for the purpose of establishing a financing mechanism to support the General Capital Improvement Programs of the City, including stormwater and storm sewer infrastructure. The City annually deposits revenues of 1.25 mills of the General Operating millage levy and 4% of the City income tax revenues into that fund. The capital requirements have exceeded the funding sources for several years. In response, the City has issued bonds to fund the most urgent capital requirements. In FY2012, debt service associated with debt issued to fund capital projects in prior years will consume \$5.8 million. Debt service is prioritized and takes precedence over new programs and services.

Bottom Line: There is not enough money or manpower to maintain the stormwater management status quo in Grand Rapids, and the financial situation becomes worse when projected forward.

Stormwater Funding Needs

CDM Smith, an environmental engineering firm, was hired to produce an independent assessment of Grand Rapids' stormwater funding requirements. CDM Smith assessed the City's stormwater infrastructure and utilized basic engineering and management principles to establish funding need estimates at four different "levels of service." The level of service scale utilized for our assessment ranged from "status-quo" to "A." This scale is a tool to discuss in simple terms what is really a continuum of possible stormwater services.

A more detailed table outlining the funding need is found in the Appendix.

CDM Smith found that roughly \$2 dollars per month for a property with an average area of impervious surface (2,400 sq. ft) would allow Grand Rapids to maintain the status quo and prevent a further degradation of service. Slightly more than \$8 per month for a property with average impervious surface area would enable Grand Rapids to purchase an ideal stormwater management system, ultimately improving water quality and preventing expensive infrastructure failures into the future.

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Total Annual Stormwater Funding Need:

Level of stormwater service	Maintain Status Quo	Grade C Services	Grade B Services	Grade A "Ideal" Services
Total Need	\$3.6 Million	\$6.6 Million	\$9.1 Million	\$13.4 Million
\$ for Avg. House	\$2/House/Month	\$4/House/Month	\$5-6/House/Month	\$8/House/Month

ERU (Equivalent Residential Unit) = a unit of measure designed to enable ready comparison of diverse parcels. For example, an ERU allows for a home and an industrial site to be assessed consistently. The average single family residential parcel has 2,400 sq/ft.

Estimated City and County Fees in an ERU Program:

Same Owner, Multiple Parcels	Impervious Area (sq. ft)	Percent Impervious	Estimated ERU's @2400 sqft/ERU	Estimated Annual Stormwater Fee @\$4/ERU/month
City of Grand Rapids	17,731,504	21%	7388	\$354,630
County of Kent	8,173,834	38%	3406	\$163,477

In such a program, eighteen other property owners have over one million square feet of impervious area with an average annual fee of \$50,000.

Stormwater Funding Needs

Fiscal Paths Forward

The Stakeholder Group considered a matrix of options to address the fiscal and substitute needs of the stormwater program. Options included partnerships with the Kent County Drain Commissioner, utility/millage hybrids, and multi-program millages. Ultimately, it was too difficult to consider so many options simultaneously and the focus was narrowed to the two leading choices: a stormwater millage or utility bounded within the City of Grand Rapids.

Stormwater Utility

A stormwater utility is a fee-for-service approach based on the impervious surface area of city parcel owners. The utility would be legally required to provide opportunities for mitigating the service fee through the installation of green infrastructure that manages stormwater onsite. This creates an incentive for property owners to design site-specific solutions to their stormwater issues and would ultimately encourage a greater utilization of green infrastructure. This approach would require administrative support and the creation and maintenance of a city-wide billing file based on impervious area.

STORMWATER FEES ARE COMMON

- 1,314 communities in 39 states have stormwater fees
- Residential Fees Rates range from \$0 to \$22.37 per month
- National average is \$4.20/month/ERU; the median is \$3.65
- Over 80 million Americans live in a community with a stormwater rate structure (approximately 30% of Americans pay a stormwater fee).

Source: Western Kentucky University

Stormwater Millage

A dedicated stormwater millage would raise restricted revenues spent only on specific purposes stipulated through the enabling law. This approach would apply a tax based on the taxable value of the property. It would be easy to administer but would be less equitable than a utility, as the tax would be based on a property's value rather than its contribution to stormwater runoff.

Stormwater Funding Needs

Additionally, non-profits (despite being contributors to the problem) would be exempt from the tax, making an incentive for green infrastructure to manage stormwater on-site more difficult. This approach would also require a vote of the people – which has the benefit of directly establishing citizen support, but the disadvantage of requiring a campaign.

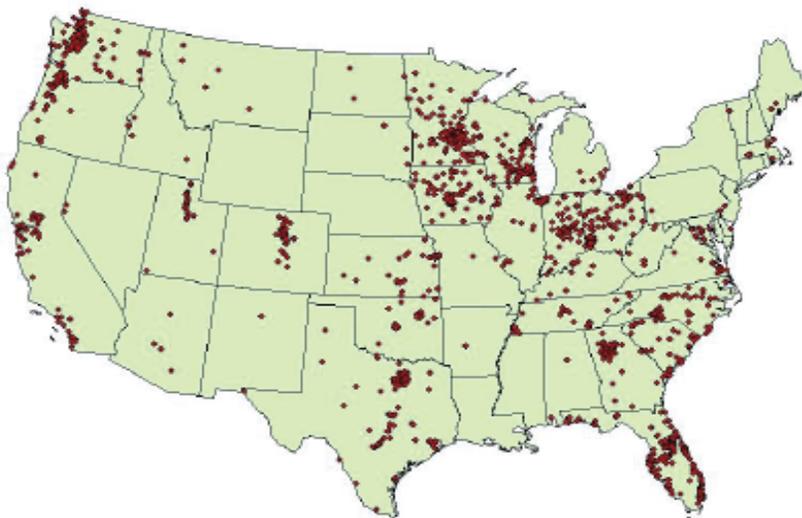
A Note on Stormwater Fees

According to an important 1998 Michigan Supreme Court Ruling, *Bolt versus the City of Lansing*, stormwater fees must have three distinct characteristics to not be considered a tax. The ruling had widespread ramifications for municipalities across Michigan.

A fee must:

1. Serve a regulatory purpose
2. Be proportionate to the cost of the service provided
3. Allow property owners to limit their use of the service and mitigate their fee liability.

Stormwater Utilities 2012



Source: *Western Kentucky University*

Stormwater fees are increasingly common as local governments and municipalities look to address non-point source water pollution more seriously. As regulations are passed down from the federal government, often without sufficient resources for compliance, stormwater fees are becoming increasingly important in filling the funding shortfall.

Stormwater Funding Needs

City	Monthly Fee	Year Enacted
Ann Arbor	\$6.92	1980
Berkley	\$3.35	2001
Detroit	NA	1979
Jackson	\$2.67	2011
Lansing	NA (Bolt)	1995
Marquette	\$4.18	Early 90s
New Baltimore	\$2.00	2005

For a variety of reasons, including major legal concerns, Michigan does not have many stormwater fee structures. Seven have been identified and at least two have been or are being challenged. Ann Arbor has one of the older and more sophisticated fee structures in Michigan.

Case Study: Ann Arbor, MI

Ann Arbor has 66 miles of creeks and open channels, 155 stream crossings, hundreds of miles of underground pipe and more than 10,000 inlets and catch basins. The system is managed by the City of Ann Arbor, Washtenaw County, and the University of Michigan. Ann Arbor bases its stormwater fees on the total amount of impervious surface of a property. Fees fall into one of two rate categories: single-family or commercial. The Single-Family and Two-Family Residential rate consists of four tiers:

- Tier One – Up to 2,187 square feet = \$19.36 per quarter
- Tier Two – 2,187 to 4,175 square feet = \$28.81 per quarter
- Tier Three – 4,178 to 7,110 square feet = \$44.55 per quarter
- Tier Four – Above 7,110 square feet = \$72.89 per quarter

Commercial and other properties (e.g. multifamily, office, institutional, commercial industrial land uses): Rate of \$314.68 per acre of impervious area per quarter, plus a customer service charge of \$6.77 per quarter. Ann Arbor uses computer analysis of infrared aerial photographs to distinguish hard, impervious surfaces in contrast to areas that can absorb stormwater, such as lawns and gardens. The computer program assigns the residential property into one of the four billing tiers to more equitably distribute costs proportional to use instead of using a flat fee. Customers can review their impervious area analysis online and submit an appeal if areas were incorrectly identified.

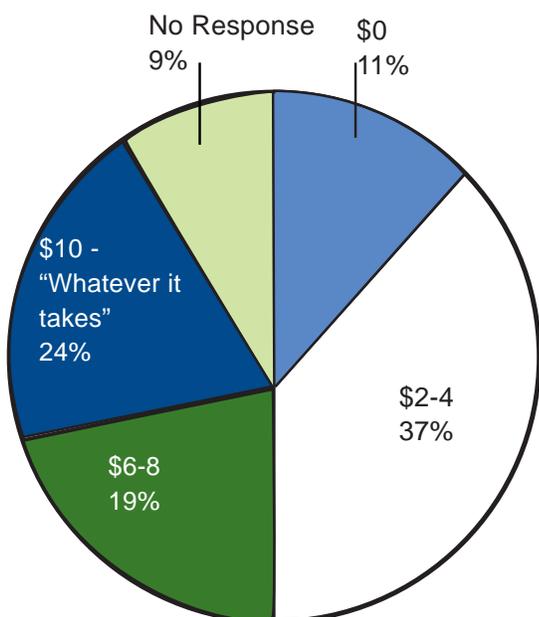
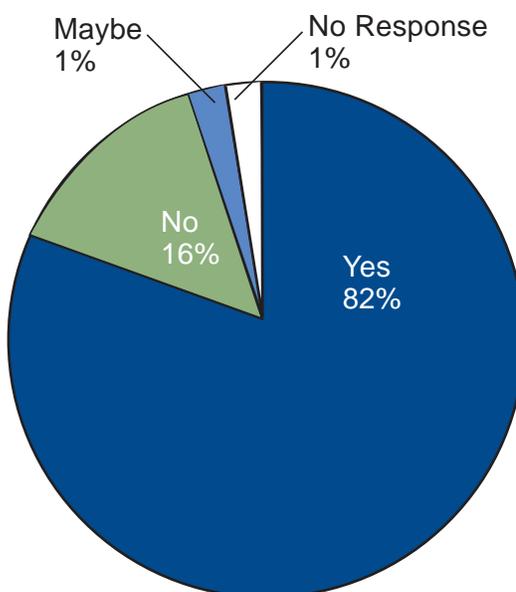
Stormwater Funding Needs

Citizens are Willing to Pay for Stormwater Improvements

WMEAC, in partnership with Clean Water Action, surveyed more than 700 homes in Grand Rapids. Though not scientific, the results were still interesting. Respondents indicated that there is clear support for investing in stormwater improvements. There is a strong interest in improving water quality. Two questions with corresponding answers are shown below.

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Would you be willing to pay more for stormwater management investments that would improve water quality in the Grand River and Lake Michigan?



How much would you be willing to pay PER MONTH in your water billing for stormwater management?

85% of respondents are willing to pay more per month to support stormwater management

13% are unwilling to pay more per month

Green Infrastructure: The Opportunity

Stormwater management best practices must include the use of green, natural stormwater management systems. The economic benefits become most distinct when a new stormwater system or improvement is considered. Early adopters have shown green stormwater infrastructure to generally be cheaper to build and maintain than the corresponding “grey” infrastructure.

Significant savings can be realized due to the reduced costs for site grading and preparation, paving, landscaping, and avoiding the need for grey infrastructure. One of the case studies identified total capital cost savings ranging from 15-80% when LID methods were used, with a few exceptions.

Examples of Green Infrastructure Tools:

- bioswales
- cisterns
- constructed wetlands
- trees
- rain gardens
- rain barrels
- green roofs
- urban forest or tree canopy
- planter boxes
- permeable pavement
- porous concrete
- parks and open spaces
- native prairie installations
- green streets and alleys
- riparian and forest buffer zones

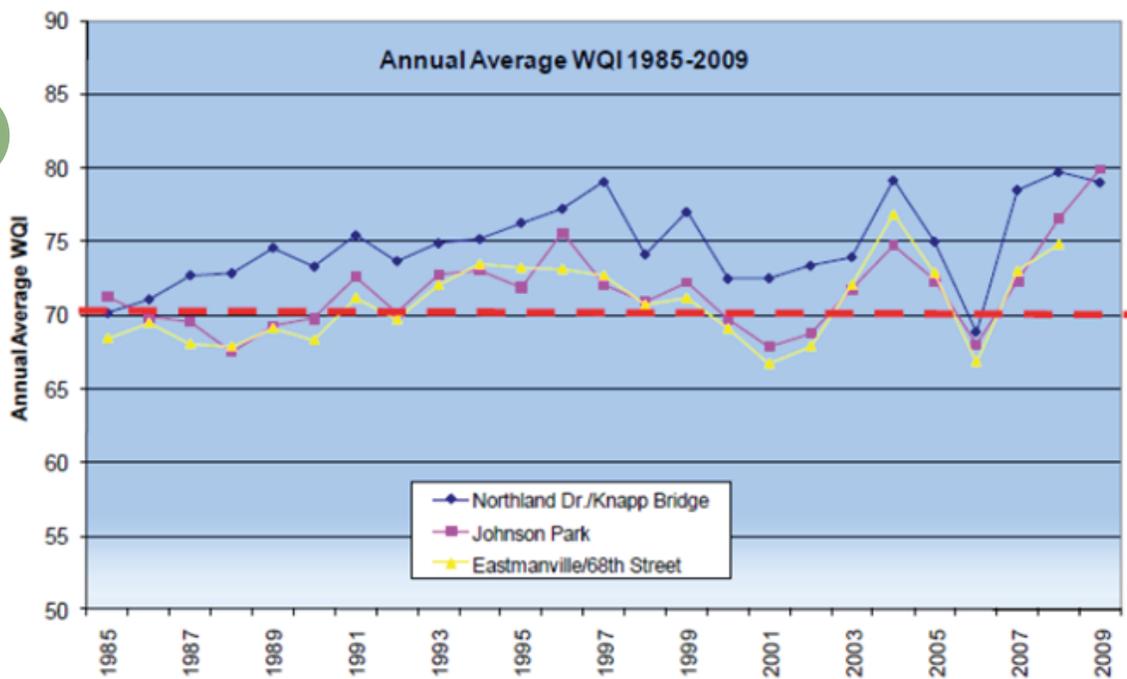


The Opportunity

Quality of Life Improvements

Improved Water Quality: Better management of stormwater in Grand Rapids will bring significant quality of life improvements to residents and visitors. The first and most obvious benefit is the improvement of water quality. Already, Grand Rapids has been named a top 10 urban fishery because of recent water quality improvements, and talks of returning the rapids to the Grand reflect an increase of interest in improving access and utilization of the Grand River. Improved downtown riverfront trails have already enhanced citizen quality of life, tourism, and are contributing to making Grand Rapids a revitalized urban destination.

Grand Rapids Water Quality Index (Three monitoring sites)



WQI Value	Aquatic Life	Recreational Use
26 - 50	Low Diversity	Limited Contact
51 - 70	Some Stress	Use with caution
71 - 90	High Diversity	Few Limits
91 - 100	High Diversity	Fully Usable

Grand Rapids has developed a water quality index and tracks data from points across the city. A number of streams and creeks show extreme impairment, but even the higher quality water bodies - including the Grand River shown above - have limitations on use and show signs of damage and ongoing stress.

The Opportunity

Parks, Green Spaces, Beautification, and Natural Areas: Best stormwater management practices include the use of green infrastructure to manage stormwater runoff. This process can be as simple as installing rain gardens planted with native plants in city parks and along city streets, or can involve more complex projects such as the creation of a natural river bank to absorb and slow runoff and flooding, a green roof or managed wetland. There are many existing clean, green infrastructure tools that would cool the summer heat-island effect, increase wildlife – including birds and pollinators – and contribute to place making and beautification of the city. Economic development professionals routinely report that young people and recent graduates identify urban green space as a key component in their attraction and retention.

Cleaner Streets: Street sweeping is a first line of defense against stormwater runoff. The cleaner the streets are kept, the less pollutants will be sent into surface waters. This would also be a boon for bicyclists, pedestrians, automobiles, and nearby homes and businesses.

Urban Canopy: Natural forests with their complete canopy cover, large leaf areas, and permeable soils handle rainwater effectively through interception and infiltration, returning water to groundwater and the atmosphere and protecting water quality in surface waterways. Urban canopy projects try to recreate this natural process by increasing the amount of canopy cover in urban areas. The Center for Clean Air Policy reports that one medium-sized tree can intercept as much as 2,380 gallons of water per year, and introducing more trees can reduce runoff in urban areas by up to 17%. This aligns with an existing initiative to promote the growth of the urban tree canopy in Grand Rapids, currently led by Friends of Grand Rapids Parks, City of Grand Rapids, and other partners. The citywide Green Grand Rapids plan includes a goal of 40% tree canopy. Currently, there are some areas that are close to that goal, but some neighborhoods are far from it. Downtown Grand Rapids, for instance, is only at 6%.

The Opportunity

Case Study: Joe Taylor Park

A world-class example of green infrastructure and stormwater management was recently unveiled in Grand Rapids' Baxter neighborhood. Joe Taylor Park, located at 940 Baxter Street SE, is both a recreational asset and a stormwater management system for the surrounding residential area. Funded partly as a CSO separation project, the sewer infrastructure around the park was separated and updated with a unique stormwater retention system that would collect runoff from the surrounding commercial and residential property and prevent pollution from entering the Grand River.

The system has a capacity of 270,000 gallons and is designed to handle 0.9 inches of rain over its 47 acres per hour, which accounts for about 95% of rain events, or the "first flush" of a heavier storm. When rain falls in the area, water collected on the surrounding streets is directed toward the park and into the underground hydrodynamic separator, which is a cone-shaped basin that creates a vortex in order to separate floatable objects and larger particles, while water moves down a pipe at the base. From there, the water moves through a short system of pipes to the filtration basin located under the parking lot, where gravel and the natural contents of the soil filter out some of the remaining contaminants.

In addition, some of the water filtered onsite is stored in underground collection tanks for park irrigation. The parking lot, which serves both the park and nearby community center, is paved with porous cement to reduce runoff.

The CSO and stormwater management project allowed for an expansion and renovation to the existing park, doubling the area of green space and providing for many new amenities to the park at a dramatically reduced cost to the City. This was an important improvement to the neighborhood. Joe Taylor Park is situated "at the epicenter of park deficiency," according to Friends of Grand Rapids Parks, which is focused on the goal outlined in the Green Grand Rapids master planning process to ensure that every person in Grand Rapids lives within a quarter mile of a park. This was a major step towards designing other parks in the area that could serve as vibrant gathering places and assets in underserved areas.



The Opportunity

Economic Opportunities



Stormwater Credits Trading System: Some stakeholders have suggested the creation of a secondary market to promote green infrastructure and LID investment, and protect property owners with difficult on-site stormwater management scenarios from high fees. Likely modeled after the secondary markets currently available for Brownfield tax incentives, such a program would allow property owners to sell or trade stormwater management opt-out credits. Ideally, such a system should have to be carefully designed and hyperlocally implemented.

Neighborhood Jobs and At-Risk Youth: In addition to jobs detailed in the list on page 24, these projects will also create jobs requiring little more than informed supervision. WMEAC received feedback from a Grand Rapids City Commissioner and several others expressing an interest in creating a “youth jobs” program to help install and maintain green infrastructure tools.

In fact, such programs are currently in place in other communities. In Los Angeles, Generation Water introduces youth to the green economy, technical best practices in water conservation, and business skills necessary to solve complex water and sustainability challenges. The program employs young people to work on sustainable landscape projects such as rain garden construction and irrigation system audits.

In Grand Rapids, such a program could build off of the Mayor’s Children’s Leadership and Employment, Achievement and Direction program, helping unemployed or at-risk youth build critical skills, make money, and increase pride in the properties and neighborhoods where their work is accomplished. It could also be directed at residences and small businesses needing financial assistance with stormwater fees.

The Opportunity

Economic Impact: A joint study by American Rivers, Economic Policy Institute, and Pacific Institute estimated that if the nation were to make an investment of \$188.4 billion in water infrastructure spread equally over five years (the level of investment necessary to bring U.S. water infrastructure up to par, as estimated by the EPA), it would generate \$265.6 billion in economic activity and create close to 1.9 million jobs, some 55,279 in Michigan.

Though regional data is not available, it is clear that stormwater infrastructure investment will support job creation in West Michigan.

Occupations Involved in Stormwater Infrastructure Projects:

- Cement Masons
- Concrete Finishers
- Construction Managers
- Environmental Engineers
- First-Line Supervisors/Managers of Construction Trades and Extraction Workers
- Paving, Surfacing, and Tamping Equipment Operators
- Pipelayers
- Plumbers, Pipefitters, and Steamfitters
- Septic Tank Servicers and Sewer Pipe Cleaners
- Water and Liquid Waste Treatment Plant and System Operators
- Maintenance and Repair Workers
- Welders, Cutters Solderers, and Brazers
- Machinists

Implications of Failure

Economic:



The economic cost of failing to manage our stormwater will be burdensome on Grand Rapids. Since stormwater management is the city's responsibility, stormwater will continue competing with police, fire, and other vital General Operating Fund services for funding, none of which should be compromised. Limited city funding combined with state revenue shortfalls will lead to the neglect of our infrastructure. Also, deferring investments in infrastructure maintenance and replacement has been shown to cost municipalities much more money in the long run.

Quality of Life:

Not investing in stormwater management is a missed opportunity for Grand Rapids. By managing our stormwater and the pollution it carries with it, we are creating a cleaner, healthier, and a high-quality place to live and work. In turn this presents a better opportunity to attract capital, talent and visitors.

Water Quality:

Although we have made great strides in water quality by separating our sewage and stormwater management systems, without seriously addressing stormwater management, our water quality will plateau before reaching levels that are safe for the environment, recreation, and our health. Grand Rapids will also have trouble complying with pending state and federal stormwater and water quality regulations, exposing us to the risk of non-compliance.

Infrastructure and Property Damage:

Since 2000 there have been over 1093 sinkholes, 959 clogged catch basins, 761 cave-ins, and 700 flooded streets in Grand Rapids resulting from stormwater runoff. These type of issues will only increase as our stormwater management system becomes increasingly outdated and as precipitation events are magnified. Facing diminishing resources, the City's Environmental Services Department will increasingly need to prioritize its response—delaying and neglecting important maintenance. Although Grand Rapids has experienced some heavy flooding in the last 10 years, including the summer of 2011 when 4.55 inches fell over a 24-hour period, floods do not have to be large to cause a significant amount of private and public property damage. If Grand Rapids and all communities in the Grand River Watershed fail to manage their stormwater, the Grand River will become increasingly prone to flooding as rain events in the city increase in number and intensity.

Stakeholder Participant Feedback

WMEAC has been working since 2010 to make the community based stormwater initiative as inclusive as possible. A master stakeholder contact list was built and continually updated as the process moved forward; by the end of the process it contained more than 150 involved citizens from across the community. It is important to note that the individuals did not consistently attend stakeholder meetings and attendees were not entirely representative of the community. With this in mind, and as the stakeholder group's work came to fruition, WMEAC created an "unengaged stakeholder" list to proactively and aggressively reach out to large property owners, major organizations, and neighborhood groups in the city that had been unrepresented at the regular bi-monthly stakeholder meetings.

In an attempt to aggregate stakeholder participant feedback and to collect views of as many participants as possible, WMEAC had stakeholder participants respond to a series of questions. Additionally, a section was included for free response and comment. More than 100 forms were circulated and 17 were returned.

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Questionnaire Results:

88% of stakeholders responding agreed that stormwater management should be significantly improved in Grand Rapids, and that more revenue is needed to adequately manage stormwater.

65% of stakeholders responding agreed that the community is reasonably informed about stormwater issues. However, several respondents suggested that the general public should be further informed of stormwater issues in Grand Rapids.

A plurality of stakeholders (41%) wanted Grand Rapids to pursue a stormwater management service at a level of Level A (\$13.4 million).

88% of stakeholders responding agreed that the City should pursue a stormwater utility before holding a public vote.

Level of Service	Percentage
Level A (\$13.4 million)	41%
Level B (\$9.1 million)	18%
Level C (\$6.5 million)	18%
Status Quo (\$3.6 million)	16%
No increase in stormwater revenue	12%

Stakeholder Participant Feedback

Stakeholder Participants Believe There are Further Issues to Resolve

A Selection of Quotes:

“Seems like there are more logistics to work out about credits and opt outs. Also, the LID or other BMPs would require inspections and ongoing maintenance assurances for functional sustainability.”

“I would like to see more effort toward community support. If this becomes a utility, will groups or funding be available to further educate residents about how they can effectively and economically mitigate stormwater on their own properties? Also – is there a balance between the expected number of residential and commercial mitigation efforts and the amount the fee would be reduced? Specifically, will enough money for stormwater management still be generated if a significant number of properties retain their own stormwater?”

“I believe there are still issues to be resolved- you spoke in generalities with no detail - what is being proposed is a new revenue stream with the intention of eliminating cost to the city’s general fund that most likely includes wages and benefits - you gave examples of problems outside the city, ie: Whitehall, Caledonia etc. The only thing you stressed was street sweeping – in the last few years a lot of work has been done to separate the storm sewers from the sanitary sewer system – you didn’t talk about that at all nor whether the work is completed. The public is totally blind to what is being proposed and the costs to their pocket book forever and ever.”

“Need to be prepared to respond to utility payers in how to mitigate fees. Provide time for anyone who will pay a fee to prepare for opt-out. Pay for changes before the fee kicks in. Once a fee is being paid it may be more challenging to pay implementing changes. A growing/warm season needed for making changes in landscaping.”

“While the Chamber recognizes the importance of stormwater infrastructure to the community and to a positive business environment, we cannot support any of the current funding recommendations or the proposal to create an Advisory Board to analyze funding mechanisms. Setting up an Advisory Board without having an asset management plan in place, would be putting the cart before the horse.[...]The Chamber is committed to exploring the issue of stormwater infrastructure and other infrastructure issues further with the City and we urge the City not to move forward with the current recommendations.”



Conclusions

Stormwater runoff management is now the front line of water pollution prevention in Grand Rapids. The City has spent hundreds of millions of dollars separating our sanitary and stormwater systems - all but eliminating sewage overflows into the Grand River. This is a great success story that has improved the water quality of the Grand River and Lake Michigan.

However, the CSO separation project removed any possibility that stormwater runoff would be filtered or cleaned before entering our natural water bodies. The Grand River and Plaster Creek are listed as impaired waterways under the Clean Water Act. Plaster Creek is so contaminated that human body contact restrictions have been put in place.

Grand Rapids can continue the positive momentum generated by the CSO separation project and protect that large investment in our infrastructure by turning our attention to the stormwater system. Despite the significant work separating and updating the sewer systems, 93% of stormwater pipes pre-date the CSO separation and 164 miles of those pipes are more than 50 years old. (52.8 new stormwater pipe miles have been installed since 1981, out of 730 miles total).

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Unfortunately, due to a decade of stagnant City revenues and declining State dollars the funding to adequately maintain stormwater management in Grand Rapids does not exist. We simply don't have the financial resources or manpower to maintain the infrastructure, responding to problems on a complaint/crisis basis. There is no capital asset management plan to prioritize infrastructure maintenance and replacement, and there is no available funding to replace and upgrade the infrastructure to equal the rate at which it is declining.

Grand Rapids has been working to improve stormwater management for two decades, and the issue will not go away until it has been solved. Even if we choose to temporarily defer taking action, the state and federal government eventually will compel it through regulation. If we begin to generate revenue for stormwater by the conclusion of the special voted income tax in 2015, we will have the time and flexibility needed to find innovative and smart solutions to our unsustainable stormwater concerns.



Conclusions

In the latest round of stormwater activity, public education and stakeholder outreach have been central in finding and implementing a sustainable community solution. Inherent in the nature of non-point source pollution, such as urban stormwater runoff, is the idea that the entire community contributes to this growing problem.

Likewise, to find an effective and equitable solution, the involvement and contributions of our full community are necessary. We are fortunate to already have successful models for urban citizen investment in Grand Rapids applicable to stormwater management, including the citywide urban forest canopy initiative, the neighborhood specific Creston Business District green infrastructure project, WMEAC's rain barrel and rain gardens programs, and the city's multiyear green infrastructure master planning process, Green Grand Rapids.

Stormwater regulations from the State of Michigan and the federal government have not been issued with adequate resources to achieve compliance. This fact, coupled with decreasing revenues from the State of Michigan, compels the citizens of Grand Rapids to act. However, this does not relinquish the state and federal governments from their responsibility to adequately fund the capacity of municipalities to meet regulatory standards.

A sustainable solution to stormwater management in Grand Rapids is attainable if we as a community are prepared to take on the challenge.

Recommendations

1. The City of Grand Rapids needs to improve management of its stormwater assets; accomplishing this will require increased resources and investment.
2. The City of Grand Rapids should establish an asset management plan for the stormwater system complete with a list of projects needed to maintain a well-functioning system – project details should include typical planning features such as timeline, cost/benefit, and operational savings.
3. Stormwater Stakeholder group participants support a funding mechanism that equitably and sustainably funds stormwater services. There is strong interest in a system that provides incentives for property owners to install green infrastructure and manage stormwater on-site while creating opportunities to mitigate stormwater costs and/or fees. Future work is required to determine the actual outcomes to be achieved.
4. A Stormwater Exploratory Group should be established and appointed by the City Commission to make recommendations on still outstanding decisions. The Stormwater Exploratory Group should be equipped with adequate resources to professionally research and recommend specific solutions. The group should be broadly representative of the community.
5. Community stormwater education should continue. Stakeholders provided mixed reviews on the level of public knowledge of stormwater issues.

*Note: There was not unanimous support among stakeholders and participants for the recommendations aforementioned.

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Appendix

Projected Cost Estimates for Maintaining and Improving Stormwater

This chart was created by CDM Smith to show how the total cost estimate revenues were developed. Cost estimates are based upon Grand Rapids' existing infrastructure, stormwater management practices, and standard stormwater engineering principles - granular to the number of pipe miles and catch basins. The estimate describes four 'levels of service' from sustaining the status-quo to the investment necessary for an ideal stormwater system. For example, in the existing level of service estimate no money is included for planning or stormwater best management practices, and only 16.5% of needed annual capital improvements are accomplished. By contrast, the A level of service includes 100% capital renewal, \$30,000 for planning, and \$500,000 for best management practices.

Drain System Component	Amount of Infrastructure		Existing Level of Service		Level of Service C		Level of Service B		Level of Service A	
			%	Cost	%	Cost	%	Cost	%	Cost
Operation and Maintenance										
Streams	16.9	miles	6%	\$5,000	10%	\$8,333	10%	\$8,333	10%	\$8,333
Stream Crossings	86	each	23%	\$20,000	33%	\$28,696	40%	\$34,783	40%	\$34,783
Pipes	383	miles	12%	\$200,000	17%	\$283,333	20%	\$333,333	20%	\$333,333
Catch Basins	17,798	each	8%	\$600,000	11%	\$825,000	13%	\$975,000	17%	\$1,275,000
Detention Basins	4	each	4%	\$5,000	6%	\$7,500	6%	\$7,500	6%	\$7,500
Pump Stations	8	each	10%	\$40,000	15%	\$60,000	15%	\$60,000	20%	\$80,000
Stormwater BMPs				\$0		\$100,000		\$250,000		\$500,000
	O&M Subtotal			\$870,000		\$1,312,862		\$1,668,949		\$2,238,949
Street Sweeping				\$780,000		\$1,020,000		\$1,140,000		\$1,140,000
Planning						\$20,000		\$30,000		\$30,000
Regulatory Compliance				\$250,000		\$400,000		\$550,000		\$550,000
Development Regulation				\$160,000		\$160,000		\$160,000		\$160,000
Capital/Renewal Projects*			16.5%	\$1,537,000	40%	\$3,572,100	60%	\$5,593,650	100%	\$9,322,750
	Total			\$3,597,000		\$6,484,962		\$9,142,599		\$13,441,699



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