CITY OF BLOOMINGTON

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Stormwater Program Master Plan

Final | *March 2022*

wood.

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Empower Results

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7.0 Appendices

Executive Summary

Executive Summary

Background, Purpose, and Goals

This Stormwater Master Plan was developed for, and with the assistance of, the City of Bloomington (Indiana) Utilities Department (CBU). CBU manages the City's stormwater program and its funding source, the stormwater utility. Currently, the program faces several opportunities and challenges:

- ✔ A recent increase in the stormwater utility fee generates $1.8M annually. The increase was necessary to fund capital improvements projects, a neighborhood stormwater infrastructure program, CBU's Residential Stormwater Grants program, and installing sustainable Green Infrastructure for stormwater management on City projects where grey infrastructure would traditionally be used.
- ✔ Bloomington's Mayor champions the use of Green Infrastructure throughout the City, to the degree that nearly one quarter of stormwater utility revenue is set aside to fund Green Infrastructure improvements. As well, CBU hired two staff to maintain Green Infrastructure, thus providing long-term staff oversight. However, there is not currently a plan or protocol for the selection, feasibility, and design of Green Infrastructure to ensure this revenue is efficiently and effectively used.
- ✔ Bloomington is regulated under Indiana's National Pollutant Discharge Elimination System - National Pollutant Discharge Elimination System (NPDES-MS4) Permit, which has, and will continue to, increase expectations for the use of Green Infrastructure on private and public land developments.
- ✔ Like many organizations today, the stormwater program has experienced frequent staff turnover in recent years. This makes program consistency and direction difficult to maintain.
- ✔ CBU does not currently have a business strategy to achieve the City's long-term goals for stormwater, such as proactively maintaining the public stormwater system.
- ✔ Increases in community growth, combined with stronger, and more frequent storms result in increased stormwater rates and volumes that are, and will continue to, overwhelm the existing public stormwater system.

In response to these opportunities and challenges, CBU enlisted the help of an engineering consultant team well-versed in municipal stormwater management to develop, and assist with implementation of, a Stormwater Master Plan. The purpose of the plan is to provide detailed strategies that will embrace opportunities, address challenges, and improve the efficiency and effectiveness of CBU's stormwater program. The goals of the Plan are listed in **Figure E-1**.

Figure E-1. Stormwater Master Plan Goals

1. Address existing water quality and quantity problems, and prevent future problems
2. Place the City in an opportune position to continue its compliance with Indiana's NPDES-MS4 permit now and well into the future, especially when considering the use of innovative Green Infrastructure practices
3. Better align the City's stormwater management program with the goals, objectives, and visions established in the City's Comprehensive Plan, Transportation Plan, and Sustainability Action Plan

Master Planning Process

The Stormwater Master Plan was developed with input from a City Staff Focus Group comprised of representatives from several City and CBU departments. This allowed internal stakeholders to guide development of the Master Plan and fostered interdepartmental collaboration and decision-making on strategies relevant to their operations and activities. The consultant also worked with individual staff and inter-department groups of staff to gather information and additional input.

A general project process, schedule, and intermediate and final deliverables is provided in **Figure E-2**. Four primary tasks are shown.

- **Task A** is where the consultant gathered City and CBU data and documents relevant to stormwater administration, regulation, and operations. They also met with the City Staff Focus Group to gather input on the master plan, program vision, and stormwater opportunities and challenges.
- **Task B** allowed the consultant and CBU to review and assess the data and input gathered, evaluate and assess problems and goals, and begin developing initial strategies.
- **Task C** began with input from the City Staff Focus Group on the initial strategies. CBU and the consultant refined and detailed the strategies, confirming their validity and relevance, and applying estimated costs and a schedule. Ultimately, these efforts led to the development of this Stormwater Master Plan.
- **Task D** is set aside for strategy implementation activities. Some of these activities have already begun.

Figure E-2. Stormwater Master Plan Process, Schedule, and Deliverables

Tasks and Activities	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14
Task A. Project Management and Kickoff Meeting														
Project management duties														
Meeting: Initial coordination w/ CBU Staff	●													
Meeting: City Staff Focus Group meeting 1		●												
Meeting: City Staff Focus Group interviews		●												
Task B. Stormwater Program Assessment														
Background data and information review														
Develop initial CIP Evaluation Tool														
Deliverable: DRAFT 1 Preliminary Strategy List			●											
Meeting: CBU Staff review and comment meeting				●										
Deliverable: DRAFT 2 Preliminary Strategy List					●									
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Meeting: City Staff Focus Group meeting 2						●								
GIS Assessment/Public Project Evaluation														
Deliverable: DRAFT 1 Stormwater Master Plan						●								
Meeting: CBU Staff review and comment meeting							●							
Deliverable: DRAFT 2 Stormwater Master Plan								●						
Meeting: CBU Staff review and comment meeting									●					
Deliverable: FINAL Stormwater Master Plan													●	
Task D. Stormwater Master Plan Implementation														
Implementation activities *(TBD, from Master Plan)*														
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Implementation activities *(TBD, from Master Plan)*														

Stormwater Strategies, Costs, and Schedule

The strategies that comprise this Stormwater Master Plan are listed in **Table E-1.** Each strategy is briefly summarized.

Table E-1. Summary of Stormwater Master Plan Strategies

Stormwater Master Plan Strategies
1. Update the Construction Stormwater Management provisions in Chapter 10.21 Revise Chapter 10.21 to better align City requirements with the Indiana Construction General Permit and provide for the protection of Green Infrastructure BMPs during construction.
2. Update & expand the Post-Construction Stormwater Management provisions in Chapter 10.21 Revise Chapter 10.21 to effectively integrate stormwater quality and quantity requirements, encourage and support land development designs using Green Infrastructure, comply with the conditions of the NPDES-MS4 Permit, and align with the City's UDO.
3. Develop a Stormwater Design Manual Develop a City-specific Stormwater Design Manual to support the requirements of and be consistent with Chapter 10.21 and the UDO.
4. Review and update the CBU Construction Specifications Update the Construction Specifications to eliminate conflicts with updated Chapter 10.21 and the new Stormwater Design Manual and establish the required hydraulic design methods.
5. Align the UDO with updated Chapter 10.21 and the new Stormwater Design Manual Revise the UDO to align with Chapter 10.21 and the Stormwater BMP Design Manual, clarify planning-level stormwater Green Infrastructure practices, and revise/define criteria for Green Infrastructure BMP incentives.
6. Develop a maintenance program for privately-owned stormwater BMPs and detention basins Develop stormwater BMP maintenance code, standards, and support tools to effectively comply with NPDES-MS4 Permit requirements and provide for effective long-term maintenance of privately-owned BMPs and detention basins.
7. Review and update the CBU Stormwater Utility Credit Manual Provide incentives in the form of user-fee credits for the use of Green Infrastructure BMPs and other protected features (e.g., reforestation areas).
8. Facilitate and support the design and implementation of Low Impact Development and Green Infrastructure for public projects Develop CBU criteria and inter-departmental support tools for Green Infrastructure funding of non-CBU public projects, protocols or memorandums of understanding between CBU and City department for consideration/inclusion of Low Impact Development and Green Infrastructure on City projects, and typical details for Green Infrastructure BMPs in public rights-of-way.
9. Eliminate conflicting activities between City & CBU depts in regard to the private land development process Define the stormwater roles and responsibilities of Planning & Transportation (P&T), CBU Engineering, and CBU Environmental during the land development process.
10. Develop a jurisdiction-wide Stormwater System Management & Maintenance Plan Implementation of the plan will allow CBU to work towards proactive management and maintenance of the public stormwater system. Three sub-strategies are included: a) stormwater system condition assessment and prioritization; b) watershed master planning; and c) system maintenance upgrades.

11. Develop guidance for control of invasive plant species
Resource share and create a formal partnership with Parks & Recreation to develop and provide guidance to other City and Utilities departments for the control of invasive species and Integrated Pest Management (IPM) plan. In addition, guidance may be translated into a fact sheet for use by private BMP owners.

12. Develop a Green Ditch Enhancement initiative
Create educational brochures or fact sheet for property owners located adjacent to public ditches who request, but ultimately dislike, ditch repairs. Provide education on the benefits of a repair and repair design templates for a variety of "green" ditches.

13. Evaluate and update the Stormwater Quality Management Plan (SWQMP)
Evaluate CBU's current NPDES-MS4 Permit compliance program, identify gaps with existing and anticipated future permit requirements, and recommend solutions for gap closure. (Much of this has already occurred through the master planning process). Update the SWQMP to reflect the current compliance program as is required by the permit.

14. Develop a Water Quality Characterization Report
Develop the Water Quality Characterization Report that is required by the next NPDES-MS4 permit.

15. Develop an Education & Outreach Program for stakeholders and the public
Develop and implement a five-year plan for stakeholders and the public geared towards stormwater education and outreach with the overarching objectives of fostering greater understanding of basic stormwater concepts, recognition of their own (and the City's) roles in stormwater management, and ensuring stakeholders understand and satisfy their own stormwater responsibilities.

16. Update CBU's stormwater cost-of-service and perform a rate study
Refine or correct costs estimated for this Master Plan as strategies 1 through 15 are implemented and include in the next (and future) stormwater cost-of-service and rate studies. Consider also other forms of funding through fees for site plan review, site inspections, and long-term BMP maintenance inspections, and from grants and other possible funding sources.

To be effective, a Stormwater Master Plan should largely result in actionable strategies that, once fully implemented, improve a community's stormwater regulations, administration, or operations so it achieves its unique set of program goals. In Bloomington's Plan, implementation of most strategies will be one-time activities that, once complete, will result in tangible "product" ready for use to drive or support the stormwater program. However, some planning efforts must be extended or enhanced in key areas to allow a community to achieve its stormwater goals. These "plan to plan" strategies arise when there is a lack of data, information, or stakeholder input to form and estimate costs for a tangible and effective administrative, regulatory, or operational product. For Bloomington, two strategies will result in continued planning activities. This is explained in **Table E-2**.

Table E-2. Explanation of "Plan to Plan" Strategies

Strategy	Explanation of Planning Need
10. Develop a jurisdiction-wide Stormwater System Management and Maintenance Plan.	The need for a technical analysis and resulting plan could not be determined at the start of this master planning project. Thus, strategy 10 was developed as a "plan to plan" strategy because of the following information gathered during the planning process: 1. CBU staff expressed the need to better understand the public stormwater system so support more effective planning and execution of their department's responsibilities 2. CBU staff expressed the desire to move to a proactive system maintenance approach, which cannot be effective without an understanding of system condition, the sources of on-going system issues, potential mitigation approaches, and system changes and expectations over time 3. CBU cannot often determine long-term solutions to drainage, flooding, and stream erosion problems because the system is not well understood. As a result, current system repairs are often "band-aids" that will not solve larger, source problems 4. CBU does not have current computer models or master plans that provide a full understanding of watershed hydrologic response and system operation information 5. CBU has a system inventory and the ability to capture subsurface system condition information via video, but does not currently have condition information for most of the system
15. Develop an Education & Outreach Program for stakeholders and the public	Stormwater Education & Outreach is rapidly becoming a critical part of local stormwater programs, especially where MS4 permit compliance and stakeholder communications are concerned. Strategy 15 was included as a "plan to plan" strategy for the following reasons. 1. Finding education and outreach strategies that fit a community take a fair amount of discussion and research time by the consultant team and a set of internal stakeholders not included in this overall master planning effort. 2. Today's world of the internet and social media means that many desirable and effective education and outreach approaches require skills and partnerships that are often foreign to typical stormwater staff and utility department skill sets. 3. Education and outreach strategies are extensions of other stormwater program elements. It helps to understand and further develop those program elements before implementing strategies that are intended to support them.

Table E-3 presents a 6-year schedule for implementation of Stormwater Master Plan strategies. The estimated cost for each strategy is included in the schedule. The total estimate cost per year is reflected at the bottom of each year column. Expressing the implementation phase schedule with costs in this way allows Master Plan stakeholders to refine the implementation phase schedule by balancing need fulfilment (i.e., strategy implementation) with annual budgets. Estimated annual costs range from $70,000 in 2022 to a maximum of $500,000 in 2026. The total estimated cost for implementation of all recommendations within the six-year period is $1,880,000. Based on our experience in other communities, stormwater costs of at least $300,000 would be expected to continue annually to support on-going activities. The primary funding need will be for stormwater system maintenance and minor repairs (strategy 10) and, less so, the BMP maintenance program

(strategy 6), the continued implementation of Green Infrastructure on public projects (strategy 8), and stakeholder and public education and outreach (strategy 15). However, note that potential stormwater/flood management capital improvement projects (CIPs) are not indicated under line item 10 in **Table E-3**. CIPs will be identified as part of the watershed master plan effort (strategy 10b). Experience tells us that CIPs, once identified, will substantially add to CBU's annual stormwater costs.

Table E-3. 6-Year Implementation Schedule and Costs

#	Strategy	Frequency	Year						
			2022	2023	2024	2025	2026	2027	2028
1	Update the Construction Stormwater Management provisions in Chapter 10.21	One time	-	$ 16,000	-	-	-	-	-
2	Update and expand the Post-Construction Stormwater Management provisions in Chapter 10.21	-	-	$ 25,000	-	-	$ 15,000	-	-
3	Develop a comprehensive Stormwater Design Manual using a stakeholder guided process	One time	-	-	$ 80,000	$ 110,000	$ 110,000	-	-
4	Review and update the CBU Construction Specifications	One time	-	-	-	-	$ 5,000	-	-
5	Align the UDO with updated Chapter 10.21 and the new Stormwater Design Manual	One time	-	-	$ 30,000	-	-	-	-
6	Develop and implement a maintenance program for privately owned stormwater BMPs and detention basins	On-going	-	-	-	$ 50,000	$ 25,000	$ 25,000	*Ongoing* →
7	Review and update the CBU Stormwater Utility Credit Manual	One time	-	-	-	-	-	$ 35,000	-
8	Facilitate and support the design and implementation of Low Impact Development and Green Infrastructure for public projects	One time	-	-	-	$ 64,000	$ 60,000	$ 60,000	*Ongoing* →
9	Eliminate conflicting activities between the City & CBU depts in regards to the private land development process	One time	-	$ 10,000	-	-	-	-	-
10	Develop a jurisdiction-wide Stormwater System Management and Maintenance plan	-	-	-	-	-	-	-	-
	10a. System condition assessment and prioritization	One time	-	$ 100,000	$ 75,000	$ 75,000	$ 75,000	-	-
	10b. Watershed master plans & climate adaptation analysis ***(leads to CIP projects & system maint. upgrades)***	Ongoing	-	-	-	$ 110,000	$ 110,000	$ 110,000	-
	10c. System maintenance upgrades	Ongoing	-	-	-	-	$ 50,000	$ 200,000	*Ongoing* →
11	Develop guidance for control of invasive plant species	One time	-	-	$ 50,000	-	-	-	-
12	Implement a Green Ditch Enhancement initiative	One time	-	$ 20,000	-	-	-	-	-
13	Evaluate and update the SWQMP	One time	$ 20,000	-	-	-	-	-	-
14	Develop a Water Quality Characterization Report	One time	$ 50,000	-	-	-	-	-	-
15	Develop an Education & Outreach Program for stakeholders and the public	Ongoing	-	-		$ 15,000	$ 50,000	$ 50,000	*Ongoing* →
16	Update CBU's stormwater cost-of-service & perform rate study	Ongoing	*Already in CBU's existing budget*		-	-	-	-	-
		ANNUAL TOTALS	**$70,000**	**$171,000**	**$235,000**	**$424,000**	**$500,000**	**$480,000**	***Ongoing → est. $300,000+ annually***
							GRAND TOTAL FOR IMPLEMENTATION OF ALL STRATEGIES		**$1,880,000**

List of Acronyms

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BMP	Best Management Practice
CBU	City of Bloomington Utilities
CCTV	Closed Circuit Television (truck)
CIP	Capital Improvement Projects
CTP	Certified Technology Park
ESD	Economic & Sustainable Development
FY	Fiscal Year
GI	Green Infrastructure
HAND	Housing & Neighborhood Development
IDDE	Illicit Discharge Detection and Elimination
IDEM	Indiana Department of Environmental Management
IU	Indiana University
LID	Low Impact Development
MCM	Minimum Control Measure, as per the NPDES-MS4 permit
MEP	Maximum Extent Practicable
MPO	Metropolitan Planning Organization
MS4	Municipal Separate Storm Sewer System
MTD	Manufactured Treatment Device
NPDES	National Pollutant Discharge Elimination System
P&T	Planning & Transportation
R/W or ROW	Right of Way
SW	Stormwater
SWMP	Stormwater Management Plan
SWP3	Stormwater Pollution Prevention Plan
SWQMP	Stormwater Quality Management Plan
T&D	Transmission & Distribution
UDO	Unified Development Ordinance

Key Terminology

Key Terminology

Definitions and explanations for key terms used in this Stormwater Master Plan are provided in this section.

Municipal Separate Storm Sewer System

The public stormwater system maintained by the City of Bloomington Utilities Department is known as a Municipal Separate Storm Sewer System (MS4). Discharges from the MS4 are regulated by the Indiana Department of Environmental Management (IDEM) under the National Pollutant Discharge Elimination System (NPDES) MS4 Permit. This permit contains six Minimum Control Measures (MCMs) that include required conditions for stormwater management, addressing both stormwater quality and quantity.

The six MCMs are:

MCM 1: Public Education and Outreach

MCM 2: Public Participation and Involvement

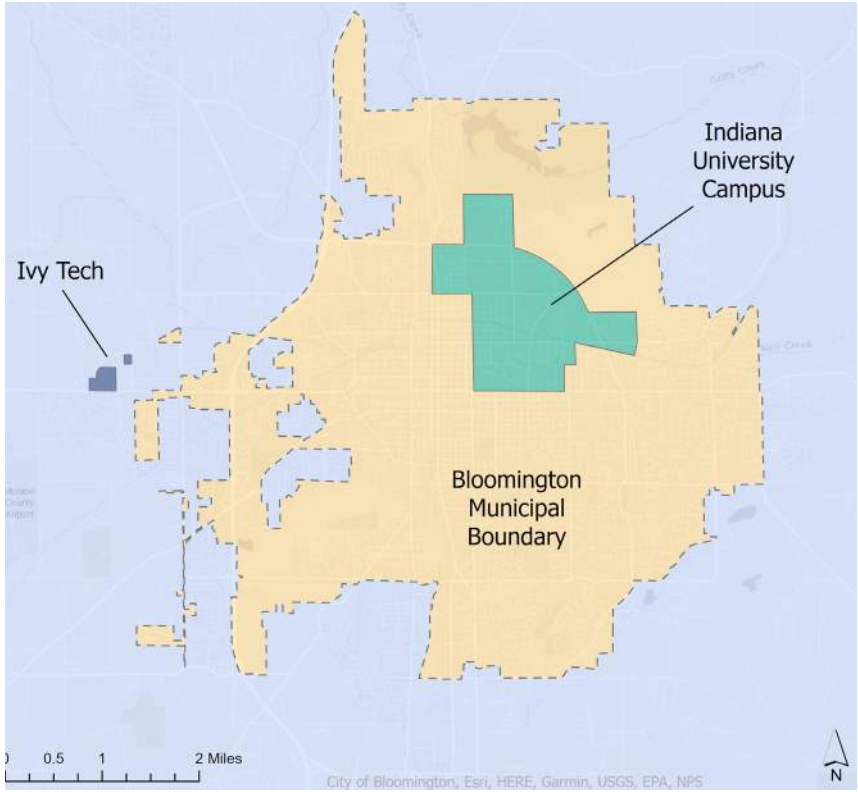
MCM 3: Illicit Discharge Detection and Elimination

MCM 4: Construction Site Stormwater Runoff Control

MCM 5: Post Construction Site Stormwater Runoff Control

MCM 6: Municipal Operations Pollution Prevention and Good Housekeeping

The City of Bloomington's Municipal Separate Storm Sewer System area is comprised of 13,114 acres.



The City of Bloomington, Indiana University, Ivy Tech, and Monroe County all hold separate MS4 permits. The State (IDEM) has a new Draft Permit that all MS4s will have to update their programs for compliance. Coordination and communication with the surrounding MS4s is critical in program development.

Best Management Practice (BMP)

Best Management Practice (BMP) means a post-construction stormwater facility that is designed and constructed to manage stormwater quality (pollution) and/or quantity (volume, peak flow, and/or velocity on developed properties). A BMP may be a Green Infrastructure BMP (see next definition) or traditional BMPs, such as a detention basin, extended detention basin, or proprietary mechanical treatment device. For purposes of this document, BMP does not include practices used during construction to prevent erosion and control sediment discharges.

Extended detention basin

Manufactured Treatment Device (MTD)

Wet detention pond

Dry detention pond

Green Infrastructure BMP

A Green Infrastructure BMP is a specific type of BMP that is designed and constructed to manage stormwater quality (pollution) using infiltration, vegetative evapotranspiration, or runoff capture and re-use. Examples of Green Infrastructure BMPs include bioretention areas, rain gardens, infiltration basins, green roofs, and cisterns.

Indianapolis, IN (Nature Conservancy): Green roofs help minimize impervious surface and manage stormwater where it falls, while also providing an amenity on otherwise unused space.

Bloomington, IN (Switchyard Park): Public parking lot using bioretention and permeable pavement to manage impervious surface and the stormwater runoff generated.
Indianapolis, IN (Bioretention Bumpouts/Public R/W)

Indianapolis, IN (Cultural Trail): Bioretention bump outs in a R/W application to manage stormwater runoff from the street.

Bioretention bump outs can often look like typical landscaping, however they are serving multiple functions including: nutrient load reduction/pollutant filtration, habitat creation, and place making.

Low Impact Development (LID)

Low Impact Development (LID), or LID practices, are site planning techniques that reduce the volume of stormwater generated on a property. Examples of LID include impervious area reduction, open space preservation/conservation easements, reforestation, stream buffer preservation and enhancement, and downspout disconnection.

Bloomington, IN: Conservation easement

Bloomington, IN: Native plant restoration

Bloomington, IN: Tree preservation

Bloomington, IN: Conservation lot subdivision

1.0 Project Background

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This Stormwater Master Plan was developed for, and with the assistance of, the City of Bloomington (Indiana) Utilities Department (CBU). CBU manages the City's stormwater program and its funding source, the stormwater utility. Currently, the program faces several opportunities and challenges:

- ✔ A recent increase in the stormwater utility fee generates $1.8M annually. The increase was necessary to fund capital improvements projects, a neighborhood stormwater infrastructure program, CBU's Residential Stormwater Grants program, and installing sustainable Green Infrastructure for stormwater management on City projects where grey infrastructure would traditionally be used.
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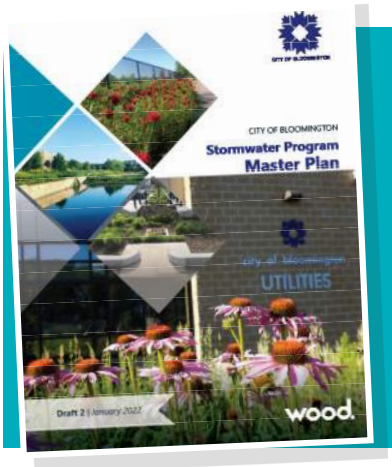
- ✔ Increases in community growth, combined with stronger, and more frequent storms result in increased stormwater rates and volumes that are, and will continue to, overwhelm the existing public stormwater system.

In response to these opportunities and challenges, CBU enlisted the help of an engineering consultant team well-versed in municipal stormwater management to develop, and assist with implementation of, a Stormwater Master Plan. The consultant team included Wood Environment & Infrastructure Solutions, Inc., and Empower Results. These firms worked primarily from their Bloomington and Indianapolis offices, respectively.

The purpose of the plan is to provide detailed strategies that will embrace opportunities, address challenges, and improve the efficiency and effectiveness of CBU's stormwater program. The goals of the Plan are listed in the below graphic.

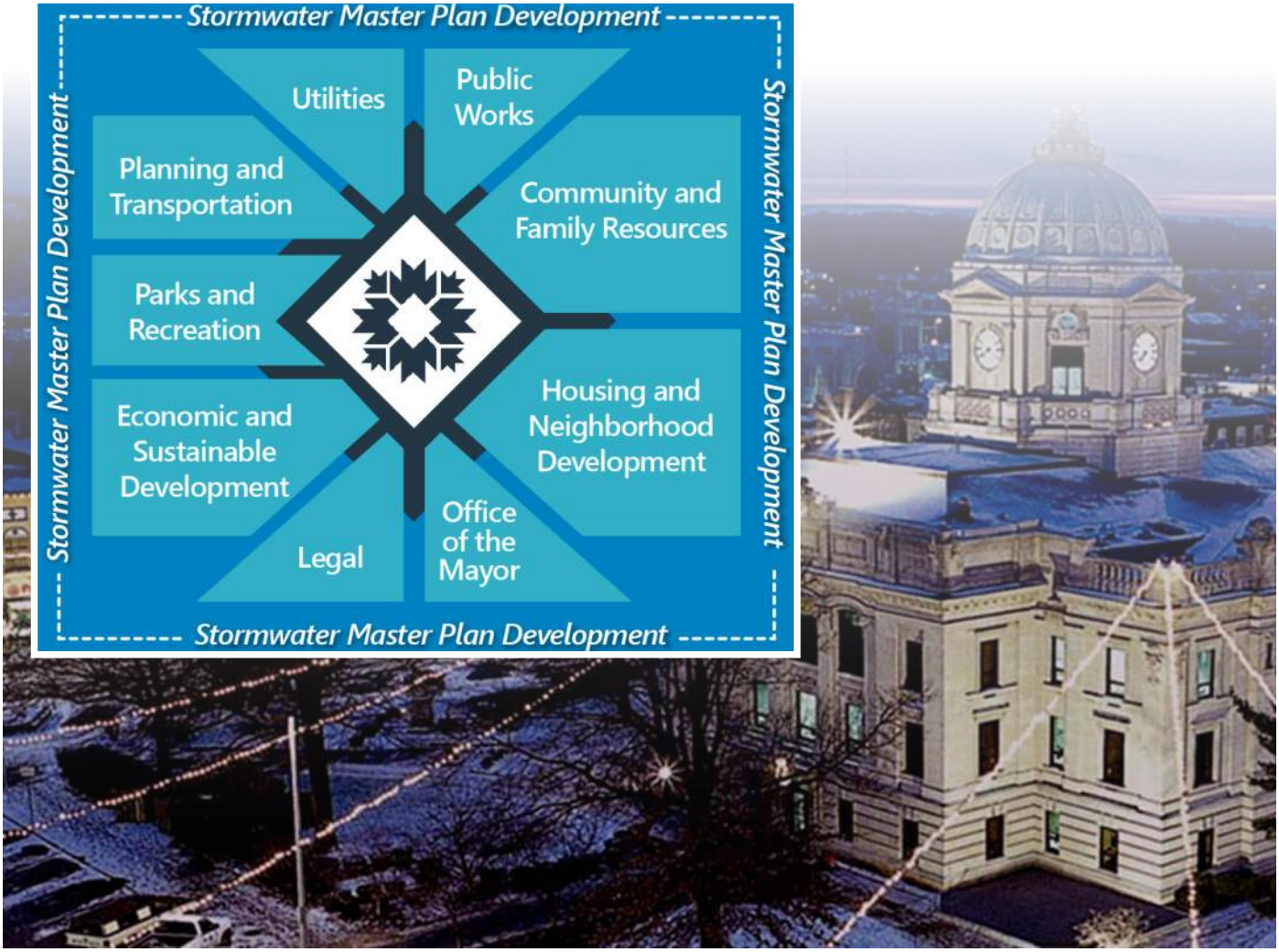


1. **Address existing water quality and quantity problems, and prevent future problems**
2. **Place the City in an opportune position to continue its compliance with Indiana's NPDES-MS4 permit now and well into the future, especially when considering the use of innovative Green Infrastructure practices**
3. **Better align the City's stormwater management program with the goals, objective, and visions established in the City's Comprehensive Plan, Transportation Plan, and Sustainability Action Plan.**

To achieve these goals, a City Staff Focus Group comprised of representatives from a number of City and CBU divisions was established to allow internal stakeholders guide development of the Master Plan, and foster interdepartmental collaboration and decision-making on strategies relevant to their operations and activities. This Focus Group shaped a project ***Vision Statement*** that underpinned the creation of Master Plan strategies. The Vision Statement is presented in the graphic below. Details of the Stakeholder Engagement Process are provided in **Section 4.0 Stakeholder Engagement Process.**

Project Vision Statement:

Bloomington will manage stormwater as an asset such that it contributes to healthy waterways, public safety, complete streets, resident well-being, and a strong sense of place that models the values of our city's commitment to equity and environmental justice. We will focus on management strategies that utilize Low Impact Development and Green Infrastructure, and balance our diverse local needs and landscapes while responsibly meeting MS4 permit requirements.



2.0 Master Planning Process

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The consultant team's services relevant to the Master Plan are divided into two phases: planning; and, implementation. The planning phase began in November 2020 and ends in March 2022. Its purpose is to develop the strategies that comprise the Stormwater Master Plan. Three City Staff Focus Group meetings occurred during the planning phase to gather departmental input to develop, and then finalize, the Plan. This report constitutes the Plan and therefore, is the result of the planning phase. The second phase, implementation, is comprised of the development, formulation, or activities required to implement the strategies recommended in this Plan. A general process and schedule for development of the Plan is shown in **Figure 1-1** and **Figure 1-2**.

Figure 1-1 Project Schedule and Tasks

Tasks and Activities	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14
Task A. Project Management and Kickoff Meeting														
Project management duties														
Meeting: Initial coordination w/ CBU Staff	●													
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Task D. Stormwater Master Plan Implementation														
Implementation activities *(TBD, from Master Plan)*														
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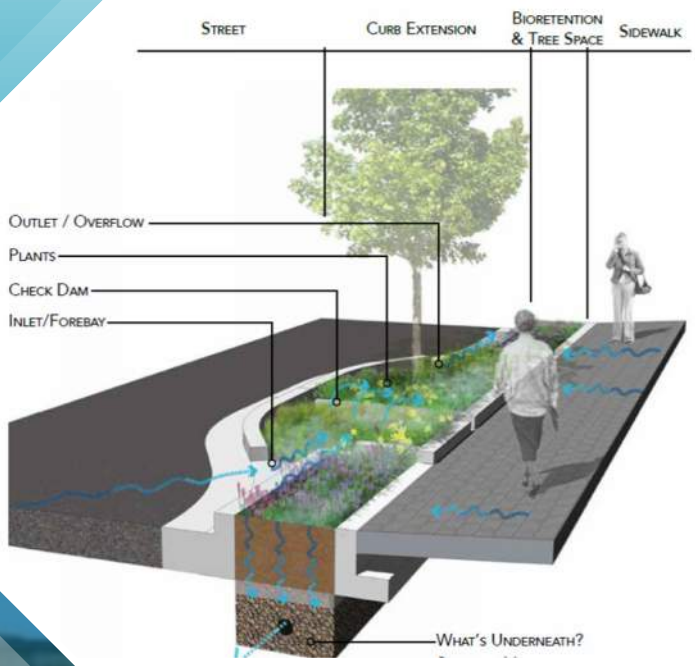
Figure 1-2 Stormwater Master Plan Process

3.0 Stormwater Program Assessment



3.0 Stormwater Program Assessment

The following pages summarize CBU's existing stormwater program and summarize observations made by the City Staff Focus Group or consultant prior to the development of Stormwater Master Plan strategies.

CBU is responsible for the City's stormwater program. Stormwater services were recognized as a unique utility program in the early 2000s. The City encompasses 13,144 acres. CBU has inventoried the surface and subsurface components of the public stormwater system. **Figure 1-3** depicts this inventory and some of its statistics.

Figure 1-3 Stormwater Structural Inventory

Storm pipes and segments:

- 25,905 linear ft of storm pipe

Storage Areas/BMPs:

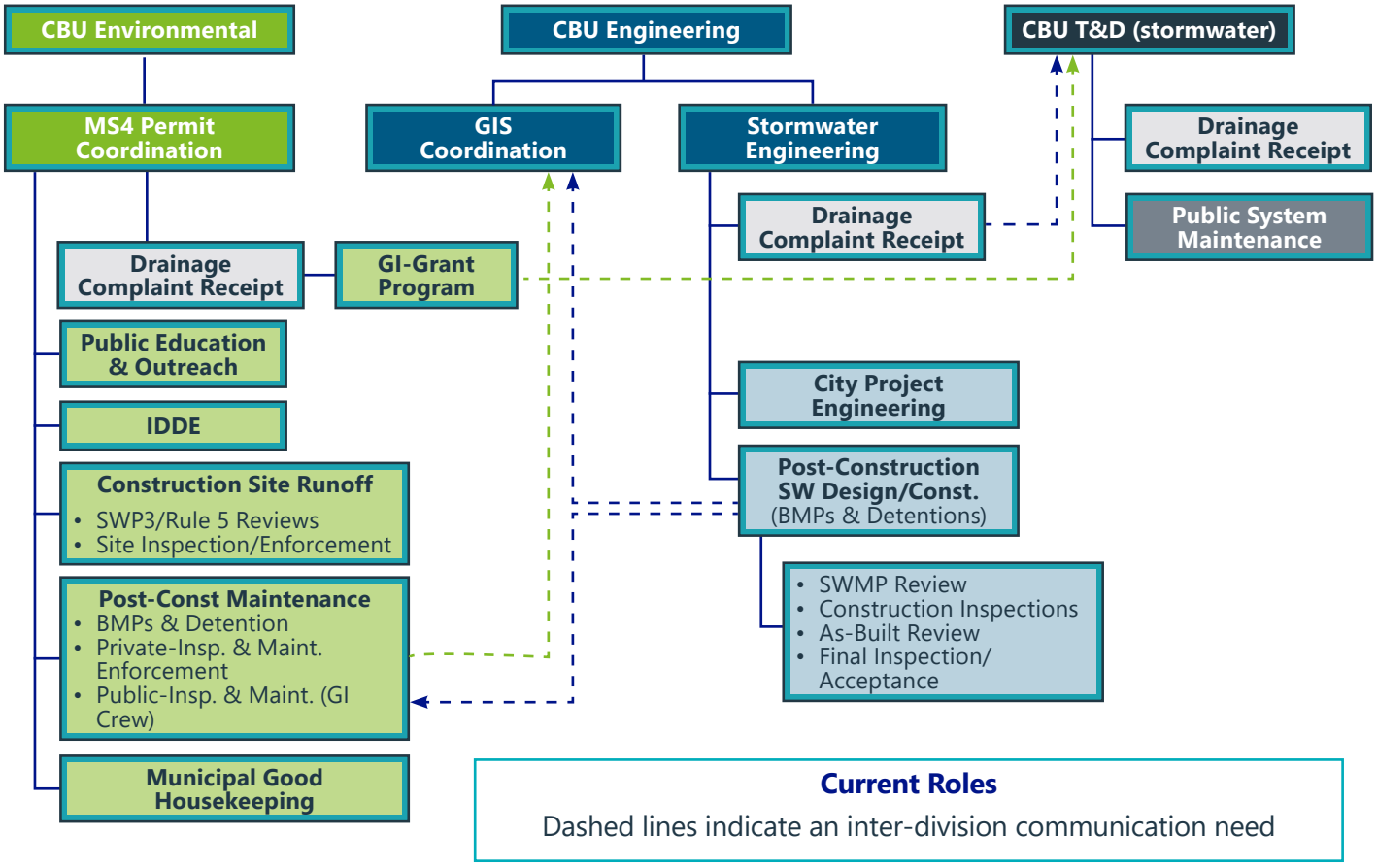
- 181 detention ponds
- 82 retention ponds
- 16 underground detention

Storm inlets and outfalls:

- 18,494 inlets
- 4,706 outfalls
- 4,586 pumps, detention pond outlet, basin w/ sump

Three divisions within CBU divide the primary responsibilities for the stormwater program and system. **Figure 1-4** presents the stormwater services provided by each of the three divisions and lines of communication for specific activities. Responsibilities of the divisions are summarized below the figure.

Figure 1-4 CBU Stormwater Services CBU Stormwater Divisions and Responsibilities



CBU Environmental: CBU environmental is responsible for administering and coordinating across divisions for ALL MS4 permit compliance activities and reporting to IDEM on an annual basis. CBU has an MS4 coordinator who manages 3 staff that complete the permit compliance activities. This includes an education and outreach specialist and a Green Infrastructure maintenance crew. In addition, drainage complaints are collected and categorized through this group. This group works closely with Planning & Transportation on construction site erosion and sediment control (MCM 4) compliance and enforcement.

CBU Engineering: CBU engineering is responsible for stormwater plan review of City Engineering projects and coordinating the design of public drainage improvement projects. This department has 3 staff dedicated to stormwater program activities. The City engineer reviews Post Construction stormwater design and construction plans for both public and private projects on BMPs and water quantity requirements. The responsibilities go from planning and design through construction termination. This group works closely with Planning & Transportation on Post Construction stormwater design and construction requirements (MCM 5) (UDO) requirements. This group also receives public drainage complaints.

CBU Transmission and Distribution (T&D): CBU T&D is responsible for public stormwater system maintenance and operation. This department has 9 staff dedicated to stormwater maintenance. This group cleans outfalls, storm drains/inlets, and pipes and pipe segments. In addition, they work on ditch rehabilitation efforts, mowing, and street sweeping efforts in the city. This group has two Vac trucks and a CCTV truck dedicated to storm infrastructure. This group also receives public drainage complaints.

With guidance from CBU staff, the consultant team identified and evaluated several City documents that provide information on how the Stormwater Master Plan can support the vision and goals of the City of Bloomington as a whole. In addition, the background document review was completed to understand the development and redevelopment requirements, from planning, design, construction termination, through long term maintenance for both public and private projects.

Common stormwater themes found in the overall background document review include the following:

- Green Infrastructure and Low Impact Development were supported throughout the majority of the documents reviewed (both public and private projects)
  - Many existing requirements and incentives in UDO for Green Infrastructure and Low Impact Development
  - Relying on CBU Engineering for design standards and typical details of Green Infrastructure
- Climate Change was of high importance throughout many documents reviewed
- Resource sharing and communication between departments
- Long Term Operation and Maintenance
  - Who is responsible for what
  - Making sure to budget for long term maintenance in CIPs
  - Making sure to enforce long term maintenance for private post construction BMPs

Table 1-1 indicates which documents were reviewed and a brief summary of each. **Appendix 2** contains the detailed Background Review Reference Tables and a detailed review of the UDO. An example of the type of information gathered during the document review is presented on the page following **Table 1-1**.

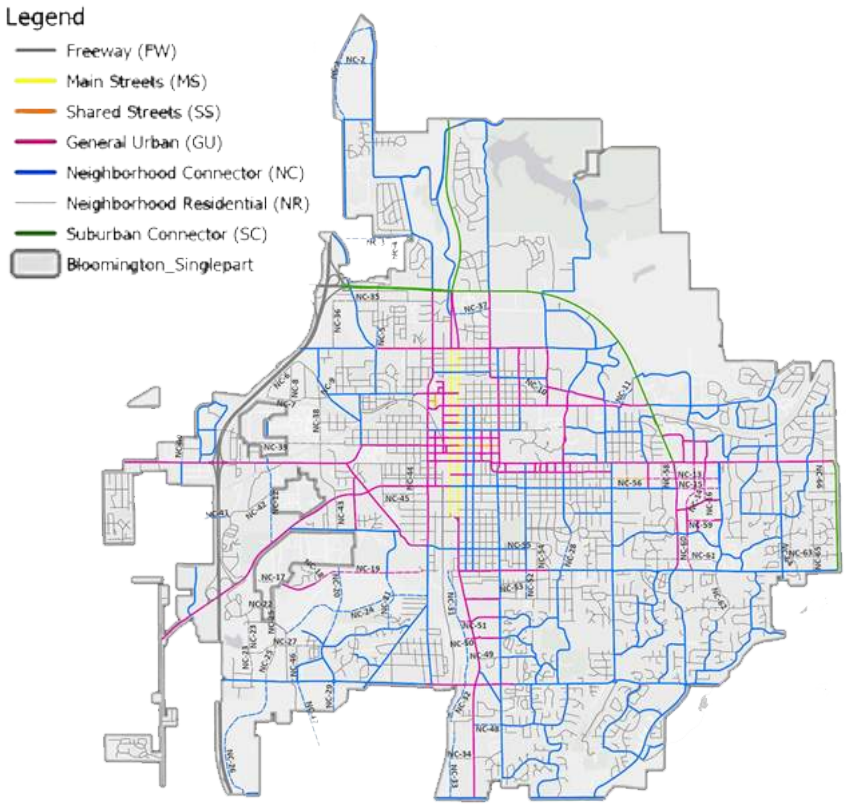
Table 1-1.Background Document Review

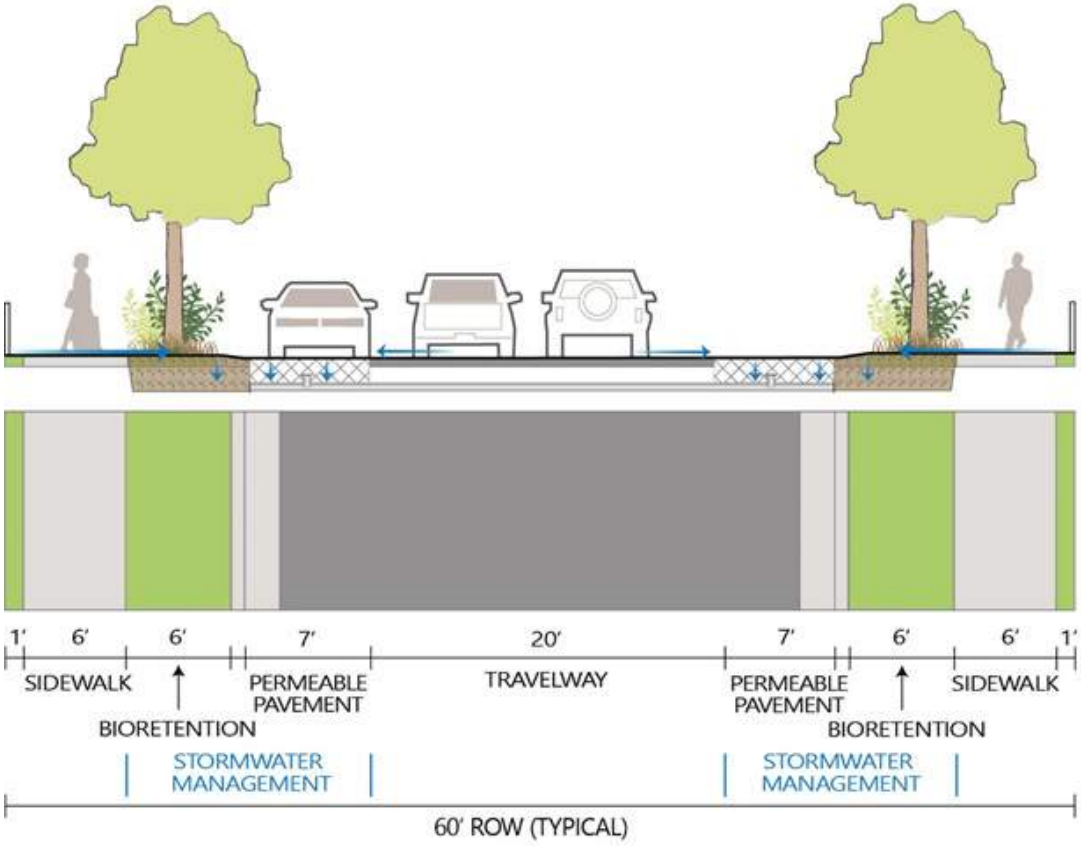
Document	Owning Department	Summary
Rules, Regulations and Standards of Service	CBU	A regulatory document for all aspects of CBU's services. ALL public construction has to be done in accordance w/ this manual. Sets requirements for drainage easements and what uses can occur.
Construction Specifications for City of Bloomington Utilities Wastewater, Water and Storm Projects	CBU	A specification document for construction requirements, including standard details, materials, sizes, and other aspects of public stormwater infrastructure. Includes requirements for design storm for stormwater infrastructure (10-year storm), and for "structures" (100-year storm).
Bloomington Municipal Code 10.20	CBU and P&T	Illicit stormwater connection and discharge code of ordinance
Bloomington Municipal Code 10.21	CBU and P&T	Construction site and post construction stormwater control ordinance for sites more than 1 acre of land disturbance. Creates requirements for water quality and quantity.
Unified Development Ordinance	P&T	The Unified Development Ordinance (UDO) governs land use and development throughout the City of Bloomington planning jurisdiction. Several areas of overlap with stormwater management in Development Standards & Incentives – Environment 20.04.030.
Comprehensive Plan 2018	P&T	Designed to guide growth into 2040, focused on sustainability and resilience, with specific goals for Green Infrastructure practices to improve quality of life for residents and tourism
Parks Tree Canopy Report	Parks and Rec	Identifies existing and plant-able areas in the City, summarizes economic and ecological benefits of increasing the size of the tree canopy
Parks Master Plan 2016-2020	Parks and Rec	Providing guidance to leaders and residents about decisions regarding plans for park land, recreation facilities/programs, and other services
Bloomington Transportation Plan	P&T	A 20-year plan that defines necessary steps to build a multi-modal transportation system that works for all roadway users
P&T Transportation Demand Mgmt Program Plan	P&T	Aims to further goals described in the Comprehensive Plan, with a focus on multi-modal transportation
HAND 2015-2019_consolidated_ plan	Housing and Neighborhood Development	Describes the City's plan to pursue the goals outlined by HUD for community planning and development programs.
ESD Sustainability Action Plan 2018	Dept of Economic and Sustainable Development	Sustainability planning effort focused on goals/actions that address environmental issues, economic prosperity, and social equity
Environmental Resource Inventory 2003	Bloomington Environmental Commission	Designed to collect and analyze information on the natural environment to help prioritize areas for future management and/or preservation.
Bloomington Flood Response Plan Full Report FINAL	Indiana Silver Jackets	A plan intended to reduce the risk of human life loss, injury, and damage to property during flood event

Document	Owning Department	Summary
Bloomington Environmental Action Plan	Bloomington Environmental Commission	Crafted to tackle environmental degradation and climate change through action and resiliency
Bloomington Climate Risk and Vulnerability Assessment May 2020	Bloomington Environmental Commission	This plan provides climate risk and vulnerability information, increases awareness of potential climate impacts and population
Sustainability Progress_Feb2019_ FINAL	Commission on Sustainability or Environmental Commission	Highlights key initiatives and achievements related to Bloomington's sustainability goals set in 2018
Bloomington Habitat Connectivity Plan	Bloomington Environmental Commission	Aims to strengthen biodiversity and improve habitat connectivity by articulating a vision for the conservation, enhancement, and expansion of green space
Trades District – Master Plan and Redevelopment Strategy for Certified Technology Park	Economic and Sustainable Development	Provides information on creating a 65-acre Certified Technology Park (CTP) with a sought-after model of modern, sustainable urban development
Trades District - Executive Summary for CTP Master Plan and Redevelopment Strategy	Economic and Sustainable Development	Created to support the attraction and growth of high-tech business and promote tech transfer opportunities
Trades District – Utility Master Plan for CTP Properties MEP Study Report	Economic and Sustainable Development	The Certified Technology Park encompasses 65 acres of downtown Bloomington and is home to several high-tech businesses. Plan outlines utility uses within this area.
Trades District – Drainage Master Plan for CTP Core Area	Economic and Sustainable Development	Intended to establish the drainage infrastructure that must be built to support development within the CTP

Background Document Review Example

The right of way area presents a significant opportunity to reduce stormwater runoff and improve the developed environment by integrating Green Infrastructure BMPs into these areas. The Bloomington Transportation Plan (adopted July 17th, 2019) established new street typologies that consider local context, follow a Complete Streets approach, and recognize the City's constrained ability to expand most roadways. However, the plan did not include stormwater management in the typology cross sections. The background document review completed as part of the Stormwater Master Plan expanded each typology cross section to consider a 'stormwater management' zone in which the Green Infrastructure BMPs and R/W details can be applied to each of the street typologies identified in the Transportation Plan. Future coordination between CBU and P&T will be required.





4.0 Stakeholder Engagement

4.0 Stakeholder Engagement

Figure 1-5 illustrates the consultant's typical stakeholder engagement process for Stormwater Master Plan development and implementation.

For the planning phase in Bloomington, the process remained within the first two center (white and green) circles. Departments represented included CBU Environmental, Engineering, and T&D, and City Planning & Transportation, Public Works, Parks and Recreation, and the Office of the Mayor. This ensured the various City stakeholder departments provided input to, and understand, the final Plan. As the implementation phase begins, a strategy to engage external stakeholders will be developed for relevant strategies.

Figure 1-5. Master Planning Process Stakeholder Involvement

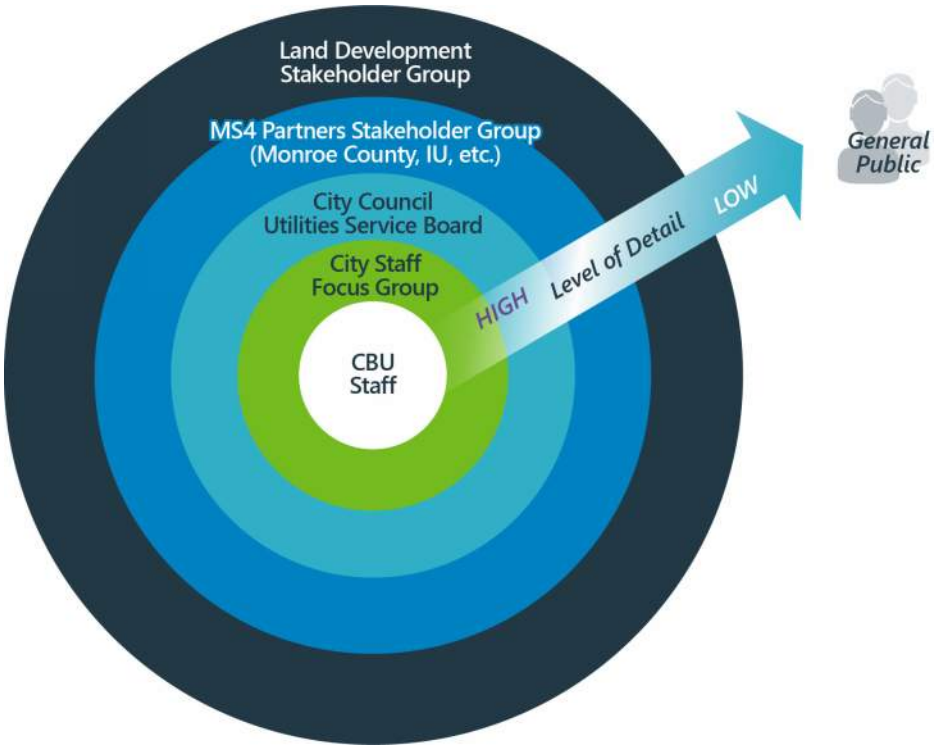


Figure 1-6. Master Plan Development Groups

Multiple groups worked to create strategies for the Master Plan (**Figure 1-6**). Below is information on each group's objectives:

- **CBU Staff** directed the project, drove the day-to-day project decision-making, and assisted the consultant with development of the Plan strategies. The consultant team met on a regular basis with CBU staff to obtain input on the Focus Group meetings and the developed strategies. CBU's Assistant Environmental Director led and managed the Master Plan development on behalf of CBU.
- **City Staff Focus Group**, was comprised of staff from nine City departments and met at key times during the Master Plan development to provide input and direction. Members and department representation are provided in **Table 1-2**. In addition, summaries of the meetings are provided after the table. **Appendix 1** provides the PowerPoint presentations and other material developed for and during Group meetings.
- **City Staff** Interviews were discussions with "like-missioned" staff aimed at gathering additional thoughts about challenges, the stormwater program in practice, how code is implemented, and what is working well for the City, and identifying opportunities and hurdles for Green Infrastructure BMP integration. A series of twelve (12) meetings with individual and groups of City staff were held between December 14th through 18th, 2020. Detailed meeting minutes organized by major need, challenge and opportunity are provided in **Appendix 3**.

Table 1-2. City Staff Focus Group Members

Name	Title	Department
Vic Kelson	Director	Utilities
James Hall	Director of Environmental Programs	Utilities
Katherine Zaiger	MS4 Coordinator	Utilities
Brad Shroeder	Director of Engineering	Utilities
Phil Peden	Utilities Engineer	Utilities
Michael Carter	Project Coordinator	Utilities
Brandon Prince	Director of T&D	Utilities
Adam Wason	Director	Public Works
Beth Rosenbarger	Planning Services Manager	Planning and Transportation
Scott Robinson	Director	Planning and Transportation
Neil Kopper	Senior Project Engineer	Planning and Transportation
Linda Thompson	Senior Environmental Planner	Planning and Transportation
Steve Cotter	Natural Resources Manager	Parks and Rec
Joanna Sparks	City Landscaper	Parks and Rec
Erin Hatch	Urban Forester	Parks and Rec
Devta Kidd	Innovation Director	Office of the Mayor
Matt Swinney	Program Manager, Housing & Construction	Housing and Neighborhood Development
Chris Wheeler	City Attorney	Legal
Lauren Travis	Director of Sustainability	Economic and Sustainable Development
Andrew Cibor	City Engineer	Planning and Transportation

Focus Group Meeting 1 Summary

Meeting date: November 18th, 2020
Time: 12pm – 2pm
Location: Virtual

Summary:
The objectives of Focus Group Meeting 1 were to: 1) introduce the City Staff Focus Group to the Master Planning purpose and process; 2) make them aware of the breadth and depth of the City's stormwater program; and gather input on stormwater opportunities and challenges within their departments. The Group also provided input on the project (Master Plan) Vision Statement (provided previously on page 2). During this virtual meeting, the consultant team used various computer-based tools, such as Mentimeter and Mural, to gain Group input. Examples of the use of, and input gained from, these tools are provided below. All meeting material is provided in **Appendix 1**.

Rate your understanding of these concepts from "It's Greek to me!"

to

"I totally get it!"

What are THREE words that come to mind when you hear "Stormwater Master Plan?"

Share an aspiration you have about stormwater management…something you wish were different…something you've seen elsewhere…something that impacts your work.

"Less runoff, more soil retention."

"Connect habitat corridors."

"The continued inclusion of green infrastructure that has minimal impact on the existing infrastructure."

"Effective, aesthetically pleasing, considers Indiana is getting hotter and wetter."

"I want green infrastructure to be incorporated into every single city project, plus retrofitting existing impervious/grass area as much as possible."

"I hope to have technical guidance/standards so that green infrastructure can be installed and maintained with confidence."

"I wish we could create living streets across the City…and in neighborhoods remove a lot of the asphalt and have just 12 or 15 feet strips of asphalt. It would dramatically reduce impervious surface, create slow streets, and create more play space."

"Reduce sanitary sewer inflow and infiltration."

"Private individuals having a better understanding of post-construction management."

"CBU receives numerous complaints from various segments of the community that complain about flooding and from a legal standpoint, we are regularly having to advise that the City is [usually] not responsible."

"Regular maintenance of mechanical BMPs. Sufficient funding to restore habitat in stormwater drainage corridors."

"Stricter detention requirements, more connections between stormwater detention and water quality requirements and the planning landscape and site design standards."

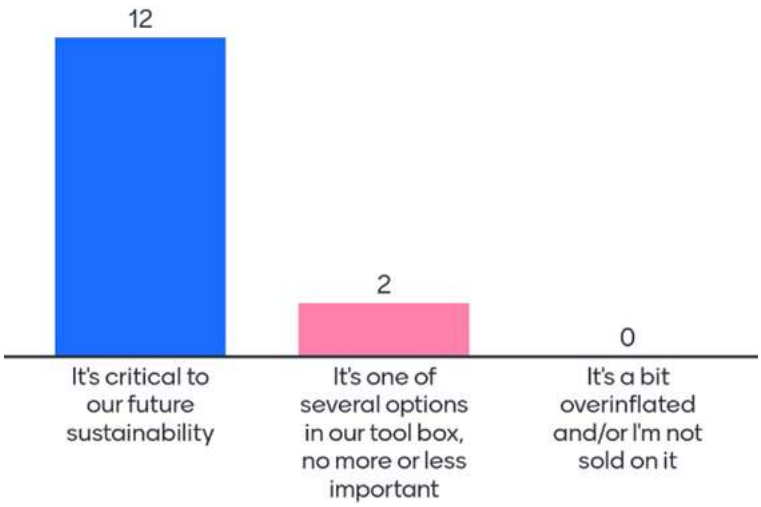
"A new way of thinking – standard practices do not meet many expectations or environmental goals. It is a costly infrastructure to implement."

"Increased mixed native vegetation understory and canopy planting, with permeable pavement."

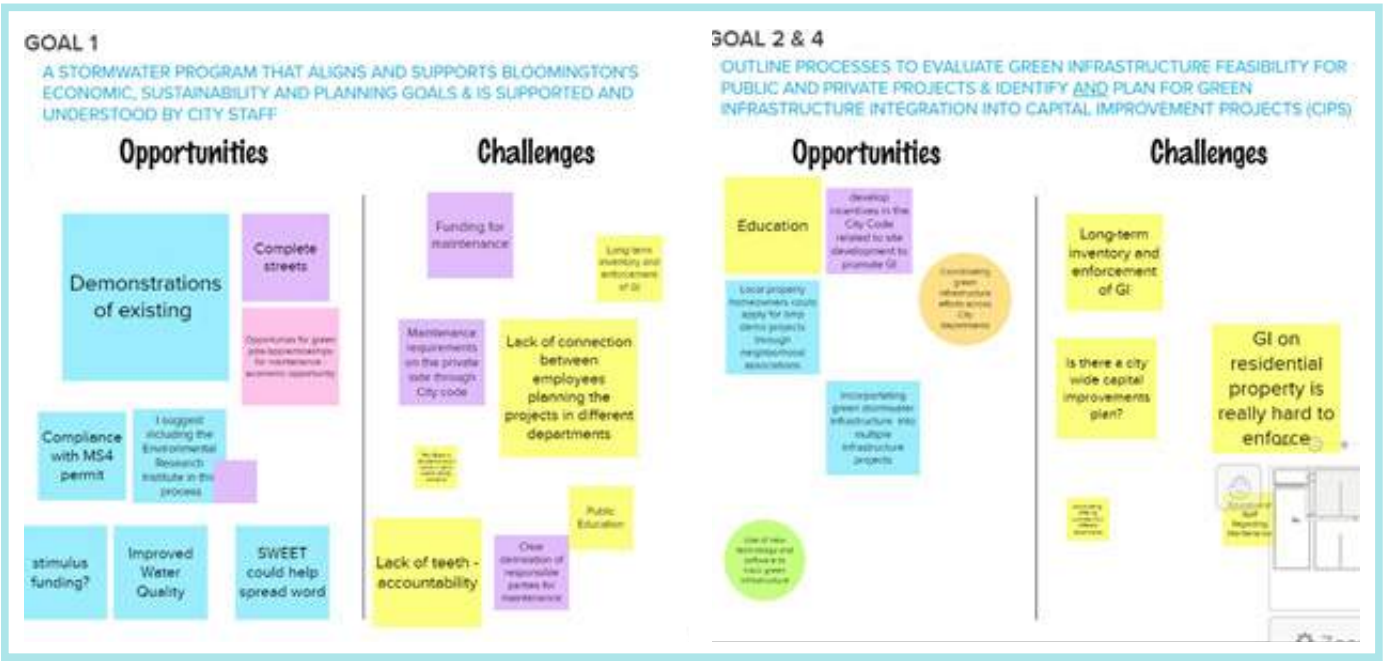
Rank what you think the greatest barriers to implementing more Green Infrastructure:

- 1st: Costs (real or perceived)
- 2nd: Maintenance concerns
- 3rd: Knowledge and will of the developers
- 4th: Public demand and desire for it
- 5th: Concerns about its function
- 6th: Existing codes and policies

What is your level of support for Green Infrastructure?




What words come to your mind when you see this picture?
Mentimeter
awesome
prettier
infiltration
maintenance of pavers
attractive
longterm
maintenance
green
sustainable
aesthetically pleasing
trades district
innovative
great
pretty

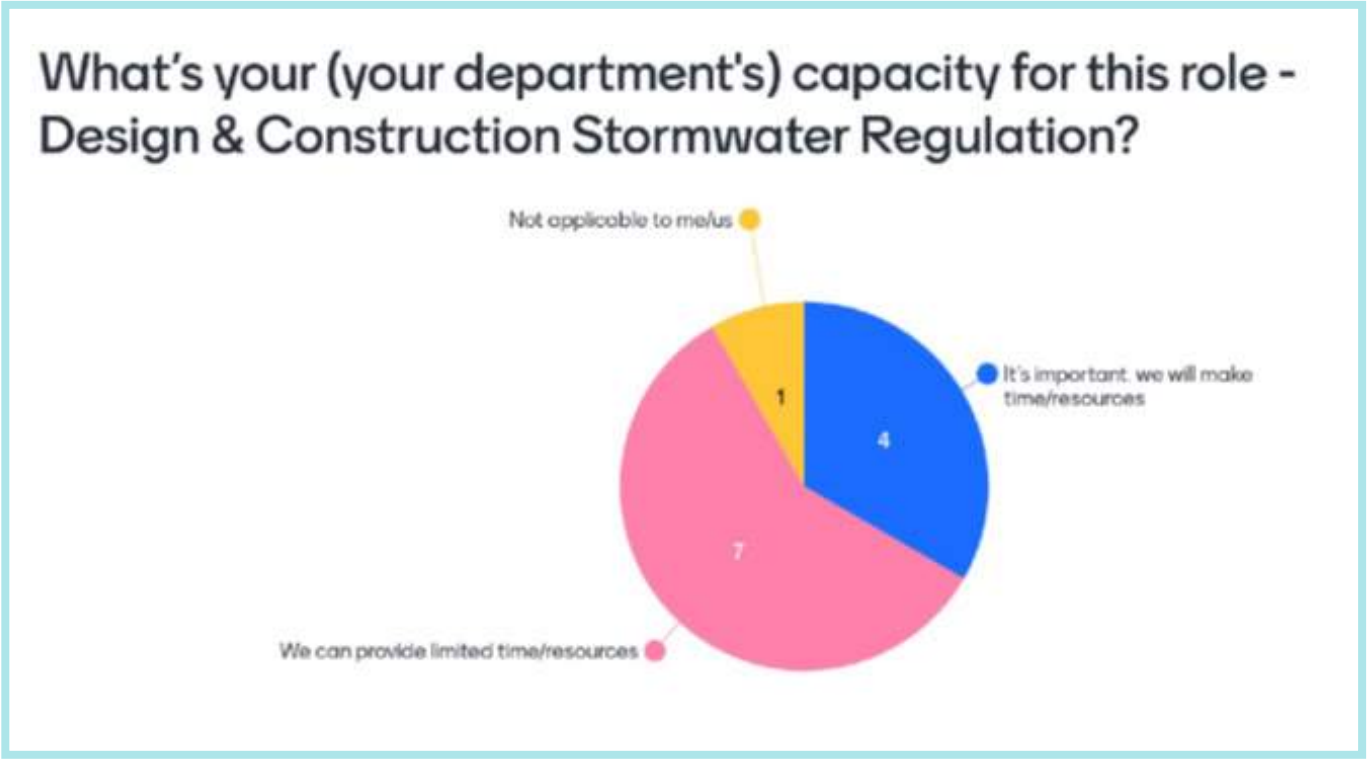

GOAL 1
A STORMWATER PROGRAM THAT ALIGNS AND SUPPORTS BLOOMINGTON'S ECONOMIC, SUSTAINABILITY AND PLANNING GOALS & IS SUPPORTED AND UNDERSTOOD BY CITY STAFF
Opportunities
Challenges
Demonstrations of existing
Complete streets
Compliance with MS4 permit
stimulus funding?
Improved Water Quality
SWEET could help spread word
Funding for maintenance
Lack of connection between employees planning the projects in different departments
Lack of teeth - accountability
Public Education
GOAL 2 & 4
OUTLINE PROCESSES TO EVALUATE GREEN INFRASTRUCTURE FEASIBILITY FOR PUBLIC AND PRIVATE PROJECTS & IDENTIFY AND PLAN FOR GREEN INFRASTRUCTURE INTEGRATION INTO CAPITAL IMPROVEMENT PROJECTS (CIPS)
Opportunities
Challenges
Education
Long-term inventory and enforcement of GI
Is there a city wide capital improvements plan?
GI on residential property is really hard to enforce

Focus Group Meeting 2 Summary

Meeting date: May 19th, 2021
Time: 11am – 1pm
Location: Virtual

Summary:
Prior to Meeting 2, the City Staff Focus Group were provided draft Master Plan strategies developed by CBU staff and the consultant team for their review and comment. They were also given the opportunity to provide detailed input (using an online survey) on a strategy to develop criteria for the use of CBU funds allocated for Green Infrastructure on City projects.

During Focus Group Meeting 2, the Consultant Team provided a high-level summary of the draft Strategies. The Focus Group members asked to answer each of the following questions using a pre-defined ranking index for each strategy: 1. Relevant need of strategy, 2. Departments role in the strategy, and 3. Department's capacity to provide assistance for strategy implementation. As well, the Focus Group spent time discussing and providing detailed input on a strategy to develop criteria for the use of funds allocated for Green Infrastructure on City projects. The goal of this strategy is to better support and guide use of funds for CBU projects. Materials used and input provided during Meeting 2 is provided below. Detailed survey results and meeting materials can be found in **Appendix 1.**

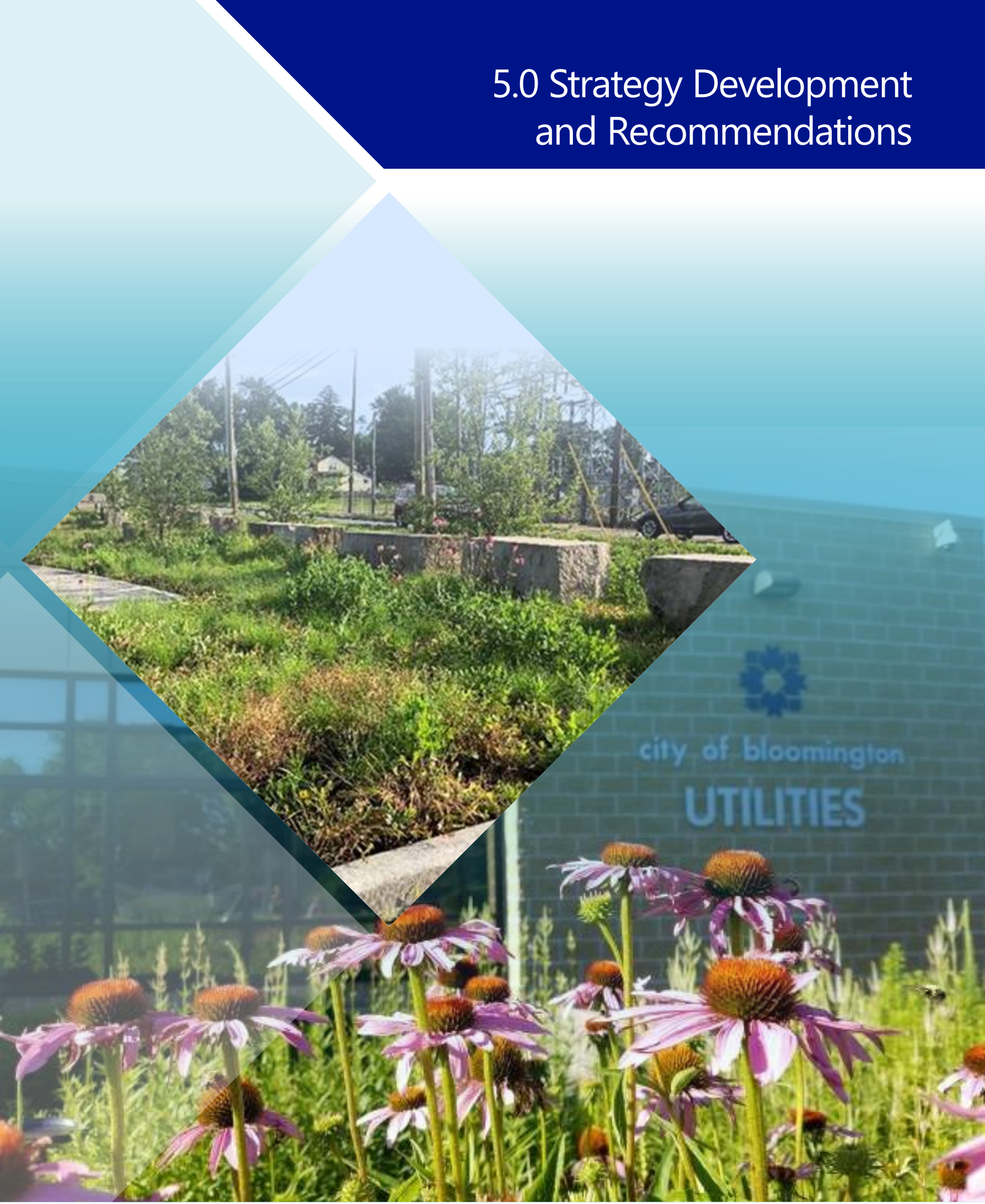


City of Bloomington Green Infrastructure Evaluation Criteria (public projects to be supported by CBU)		
ID	id	**Evaluation Criteria**
1		**Policy, Plans, and Regulations**
	1a.	Project furthers Green Infrastructure goals identified in the *Stormwater Master Plan*
	1b.	Project benefits the MS4 program and minimum control measures (MCMs)
	1c.	Project supports other City initiatives and goals (Sustainability Plan, Comp Plan, Parks Plan, etc.)
2		**Public Impact, Equity & Environmental Justice**
	2a.	Project is located in a highly visible area/public space
	2b.	Project addresses resident complaints about stormwater quality &/or flooding
	2c.	Project improves/enhances mobility systems, safe connections, public spaces, recreational opportunities that support physical and mental well-being
	2d.	Project is located in an underserved neighborhood
	2e.	Project has public/private partnership w/ local equity & env. justice group
	2f.	Project provides training to underserved communities and volunteer opportunities
3		**Sustainability & Resiliency**
	3a.	Project has the potential to mitigate local flooding issues
	3b.	Project has the potentital to mitigate extreme storm events
	3c.	Project has the potential to mitigate recurring maintenance issues & upgrade aging infrastructure
	3d.	Project will create or enhance habitat
	3e.	Project has the potential to reduce Bloomington's carbon footprint (heat island reduction, water reuse, reduced maintenance or treatment demands, alternative energy generation)
	3f.	Project has the potential to improve WQ in a sensitive watershed (Griffy Lake, Clear Creek, Jackson Creek)
	3g.	Project promotes interdepartmental resource/knowledge sharing
	3h.	Project concept is easily repeatable and can be applied in other areas of City
4		**Economic Impact**
	4a.	Project will improve local aesthetic quality & character
	4b.	Project implementation has potential to increase surrounding land values
	4c.	Project is eligible for ongoing funding &/or has grant potential
	4d.	Project cost is commensurate with the benefits achieved (cost/benefit analysis has been performed)
5		**Design, Construction, & O&M**
	5a.	Project permitting is obtainable
	5b.	Project design provides maximum stormwater benefit
	5c.	Project is well suited for &/or plans are easily retrofitted to include Green Infrastructure
	5d.	Project lifecycle cost of O&M is evaluated and budgeted for
	5e.	Project has O&M plan & responsibilities have been clearly defined through departmental MOU or other legal documentation

What are Bloomington's Values?

How to create PROCESS for Green Infrastructure Prioritization?

5.0 Strategy Development and Recommendations



5.0 Strategy Development and Recommendations

As detailed in the previous sections, strategies were developed with input from the Focus Group. Summary descriptions for each of the strategies listed in **Table 1-3** are provided in the pages that follow. Strategies are listed in the table along with the page number where the strategy is summarized. Each description includes a list of City and CBU divisions that are most affected by implementation of the strategy. CBU's stormwater related divisions are identified individually (e.g., "CBU Env., CBU Eng., etc.) except when the strategy impacts all of them. In the latter case, all stormwater related divisions are identified as "CBU (all)". Each summary description is followed by an estimated cost, its priority for implementation, and a recommended timeframe.

- **Estimated cost** is defined as the anticipated cost to implement the strategy within CBU's current operations if outside consulting services are used. Most strategies do not require additional CBU staff and equipment for implementation (e.g., development of a watershed master plan or proactive system maintenance plan). However, once strategies are implemented as an on-going activity, CBU's on-going operational resource needs may increase (e.g., project managers may be needed to oversee master plan CIPs and additional maintenance staff and equipment may be needed for a proactive maintenance program). These annual and on-going costs are not included in the estimated costs below. As strategies are implemented, consultant deliverables should include annual estimates of CBU's resource needs that result from strategy implementation. These estimates can then be included in CBU's annual budgets and regular stormwater utility cost-of-service and rate reviews.
- **Priority | Year** is the suggested importance of a strategy based on implementation of this master plan over the next six years as listed below. Note: strategies are listed based on the year funding is first allocated for implementation. Strategies may take multiple years to develop before they are fully implemented, or may become an on-going part of CBU operations once it has begun.
    - **High priority** strategies should begin in fiscal year 2022
    - **Medium priority** strategies should begin in 2023 or 2024
    - **Low priority** strategies should begin in 2025, 2026, or 2027
- **Execution Timeframe** indicates whether the strategy will be implemented one-time or will lead to on-going significant administrative or operational activities/costs once it is fully adopted. Significant activities/costs for on-going execution timeframes are explained in the table.

A detailed narrative on each strategy is provided in **Appendix 5**.

Table 1-3. Stormwater Master Plan Strategies

Stormwater Master Plan Strategies	Page
Stormwater Regulation Strategies - Design & Construction Stages	
1. Update the Construction Stormwater Management provisions in Chapter 10.21	20
2. Update and expand the Post-Construction Stormwater Management provisions in Chapter 10.21	20
3. Develop a Stormwater Design Manual	20
4. Review and update the CBU Construction Specifications	21
5. Align the UDO with updated Chapter 10.21 and the new Stormwater Design Manual	21
Stormwater Regulation Strategies - BMP/Detention Maintenance Stage	
6. Develop a maintenance program for privately-owned stormwater BMPs/detention basins	21
7. Review and update the CBU Stormwater Utility Credit Manual	22
Stormwater Regulation Strategies - Organizational	
8. Facilitate and support the design and implementation of of Low Impact Development and Green Infrastructure for public projects	22
9. Eliminate conflicting activities between City & CBU depts in regards to private land dev. process	22
Stormwater System Management Strategies	
10. Develop a jurisdiction-wide Stormwater System Management & Maintenance Plan a. System condition assessment and prioritization b. Watershed master planning c. System maintenance upgrades	23
11. Develop guidance for control of invasive plant species	24
12. Develop a Green Ditch Enhancement initiative	24
MS4 Permit Strategies	
13. Evaluate and update the SWQMP	24
14. Develop a Water Quality Characterization Report	25
Education, Training, & Outreach Strategies	
15. Develop an Education & Outreach Program for stakeholders and the public	25
Stormwater Funding Strategies	
16. Update CBU's stormwater cost-of-service and perform a rate study	26

Strategy 4. Review and update the CBU Construction Specifications	
Description: Update the Construction Specifications as appropriate to eliminate conflicts with updated Chapter 10.21 and the new Stormwater Design Manual. Provide also hydraulic methods, referring to the Stormwater Design Manual for hydrologic methods. Create also a Table of Contents for the Construction Specifications to simplify navigation. **Estimated Cost:** $5,000 **Priority | Year:** Low Priority | FY 2026 **Execution Timeframe:** One time	**Impacted Department(s):** CBU Eng.
Strategy 5. Align the Unified Development Ordinance (UDO) with updated Chapter 10.21 and the new Stormwater Design Manual	
Description: Revise the UDO to align with and use stormwater terminology consistent with Chapter 10.21 and the Stormwater BMP Design Manual, clarify planning-level stormwater Green Infrastructure practices (many already exist within the current UDO), and revise/ define criteria for Green Infrastructure BMPs incentives. Align the UDO's landscape requirements with vegetation requirements for Green Infrastructure BMPs. **Estimated Cost: $30,000** **Priority | Year:** Medium Priority | FY 2024 **Execution Timeframe:** One time	**Impacted Department(s):** CBU Eng. CBU Env. P&T

Stormwater Regulation Strategies – BMP Maintenance Stage

Strategy 6. Develop a maintenance program for privately-owned stormwater BMPs and detention basins	
Description: Develop a Stormwater BMP Maintenance Program to comply with NPDES-MS4 Permit requirements and provide for effective long-term maintenance of BMPs. The program should include: • A new ordinance to require property owners to protect and maintain the BMPs located on their property • Strong BMP owner communication and education components to guide and support owners in complying with the ordinance (links to strategy 15) • An enforcement response protocol that emphasizes education first (especially for new owners) but includes graduated penalties for repeat violations • A georeferenced database to document and track BMP inspection, maintenance, and enforcement, and automate owner engagement **Estimated Cost:** $50,000 initially then $25,000 annually **Priority | Year:** Low Priority | FY 2025 **Execution Timeframe:** On-going. Once the maintenance program is fully defined, CBU will incur on-going costs for staff inspections and enforcement, database maintenance, NPDES-MS4 permit reporting (if any), and any on-going educational program elements (such as training)	**Impacted Department(s):** CBU Eng. (GIS) CBU Env. CBU T&D Public Works Parks & Rec

Strategy 7. Review and update the CBU Stormwater Utility Credit Manual

Description: Provide incentives in the form of user-fee credits for the use of Green Infrastructure BMPs and other protected features (e.g., reforestation areas). If used, credits should be tied to BMP maintenance program, such that unmaintained BMPs lose their credit. Also provide templates/guidance on how developers can use these credits to advertise their developments.

Estimated Cost: $30,000

Priority | Year: Low Priority | FY 2027 **Execution Timeframe:** One time

Impacted Department(s):

CBU Eng. (GIS)

CBU Env.

Stormwater Strategy Summaries - Organizational

Strategy 8. Facilitate and support the design and implementation of Low Impact Development and Green Infrastructure for public projects

Description: This strategy includes:

- Development of CBU criteria for Green Infrastructure funding of non-CBU public projects, such as roadway development/revisioning. Also development of a fact sheet/application that can be used by other departments to request funding
- Development of protocols or memorandums of understanding between CBU and other City departments for the consideration/inclusion of Low Impact Development and Green Infrastructure projects on non-CBU city projects.
- Development of typical details for Green Infrastructure BMPs located in the public rights-of-way.

Estimated Cost: $64,000 initially based on scope provided by Wood to CBU for then $60,000 annually thereafter

Priority | Year: Medium Priority | FY 2024 **Execution Timeframe:** On-going

Impacted Department(s):

CBU Eng.

CBU Env.

CBU T&D

City Eng.

Public Works

Parks & Rec

Strategy 9. Eliminate conflicting activities between City & CBU departments in regards to the private land development process

Description: Define the stormwater roles and responsibilities of Planning & Transportation, CBU Engineering, and CBU Environmental during the land development process, for land developments that must comply with Chapter 10.21. Revise and align relevant codes and inter-departmental processes accordingly.

Estimated Cost: $10,000

Priority | Year: Medium Priority | FY 2023 **Execution Timeframe:** One time

Impacted Department(s):

CBU (all)

Stormwater System Management Strategy Summaries

Strategy 10. Develop a jurisdiction-wide Stormwater System Management & Maintenance Plan

Description: CBU desires to improve management of the public stormwater system to a more informed and proactive approach. To do this, the following activities must be implemented.

a. System condition assessment and prioritization – Visually inspect and document the condition of the system. Data collected will be used for activities b. and c. immediately below.

b. Watershed master planning – Analyze watersheds in the CBU stormwater service area and develop mitigation strategies for stream erosion, drainage issues, flooding, climate adaptation, and poor water quality.

c. Stormwater System Maintenance Upgrades – Based on the results of activities a. and b. immediately above, gradually improve stormwater system maintenance protocols and processes to reach the goal of proactive maintenance provided throughout the CBU stormwater service area.

Estimated Costs are as follows:

a. System condition assessment and prioritization – $325,000 over 4 years. This amount is roughly estimated for in-field condition assessment city-wide, with additional collection of privately-owned BMP data, and an asset inventory in areas that currently have no stormwater information.

b. Watershed master planning – $330,000 over 3 years (for the CBU system service area)

c. Stormwater System Maintenance Upgrades – $250,000 over 2 years, with ongoing annual costs depending on maintenance and repair needs identified by activities 10a and 10b described above. CIPs will be identified as part of the watershed master plan effort (strategy 10b). Experience tells us that CIPs, once identified, will substantially add to CBU's annual stormwater costs. Therefore, after 2026, it is expected that this line item could increase substantially.

Priority | Year and **Execution Timeframe** are as follows:

a. System condition assessment and prioritization – High priority | FY 2023 | One-time over 3 budget years

b. Watershed master planning – Low priority | FY 2025 | One-Time over 3 budget years

c. Stormwater System Maintenance Upgrades – Low priority | FY 2026 | On-going. Once the master plan is developed, significant on-going costs are anticipated from increased need for equipment and staff to support system cleaning and rehabilitation identified in activities a. and b., immediately above and from capital improvement projects identified by master planning, increased need, upgraded system maintenance protocols.

Impacted Department(s):

CBU Env.,

CBU Eng., GIS,

CBU T&D

Strategy 13. Evaluate and update the SWQMP

Description: Evaluate CBU's current NPDES-MS4 Permit compliance program, identify gaps with existing and anticipated future permit requirements, and recommend solutions for gap closure. Update the SWQMP and maintain it, as required by the permit, as a dynamic "document" (through the Annual Reporting effort) to better describe CBU's stormwater compliance program.

Estimated Cost: $15,000

Priority | Year: High Priority | FY 2022 **Execution Timeframe:** One time

Impacted Department(s):

CBU Env.

Strategy 14. Develop a Water Quality Characterization Report	
Description: The current and anticipated future NPDES-MS4 Permit requires permittees to develop a Water Quality Characterization Report. This is largely a GIS desktop exercise. The outcome can drive decisions made by CBU regarding permit, system maintenance, and regulatory activities. **Estimated Cost:** $50,000 **Priority | Year:** High Priority | FY 2022 **Execution Timeframe:** One time	**Impacted Department(s):** CBU Env.

Education, Training, & Outreach Strategy Summary

Strategy 15. Develop an Education & Outreach Program for stakeholders/public	
Description: Activities are as follows: a. Develop plan – Develop and implement a five-year plan for stakeholders and the public geared towards stormwater education and outreach with the overarching objectives of fostering greater understanding of basic stormwater concepts, recognition of their own (and the City's) roles in stormwater management, and ensuring stakeholders understand and satisfy their own stormwater responsibilities. Substrategies include: creating a brand and logo for CBU's stormwater program to foster program recognition; development of a web resources center; and development of outreach and training practices for various stakeholder audiences, including City staff, developers and site designers, site contractors, and BMP owners. b. Activity implementation – Implement the education and outreach plan. **Estimated Costs** are as follows: a. Develop plan – $15,000 including stakeholder involvment b. Activity implementation – $50,000 for the first two years to develop base content and set-up education/outreach activities, then a lesser amount annually for on-going execution **Priority | Year** and **Execution Timeframe** are as follows: a. Develop plan – Low priority | FY 2025 | One-time b. Activity implementation – Low priority | FY 2026 | Ongoing Once the education plan is fully defined, CBU may incur costs, possibly on-going, for activities that will be performed on an on-going basis. An example of such an activity is stakeholder training held annually to update or train site developers on CBU/City stormwater regulations or design preferences.	**Impacted Department(s):** CBU (all)

Funding Strategy Summary

Strategy 16. Update CBU's stormwater cost-of-service & perform rate study	
Description: Refine or correct costs estimated for this Master Plan as strategies 1 through 15 are implemented. Costs for CIPs and other mitigation strategies developed as part of the stormwater system management and maintenance upgrades (see Strategy 10) will likely comprise the majority of new costs as CIPs and maintenance typically comprise the largest cost-of-service line item within a stormwater utility. Consider multiple sources of revenue for plan implementation, as follows: a. Include costs in the the next stormwater utility rate study (anticipated in 2022) b. Consider installing fees for site plan review and site inspections Consider fees for long-term BMP maintenance inspections. However, long-term BMP inspection costs may be more appropriate as a line item cost within stormwater cost-of-services as the service provided benefits all stormwater customers as opposed to just owners of post-construction BMPs. **Estimated Cost:** *Not shown here, already captured in CBU's existing 2022 budget* **Priority | Year:** High Priority **Execution Timeframe:** Ongoing as already predicated by CBU policy for rate reviews	**Impacted Department(s):** CBU (all)

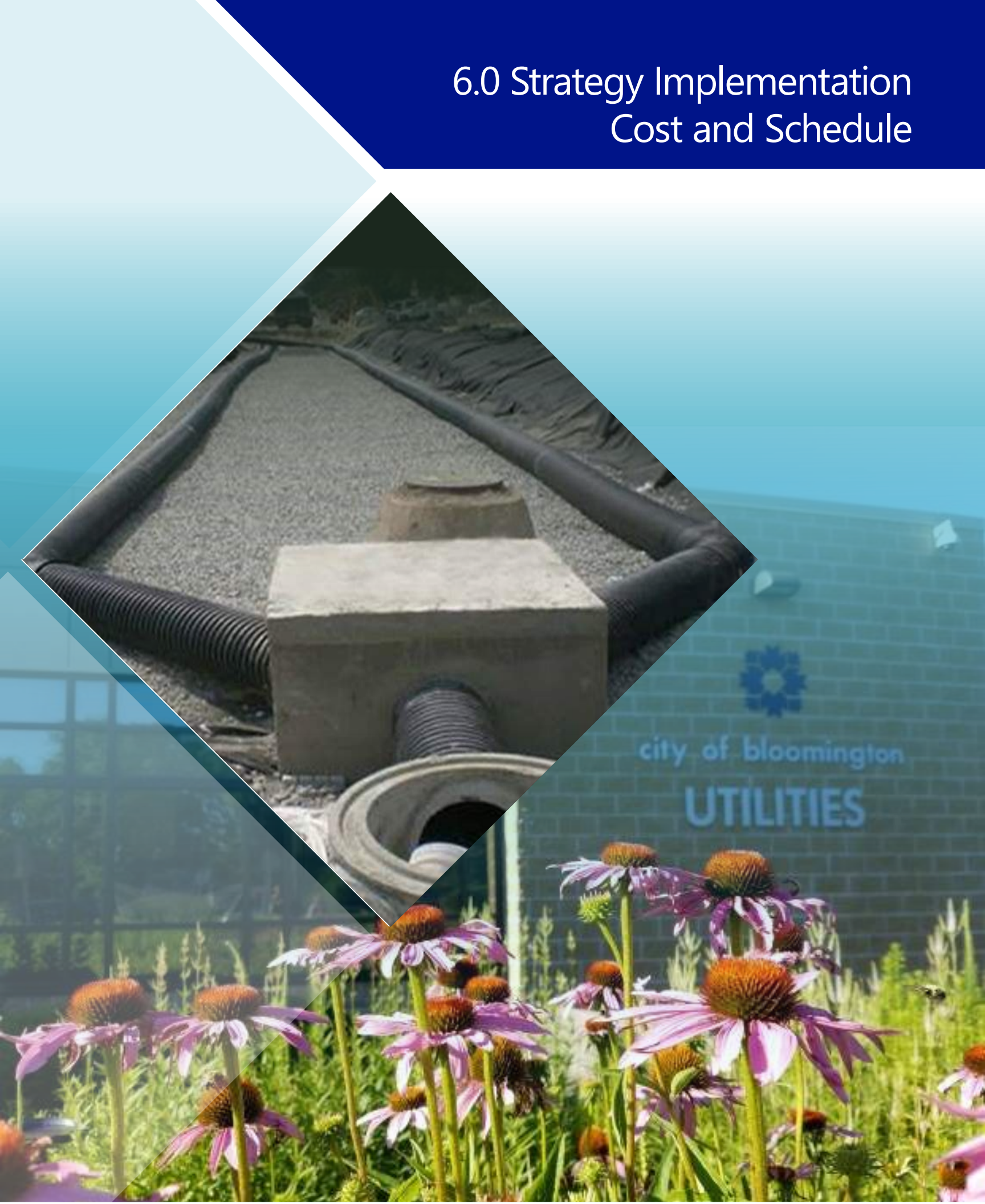
To be effective, a Stormwater Master Plan should result, largely, in actionable strategies that, once fully implemented, improve a community's stormwater regulations, administration, or operations so it achieves its unique set of program goals. In Bloomington's Plan, implementation of most strategies will be one-time activities that, once complete, will result in tangible "product" ready for use to drive or support the stormwater program. For example, strategies 1 through 5 will result in revised City code and support tools used to administer and guide stormwater design and construction.

On occasion, planning efforts must be extended or enhanced in key areas to allow a community to achieve its stormwater goals. These "plan to plan" strategies arise when there is a lack of data, information, or stakeholder input to form and estimate costs for a tangible and effective administrative, regulatory, or operational product. The need for additional planning is often not recognized until a Master Plan is developed, as data gathering and stakeholder input sheds light on information/data gaps. For Bloomington, two strategies will result in continued planning activities. This is explained in **Table 1-4**.

Table 1-4. Explanation of "Plan to Plan" Strategies

Strategy	Explanation of Planning Need
10. Develop a jurisdiction-wide Stormwater System Management and Maintenance Plan	This strategy includes the development of a watershed/stormwater system (technical) master plan, where watershed and system response to rainfall and snow events is modeled and mitigation alternatives for negative stormwater impacts are analyzed and recommended. The need for a technical analysis and resulting plan could not be determined at the start of the project. The strategy was developed because of the information gathered during the planning process, as follows: 1. CBU staff expressed the need to better understand the public stormwater system so support more effective planning and execution of their department's responsibilities 2. CBU staff expressed the desire to move to a proactive system maintenance approach, which cannot be effective without an understanding of system condition, the sources of on-going system issues, potential mitigation approaches, and system changes and expectations over time 3. CBU cannot often determine long-term solutions to drainage, flooding, and stream erosion problems because the system is not well understood. As a result, current system repairs are often "band-aids" that will not solve larger, source problems 4. CBU does not have current computer models or master plans that provide a full understanding of watershed hydrologic response and system operation information 5. CBU has a system inventory and the ability to capture subsurface system condition information via video, but does not currently have condition information for most of the system
15. Develop an Education & Outreach Program for stakeholders and the public	Stormwater Education & Outreach is rapidly becoming a critical part of local stormwater programs, especially where MS4 permit compliance and stakeholder communications are concerned. The development of an Education & Outreach Plan is not a complicated or costly effort. It was included as a "plan to plan" strategy in this Master Plan for the following reasons. 1. Finding education and outreach strategies that fit a community take a fair amount of discussion and research time by the consultant team and a different set of internal stakeholders, such as the City's information technology staff and City public relations staff. These staff were not necessary for the master planning effort and therefore were not included in the planning phase of this project. However, they may be key to development education and outreach strategies. 2. Today's world of the internet and social media means that many desirable and effective education and outreach approaches require skills and partnerships that are often foreign to typical stormwater staff and utility department skill sets. It takes time to determine if these approaches are desired, and then find the right partnerships or skill sets. 3. Education and outreach strategies are really extensions of other stormwater program elements. For example, privately-owned BMP maintenance and enforcement often requires a substantial education, outreach, and communication tools to ensure success. Therefore, it helps to understand and further develop those program elements before implementing strategies that are intended to support them.

6.0 Strategy Implementation Cost and Schedule



6.0 Strategy Implementation Cost and Schedule

A schedule for implementation of each recommended strategy is provided in **Table 1-5.** The schedule was developed by the consultant team based on their experience with implementation of similar strategies, a necessary progression for interrelated strategies, and the program priorities expressed by CBU staff and the City Staff Focus Group (in Meeting 2). The estimated cost for each strategy is included in the schedule. The total estimate cost per year is reflected at the bottom of each year column. Expressing the implementation phase schedule with costs in this way allows Master Plan stakeholders to refine the implementation phase schedule by balancing need fulfillment (i.e., strategy implementation) with annual budgets. The total estimated cost for implementation of all recommendations within the six-year period is **$1,880,000.**

Based in our experience in other communities, stormwater costs of at least $300,000 would be expected to continue annually to support on-going activities. The primary funding need will be for stormwater system maintenance and minor repairs (strategy 10) and, less so, the BMP maintenance program (strategy 6), the continued implementation of Low Impact Development on public projects (strategy 8), and stakeholder and public education and outreach (strategy 15. However, note that potential stormwater/flood management capital improvement projects (CIPs) are not indicated under line item 10 in **Table E-3**. CIPs will be identified as part of the watershed master plan effort (strategy 10b). Experience tells us that CIPs, once identified, will substantially add to CBU's annual stormwater costs.

The stormwater regulation strategies recommended in Strategies 1 through 5 are all interrelated and include numerous sub-strategies. More detail, in terms of sub-strategies and (in some cases) costs, is provided in **Table 1-6**. The schedule shown in **Table 1-6** presumes Indiana's next Construction General Permit and General MS4 Permit are issued in early 2022. The following permit-related deadlines were considered when developing this schedule:

- CBUs General Permit Notice of Intent (NOI) must be submitted within 90-days of the effective date of the new permit, and the SWQMP must be submitted with 6-months of the date of NOI submittal.
- MS4-permit related ordinances must be updated within 24-months of the date of NOI submittal.
- Wood assumed the fully-updated stormwater design program (including the ordinance and manual) are adopted by the end of 2026.

Table 1-5. Stormwater Master Plan Strategy Implementation

#	Strategy	Frequency	Year						
			2022	2023	2024	2025	2026	2027	2028
1	Update the Construction Stormwater Management provisions in Chapter 10.21	One time	-	$ 16,000	-	-	-	-	-
2	Update and expand the Post-Construction Stormwater Management provisions in Chapter 10.21	-	-	$ 25,000	-	-	$ 15,000	-	-
3	Develop a comprehensive Stormwater Design Manual using a stakeholder guided process	One time	-	-	$ 80,000	$ 110,000	$ 110,000	-	-
4	Review and update the CBU Construction Specifications	One time	-	-	-	-	$ 5,000	-	-
5	Align the UDO with updated Chapter 10.21 and the new Stormwater Design Manual	One time	-	-	$ 30,000	-	-	-	-
6	Develop and implement a maintenance program for privately owned stormwater BMPs and detention basins	On-going	-	-	-	$ 50,000	$ 25,000	$ 25,000	*Ongoing* →
7	Review and update the CBU Stormwater Utility Credit Manual	One time	-	-	-	-	-	$ 35,000	-
8	Facilitate and support the design and implementation of Low Impact Development and Green Infrastructure for public projects	One time	-	-	-	$ 64,000	$ 60,000	$ 60,000	*Ongoing* →
9	Eliminate conflicting activities between the City & CBU depts in regards to the private land development process	One time	-	$ 10,000	-	-	-	-	-
10	Develop a jurisdiction-wide Stormwater System Management and Maintenance plan	-	-	-	-	-	-	-	-
	10a. System condition assessment and prioritization	One time	-	$ 100,000	$ 75,000	$ 75,000	$ 75,000	-	-
	10b. Watershed master plans & climate adaptation analysis ***(leads to CIP projects & system maint. upgrades)***	Ongoing	-	-	-	$ 110,000	$ 110,000	$ 110,000	-
	10c. System maintenance upgrades	Ongoing	-	-	-	-	$ 50,000	$ 200,000	*Ongoing* →
11	Develop guidance for control of invasive plant species	One time	-	-	$ 50,000	-	-	-	-
12	Implement a Green Ditch Enhancement initiative	One time	-	$ 20,000	-	-	-	-	-
13	Evaluate and update the SWQMP	One time	$ 20,000	-	-	-	-	-	-
14	Develop a Water Quality Characterization Report	One time	$ 50,000	-	-	-	-	-	-
15	Develop an Education & Outreach Program for stakeholders and the public	Ongoing	-	-		$ 15,000	$ 50,000	$ 50,000	*Ongoing* →
16	Update CBU's stormwater cost-of-service & perform rate study	Ongoing	*Already in CBU's existing budget*		-	-	-	-	-
		ANNUAL TOTALS	**$70,000**	**$171,000**	**$235,000**	**$424,000**	**$500,000**	**$480,000**	***Ongoing est. $300,000+ annually*** →
							GRAND TOTAL FOR IMPLEMENTATION OF ALL STRATEGIES		**$1,880,000**

Table 1-6. Stormwater Master Plan Strategy and Tactics

#	Strategy and Tactics	2022*	2023**	2024	2025	2026***	2027
1	**Update the Construction Stormwater Management provisions in Chapter 10.21** - Differentiate between SWP3 plan pages for construction site BMP design vs post-construction BMP design - Align with, but do not repeat, CGP requirements except where emphasis or greater stringency is desired - Establish provisions for protection of of Low Impact Development, Green Infrastructure BMPs, and stormwater green spaces - Establish construction design provisions for Green Infrastructure BMPs - Disconnect the construction NOI termination and CO issuance. Rather, connect to EPSC Bond release - Evaluate staffing levels for ordinance administration and factor changes into next rate study	-	$16,000	-	-	-	-
2a	**Update Chapter 10.21, Construction Site and Post-Construction Stormwater Control Ordinance** - 2023 Expand section 10.21.110 to address stormwater quality and quantity control (per draft permit Part 4.6(c)(1)) - 2023 Replace references to the IN Storm Water Quality Manual with reference to a local SW Design Manual *(per draft permit Parts 4.6(c)(1) and (3))* - 2023 Explicitly prohibit private BMPs to be designed or constructed in the public ROW w/o prior approval by CBU - 2023 Explicitly require pretreatment for BMPs located in karst areas *(per draft permit Part 4.6(c)(5)(A))* - 2023 Align list of BMPs in 10.21.110(c) with that in current Section VII Stormwater Design Standards - 2023 Create and explicitly reference Low Impact Development and Green Infrastructure incentives, create supporting policy document detailing incentives in interim of Stormwater Design Manual creation - 2023 Eliminate text referring to six minimum control measures - 2026 Review and revise as needed to align with decisions made for Stormwater Design Manual	-	$10,000	-	-	$15,000	-
2b	**Update the current' "Section VII Stormwater Design Standards" in keeping with the MS4 Permit** - Insert and require the use of a Water Quality Volume (WQv) equation to support Section 6.2 *(also per draft permit Part 4.6(c)(3)(B)* - Use current list of accepted BMPs in Chapter 6 for permit compliance *(per draft permit Part 4.6(c)(2)*) - Ensure Allowable Release Rates conform with or exceed the permit's quantity standards *(Part 4.6(c)(3)(A)*) - Where possible, refer to UDO for non-structural LID strategies - Adopt Indianapolis' Manufactured Treatment Device review committee results for MTD pollutant removal %'s	-	$7,500	-	-	-	-
2c	**Stormwater Ordinance Update "Training" for Land Developers & Site Designers** (1 to 2 hrs max.) *(new strategy)*	-	$7,500	-	-	-	-
3	**Develop comprehensive Stormwater Design Manual using current *Stormwater Design Standards* as the foundation**	see costs in 3a through 3e below					
3a	**Policy Creation Phase** - Align definition of "impervious surfaces" with UDO and utility - Expand the list of BMPs, to include more options for Green Infrastructure BMPs - Develop feasibility criteria for Green Infrastructure BMPs - Develop underdrain design policies for infiltration-based Green Infrastructure BMPs - Consider alternate methods for the "pre-construction condition" for redevelopments (e.g., Monroe County's method) - Use of regional or offsite facilities or fee-in-lieu program - Define criteria for post-construction BMPs in parking garages - Re evaluate incentives (created in 2023) or design standards that more strongly encourage Low Impact Development and Green Infrastructure BMPs - Set internal goal for Low Impact Development and Green Infrastructure usage in Bloomington - Evaluate and develop policies for limiting Manufactured Treatment Devices			$60,000	$20,000		
3b	**Document Creation Phase** - Manual creation based on decisions made in 3a above - Includes checklist updates, detailed BMP specifications, required forms, and design procedure forms - Typical details for popular BMPs				$50,000	$50,000	
3c	**Develop Vegetation Design and Maintenance Guidance for vegetated BMPs, riaprian areas, and reforested areas**					$30,000	
3d	**Land Development Stakeholder Engagement for Ordinance and Design Manual Updates** (6 mtgs to gather input)			$20,000	$35,000	$15,000	
3e	**City Council Support for revised Chapter 10.21 consideration and adoption**				$5,000	$15,000	
4	**Review and update the CBU Construction Specifications**					$5,000	
5	**Align the UDO with updated Chapter 10.21 and the new Stormwater Design Manual**			$30,000			
	ANNUAL TOTAL RANGES	**$0**	**$41,000**	**$110,000**	**$110,000**	**$130,000**	**$0**

* The NOI must be submitted within 90-days of the effective date of the permit, and the SWQMP must be submitted within 6-months of the date the NOI submittal

** MS4-related ordinances must be updated within 24 months of the date of NOI submittal

*** Assume fully updated stormwater design program (ordinance and manual) is adopted by the end of 2026

7.0 Appendices

7.0 Appendices

Appendix 1: Focus Group Presentations

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Appendix 2: Background Document Review and UDO Detailed Tables

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Appendix 3: City Staff Interview Opportunities and Challenges

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Appendix 4: Core Team Draft Strategy Presentation

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Appendix 5: Strategy Details