



Stormwater Master Plan

CITY OF ROCKFORD | JULY 2024

PREPARED BY:



1. INTRODUCTION

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1. INTRODUCTION

Stormwater Program Goals

The City has established several goals that guide the activities of the program. These goals promote effective and sustainable stormwater management.

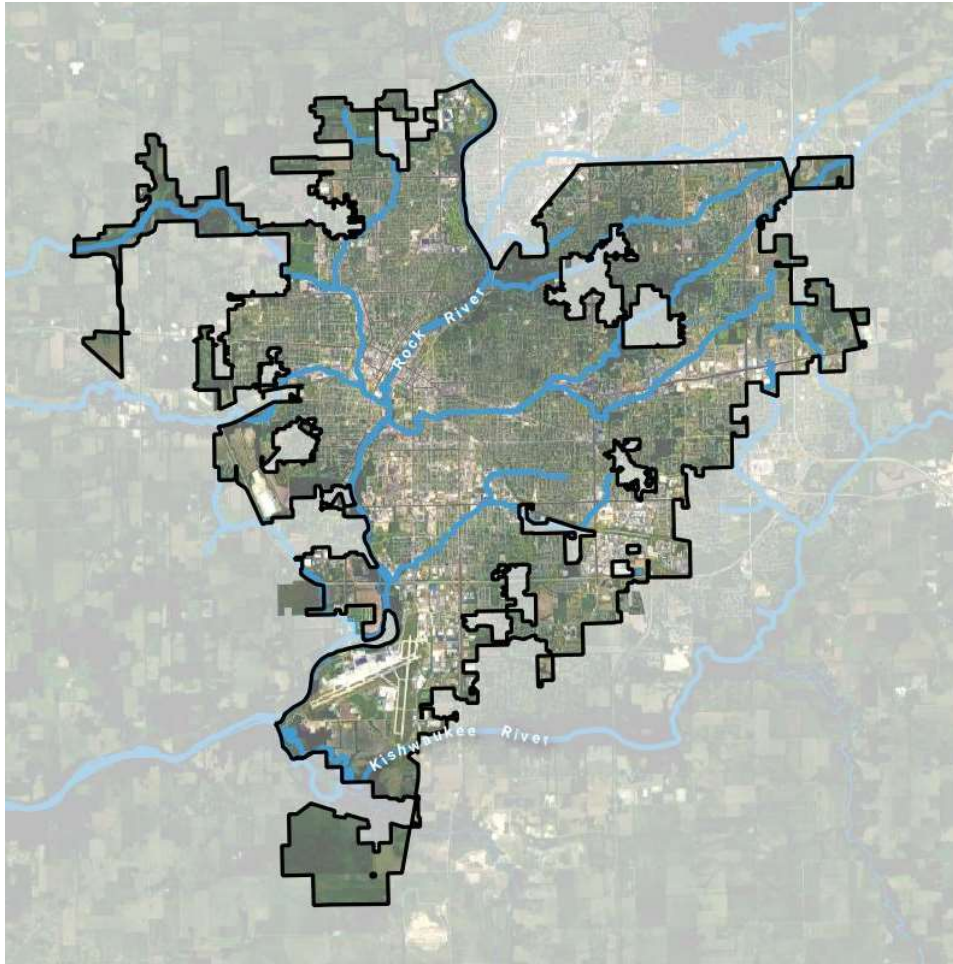
- ▶ Reduce the potential for stormwater threats to public health, safety and property.
- ▶ Improve water quality and habitat conditions in the City's watersheds.
- ▶ Encourage site planning and stormwater techniques, such as low-impact development and green infrastructure, that best replicate pre-development hydrologic conditions.
- ▶ Comply with City, State and Federal regulations for stormwater, water quality and floodplain management.

The goals are implemented through the City's stormwater management program, standard operating procedures, best management practices, and capital improvement program. The Stormwater Management Program and Standard Operation Procedures are included in the appendices of this report.



1. INTRODUCTION

Planning Area



Source: HR Green; Google

Stormwater Planning Overview

Water that falls during rainstorms is also called stormwater. It soaks into the ground or runs off. Stormwater runoff travels through a series of storm sewers and drainageways on its way to local rivers and streams.

The City of Rockford operates and maintains a large network of drainage infrastructure, which includes inlets, catch basins, storm sewers, culverts, ditches, and streams. The city administers the stormwater program by complying with permits, managing assets, monitoring outcomes, and communicating with the public. The stormwater program includes the planning, design, and construction of drainage improvements.

The Stormwater Master Plan creates a framework for managing stormwater effectively and details the capital improvements most critical to program success.

The recommendations throughout the plan are aimed at protecting property from flood damages, providing adequate drainage, protecting water resources, and maximizing financial resources. The plan will support public works, engineering, and economic development as they manage the improvement and development of City infrastructure.

The City works diligently to provide a healthy and safe environment for all community members. This principle informs many of the goals and recommendations in the plan, which are aimed at providing equitable stormwater management service and investments to all neighborhoods in Rockford.



1. INTRODUCTION

2024 Stormwater Master Plan Outcomes by the Numbers

\$120 Million

Identified Capital Needs

35

Capital Projects

9 Watersheds

with Projects

580 Buildings

with Reduced Flood Risk

after Projects are Implemented

400 Acres

of Land Restored to Natural Conditions

or Public Open Space

\$30 Million

Identified grant fund sources



2. Community Engagement

2. COMMUNITY ENGAGEMENT

Overview

Effective community engagement is critical to creating a stormwater management plan that best serves the residents of Rockford. The City relied on two methods to gather input from residents: a targeted period of community meetings and online engagement; and an ongoing stormwater reporting program where residents provide the City with information on local stormwater and flooding issues. The City used this feedback to develop overarching goals for the Stormwater Master Plan and to identify priority areas for drainage and stormwater improvements.

11 total community meetings:
9 in-person,
2 virtual

90 residents participated

Rockford City Market



2. COMMUNITY ENGAGEMENT

Community Meetings

From September to November of 2023, the City hosted 6 in-person and one virtual community meeting to gather information from the public. Meeting locations were spread throughout Rockford to accommodate residents from all areas of Rockford. The purpose of the meetings was to provide residents and property owners with an overview of the stormwater planning and management process, and to allow them to share their stormwater concerns. Over 60 people participated in the meetings.

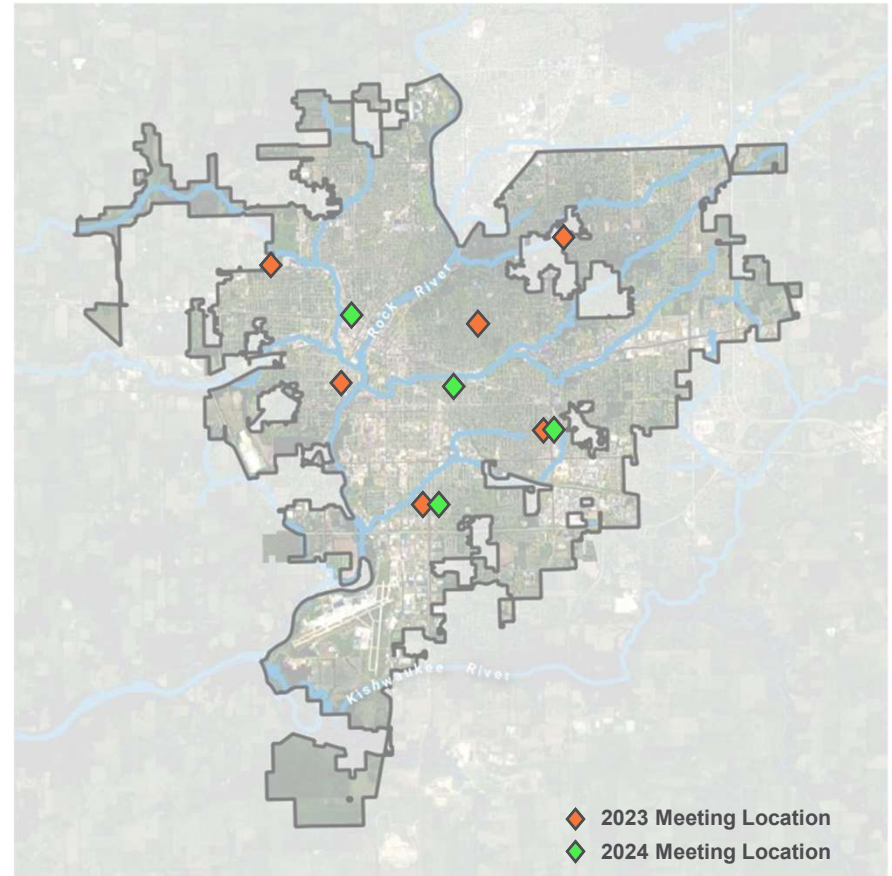
To collect feedback, the City distributed paper copies of surveys where residents could record how stormwater issues affect them and identify areas of concern. Several common themes were noted including concerns over clearing street inlets and flooding issues in neighborhoods.

In June of 2024, the City hosted 4 in-person meetings and one virtual meeting to review the draft stormwater master plan and solicit feedback. Over 30 people participated in the meetings.

Northwest Community Center Meeting



Meeting Locations



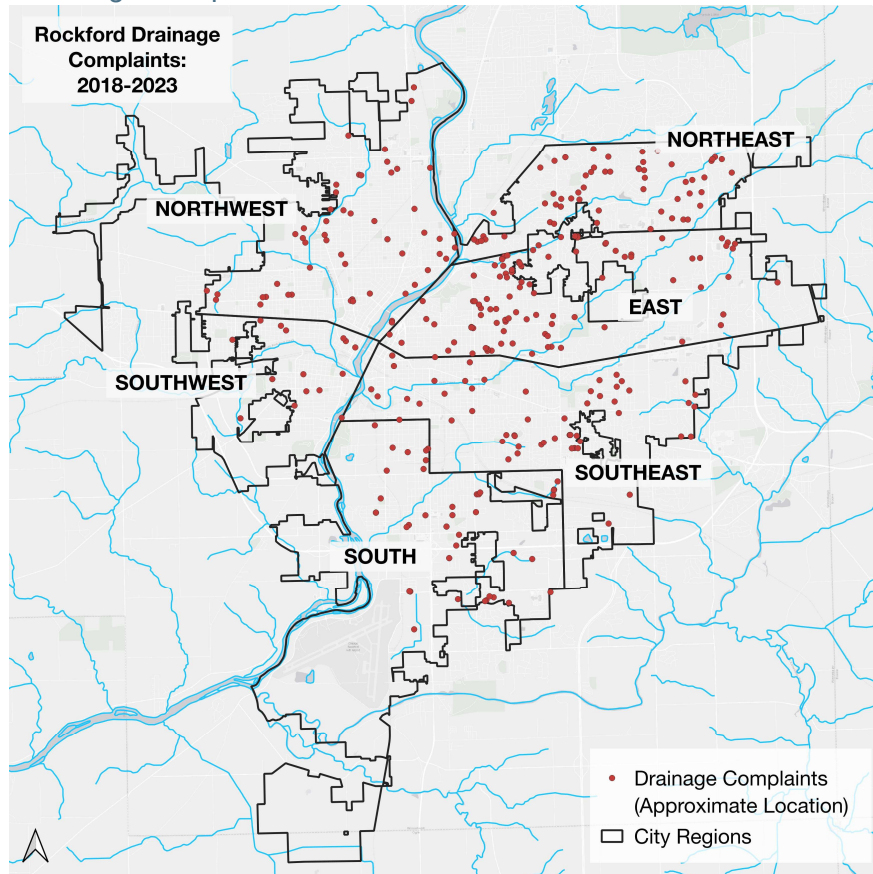
Source: HR Green; Google

2. COMMUNITY ENGAGEMENT

Drainage Complaint Program

In addition to targeted community engagement sessions, the City of Rockford routinely collects and processes feedback from residents regarding stormwater and flooding issues. Residents can call the City's Street or Stormwater divisions to report any problems with drainage inlets, illicit waste disposal, or erosion and sedimentation from active construction.

Drainage Complaints: 2018-2023

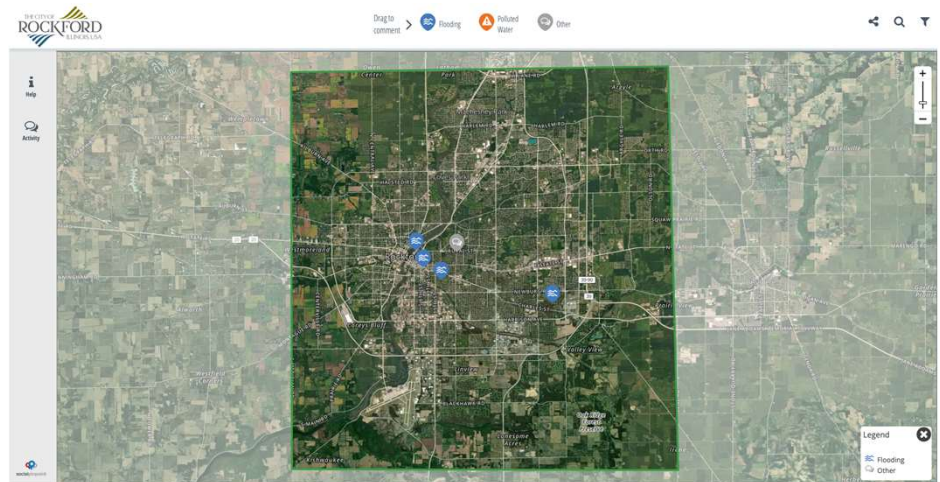


Source: City of Rockford, ESRI

Online Platform

Rockford also hosted an online comment mapping tool that allowed residents to interactively submit issues on the map. This provided another visual of where issues are taking place within Rockford.

City of Rockford Stormwater Map Tool



2. COMMUNITY ENGAGEMENT

Community Survey

Rockford distributed paper copies of surveys at each community meeting. The survey was also made available online. Questions focus on the occurrence of flooding and the impact to property owners' quality of life. The reported severity and frequency of flooding correlated with the level of concern. Some residents have frequent and severe flooding issues, and this greatly affects their quality of life. For people that do not experience the same level of flooding, it is not as much of a concern.

Residents from across the City filled out the survey and generally all people reporting issues could name at least one nearby area that floods during heavy rain events. Flooding is widespread across the city, but not everyone is impacted equally.

The most urgent concern for residents is the occurrence of flood waters entering their homes and damaging property. These people reported spending thousands of dollars on flood proofing systems and experiencing consistent fear during rain events. One resident shared that he does not go out of town during the summer because he is concerned that flooding will happen while he is gone.


Several quotes from the responses are shown here.

“My backyard and basement flood whenever we get more than 1” of rain”

“My house gets surrounded by water. It gets over ankle deep at the house.”

“I had a drain put in my backyard which helped. Despite sump pump, I get water in my basement, so I recently had water proofing done.”

Questionnaire of Property Owners



Help Us Understand Your Concerns:
These questions give us insight on the severity of stormwater issues.

- Have you observed flooding near your home/workplace?
☐ Yes
☐ No
- What is the level of concern regarding the impact of flooding on your property or its value?
☐ Very worried
☐ Moderately worried
☐ Not at all worried
- How much does heavy rainfall and flooding impact quality of life?
☐ A great deal
☐ A little
☐ Not at all
- Any additional comments about your level of concern?

- What region of Rockford do you live in? If the concern is about your workplace, what area is the workplace in?
4. Any additional comments about your level of concern?

- What region of Rockford do you live in? If the concern is about your workplace, what area is the workplace in?
☐ Northwest
☐ Southwest
☐ Central
☐ South
☐ Southeast
☐ Northeast
- Email:

Source: HR Green



2. COMMUNITY ENGAGEMENT

On-Going Community Engagement Strategies

The stormwater program has actively engaged with the community during the Master Plan process and provides on-call services to residents who have questions and issues on an ongoing basis. The following strategies will promote engagement for Rockford's stormwater education and outreach work.

ONLINE PRESENCE

- Strengthen the City's online and social media presence to foster greater community engagement. Utilize active engagement on platforms such as Facebook, Instagram, and LinkedIn, with a focus on frequent updates about upcoming events and social media campaigns addressing stormwater and public works issues.

ADVERTISE WITH MULTIPLE PLATFORMS FOR COMMUNITY EVENTS

- Explore alternative methods to advertise community engagement events, both in-person and virtual. Consider using mailers or direct calls ahead of events to increase awareness and attendance. Recognize that not all residents are comfortable with online platforms, necessitating a diverse range of advertising strategies.

COLLABORATE WITH CITY COUNCIL AND NEIGHBORHOOD LEADERS

- Work closely with City Council members and leaders of neighborhood associations to extend resources directly to residents. Empower these elected officials and community leaders to aid City staff in community engagement efforts. Provide physical resources like feedback surveys, informative brochures, and talking points for dissemination during community meetings.

ESTABLISH A ROCKFORD STORMWATER COMMISSION

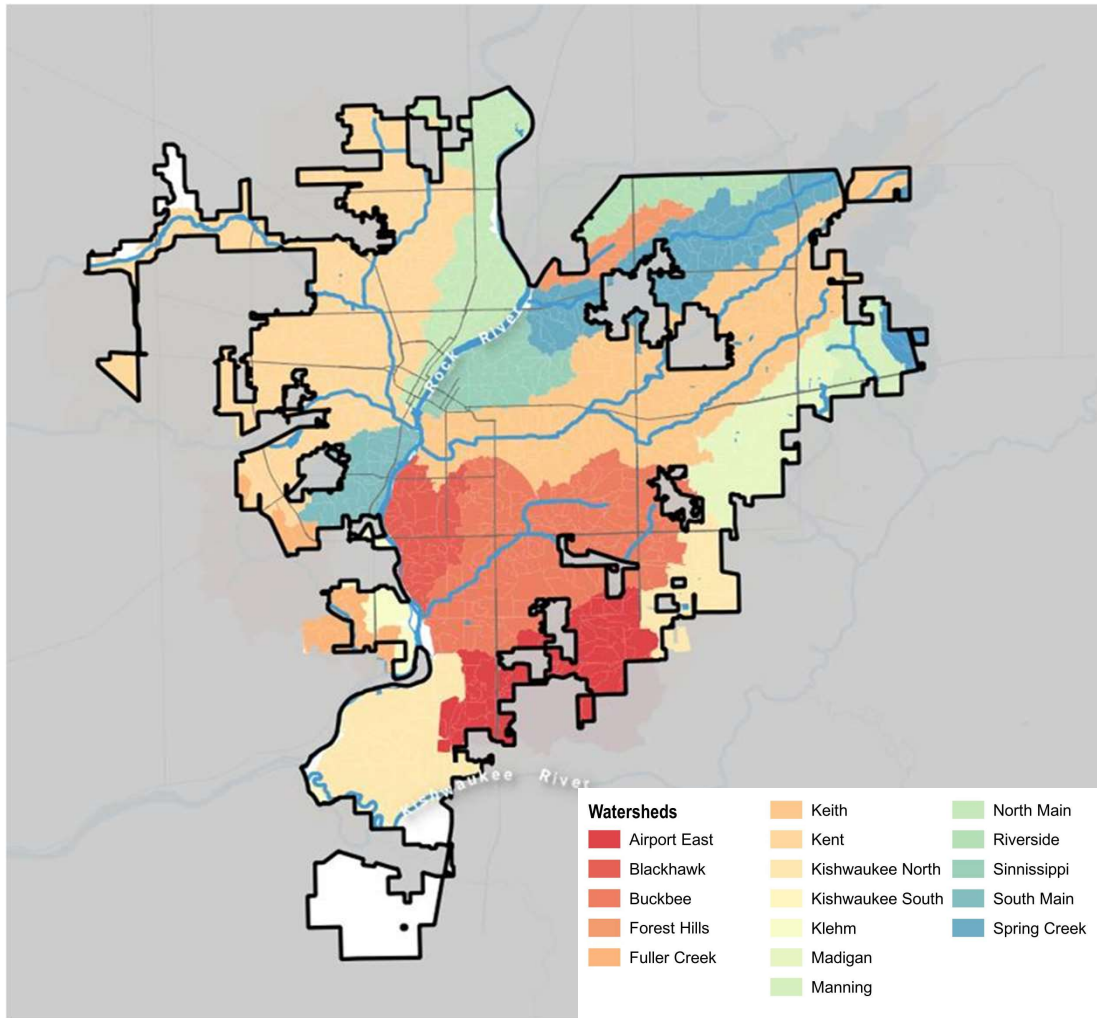
- Given the substantial time and effort required for effective community engagement, consider allocating official resources to create and evaluate stormwater-related community engagement efforts. Form a commission comprised of city staff and community leaders exclusively focused on stormwater management issues. Draw inspiration from existing commissions, such as the Traffic Commission, as a model for this strategic approach.



3. Evaluating Rockford's Drainage System

3. EVALUATING ROCKFORD'S DRAINAGE SYSTEM

Rockford Watersheds



Source: HR Green

City-Wide Drainage Network

The City of Rockford spans 65 square miles of land area. The land area can be broken up into watersheds defined by the stream to which the area drains. There are 17 distinct watersheds that have land area within Rockford. These include Keith Creek, Kent Creek, and Spring Creek.

Each watershed has a system of drainage infrastructure that guides stormwater from upland areas to receiving waters.

Within Rockford, there are:

- ▶ 579 miles of storm sewer,
- ▶ 69 miles of streams,
- ▶ 24,000 inlets,
- ▶ 1,036 outfalls,
- ▶ 500 detention basins,
- ▶ 4 dams,
- ▶ 1 levee.

Each neighborhood has its own drainage system that manages stormwater flows. The drainage system is designed to drain water away from buildings, roads, and parking areas as it travels downstream.

Major and Minor System

The drainage system can be broken into two systems. The minor system is the first path that water takes as it runs off. This is made up of storm sewers, ditches, and culverts that provide drainage for frequent and low intensity rainstorms. The major system is the backup to the minor system. It routes overflows from the minor system. It can include storm sewers and culverts, but it is much less formal. Flow is generally carried on the surface by roadways and grassed that allow flow to pass downstream without affecting buildings.

3. EVALUATING ROCKFORD'S DRAINAGE SYSTEM

Drainage Infrastructure Glossary

Street Inlet



Street inlets drain stormwater from roads.

Detention Pond



Detention ponds are depressed areas that are designed to temporarily hold water and slowly discharge waters from upstream urban areas.

Storm Sewer



Storm sewers are underground pipes that carry water from the surface to streams and rivers.

Ditch



Ditches are v-shaped or trapezoidal drainage channels that carry waters from relatively small areas before they reach streams and rivers.

Outfall



Outfalls are the discharge points of storm sewers. They connect the underground system with streams and river.

Culvert



Culverts are structures under roadways that pass water underground from an open channel to another drainageway. They can convey small ditches or large streams.

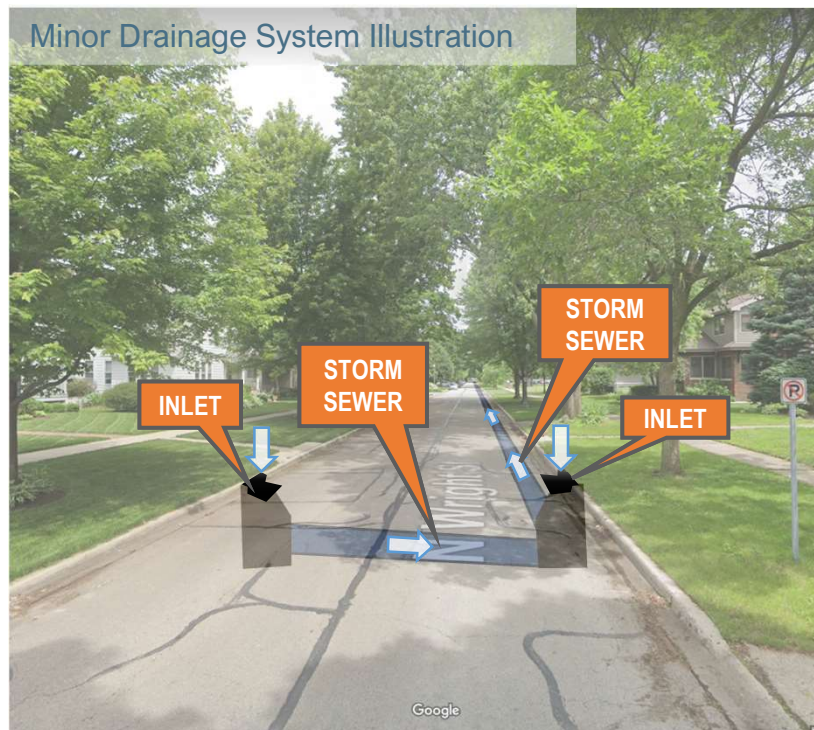
3. EVALUATING ROCKFORD'S DRAINAGE SYSTEM

Minor Drainage System

The minor drainage system drains stormwater from streets and parking areas. The streetview illustration of a typical urban storm system depicts the flow of water through the minor system.

The minor stormwater system conveys flows from frequent and low intensity rain storms. Rain water flows into an underground system via inlets and catch basins. Roadside ditches are also considered part of the minor drainage system.

For all **new** developments in Rockford, the minor system must have capacity to contain the **10-Year storm event** in the underground drainage network.

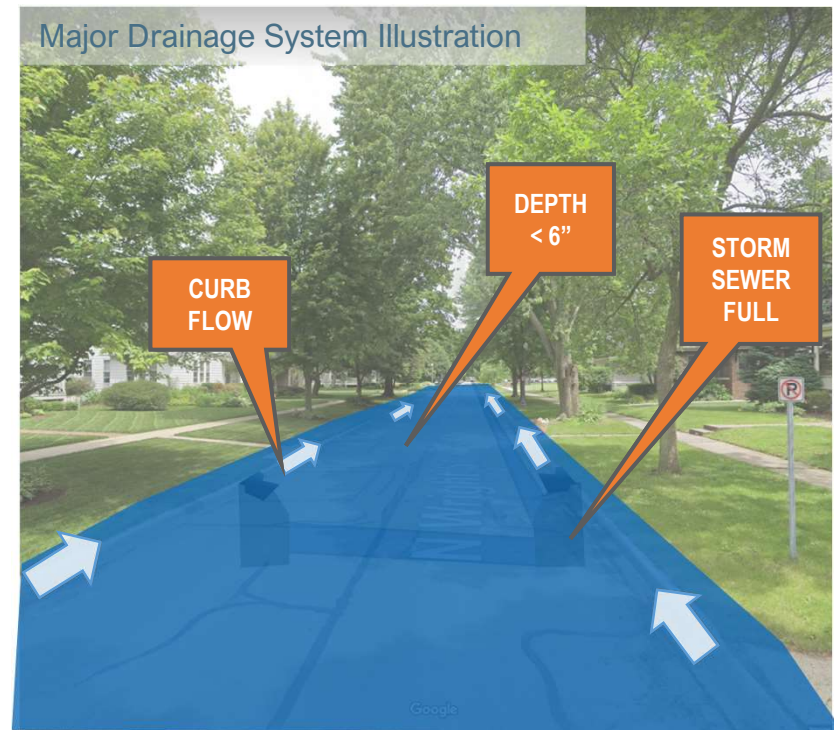


Major Drainage System

The major drainage system conveys flows from less frequent and larger rain events. It acts as a backup system for scenarios when the minor drainage system cannot handle flows. It can take the form of roadways, ditches, and side yard swales.

For all **new** developments in Rockford, the minor system must meet the following standards:

The **100-Year storm event** must be conveyed without touching homes and buildings. Streets can convey the 100-year flows, but the water depth cannot exceed 6" at the high point of the road.



3. EVALUATING ROCKFORD'S DRAINAGE SYSTEM

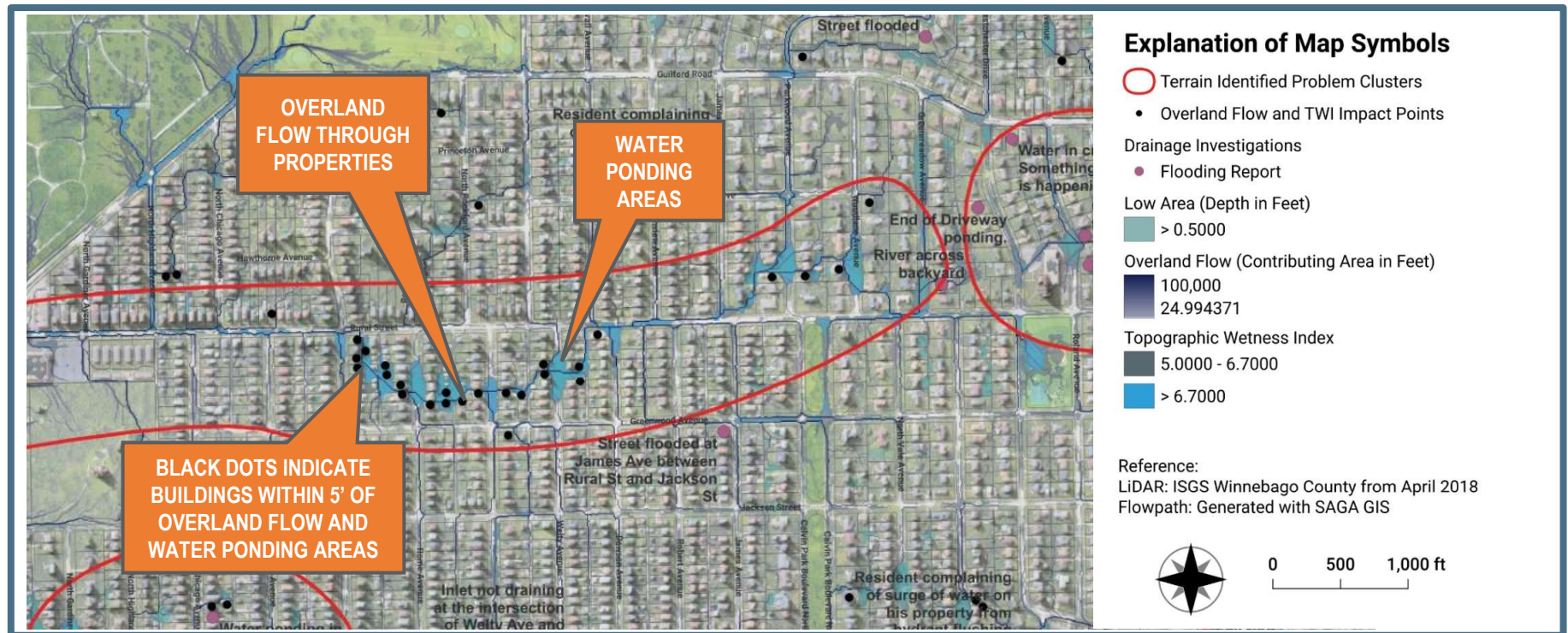
Mapping Flood Risk Areas

Rockford's public works department is dedicated to providing drainage service to all properties in the City. The City generated high-resolution maps of its urban drainage patterns from the latest available topography.

These maps allow the City to get a block-by-block understanding of how drainage flows through areas of the city without having to access old engineering plans or perform detailed studies of each area.

Typically, older neighborhoods have small minor drainage systems and undefined major drainage systems because they were developed before the current ordinance was put into practice. The maps were used as the first step in identifying areas with substandard drainage service. All buildings that are within 5 feet of a major overland flow route or a ponding area were mapped. The City also mapped all previous drainage complaints and observations that are on record. Finally, the areas with the most complaints and buildings with impacts from overland flow or ponding were circled and reviewed by the City.

Existing Drainage Problem Area Map



3. EVALUATING ROCKFORD'S DRAINAGE SYSTEM

Reviewing Major Historical Floods

Rockford has experienced significant flooding in the last twenty years. The most noteworthy are listed on this page, but flash flooding occurs almost every year. Flooding has major impacts to quality of life in Rockford.

Floods have caused extensive damage to homes and businesses in Rockford. These have produced life-threatening situations and numerous emergency water rescues.

These storms all exceed the capacity of the minor drainage system, which at most can handle a 10-year storm. Roads, parking areas, businesses, and homes had to rely on the major system to drain waters away safely. Dozens of areas lacked adequate major system facilities and flooded because of the severity of the storm. Previously flooded areas were noted and added to the list of drainage issues for the purpose of identifying flood prone areas in this Master Plan.



Source: Rockford Register Star

Summary of Recent Flood Events

2006 Torrential Downpour on Labor Day

- ▶ Intense rainfall at rates as high as 3 inches per hour
- ▶ Keith Creek overtopped banks and flood water inundated nearby homes and businesses
- ▶ The force of water caused basements to collapse
- ▶ Cars floated in the streets and residents were rescued by boats

2007 Widespread Flooding on Southeast Side

- ▶ Rainfall of 5 to 7 inches lead to flash flooding
- ▶ Widespread flooding of homes and businesses
- ▶ Keith Creek, the southeast side, and Cherry Valley were hit hardest by the flooding

2010 Keith Creek Floods Again

- ▶ Significant flooding reported near Keith Creek in the Churchill Park neighborhood

2018 Flash Flood Inundates Rockford

- ▶ 3 to 5 inches of rain fell in 4 hours
- ▶ Significant flash flooding with parts of numerous roads covered in several feet of water
- ▶ 15 water rescues from vehicles
- ▶ Multiple homes and buildings with flooding



4. Planning Drainage Improvements

4. PLANNING DRAINAGE IMPROVEMENTS

Designing System Retrofits

The City has many areas that do not meet current design standards since they were developed before the standards were in place. In order to improve drainage and not cause issues for other areas, three main elements are incorporated into retrofits of drainage systems.

- ▶ **Minor Drainage – Storm Sewers and Ditches**
- ▶ **Major Drainage - Overflow Routing**
- ▶ **Storage Basins**

Minor drainage improvements can be made in all retrofit scenarios. Providing new storm systems or upsizing drainage components to the 10-year service level is an achievable goal in almost all situations.

Major drainage improvements are more challenging because the topography of the area is already defined and cannot easily be modified to provide safe overflow routing. Ideally, a safe overland flow route can be graded to provide acceptable overflow conditions. But this process can require buy-outs of homes that are in the natural overflow path. Underground systems can also be sized to convey 100-year flows, but cost and available space can be a limiting factor.

Storage basins slow water down and store it temporarily, to limit the rate of water that drains downstream. This provides two benefits to drainage systems: managing water from upsized systems; and increasing minor or major system capacity by adding system volume.

DESIGN CRITERIA

- ✓ Provide Minor Drainage System
- ✓ Provide Major Drainage System
- ✓ Protect Buildings/Structures
- ✓ Do Not Worsen Flooding Elsewhere
- ✓ Minimize Street Ponding

LIMITING FACTORS

- Site topography may not accommodate overflows
- Property buy-outs may be required for overflows
- Underground routing of overflows is costly
- Lack of open space to create storage necessary for project
- Costs of implementing standards do not align with priority to provide equitable service across City

Areas with existing depressional areas that will be drained by proposed improvements typically require offsetting storage. When the volume is drained from that area it can increase flooding downstream. So constructing engineered storage basins becomes a critical part of improving the drainage system in many cases.

Due to the patterns of development and the highly urbanized nature of Rockford, many areas lack open space that could be used to create storage basins. This along with lack of suitable overland flowpaths are the major barriers to implementing the current design standards to previously developed areas.



4. PLANNING DRAINAGE IMPROVEMENTS

Stormwater Modeling

The design of stormwater improvements requires an analysis of the system before and after construction to confirm it meets the design criteria. The analysis is generally performed with stormwater modeling software.

Modeling provides detailed information not available from the drainage pattern mapping exhibits. This includes flood depths, flow rates, and performance of existing infrastructure.

For areas that were considered most severe during the evaluation of the existing drainage system, these additional parameters are computed. Models allow engineers to complete critical tasks during the design process.

- Compute system flow rates
- Analyze major and minor drainage system performance
- Review downstream and upstream system impacts
- Map flood depth and extent
- Identify impacted homes and structures
- Size improvements appropriately
- Confirm design meets standards

With a standard approach to modeling improvements, the cost and benefit of each project can be compared.

Stormwater Model Results Map



4. PLANNING DRAINAGE IMPROVEMENTS

Stormwater Program Priorities

The City has specific priorities for its stormwater management investments, so that projects can be evaluated and implemented in line with those priorities.

PROVIDE EQUITABLE SERVICE

- Areas without a drainage system are prioritized over areas that already have a drainage systems
- Provide improvements across city rather than higher protection in one or two areas
- Prioritize improvements in areas with disproportional populations of people with fewer resources to recover from flood damages. Vulnerability of those impacted is measured by the poverty rate and employment rate in project areas.

REDUCE RISK OF LOSS

- Projects that reduce structural flood damages to homes or buildings are prioritized over projects that reduce yard, street, or nuisance flooding.
- Multiple residents have attested to home damage, extensive financial resource expenditures on damage repair and flood readiness systems, and continual anxiety and lower quality of life because of past flood events.

MAXIMIZE FINANCIAL RESOURCES

- Grant or financial incentivized projects are prioritized over projects without such incentives
- Integrated planning with City and related entities' Capital Improvement Programs reduces costs by combining multiple improvements into one project.
- Cost effectiveness is measured by the cost to provide drainage service per property or cost to reduce structural flooding risk per building



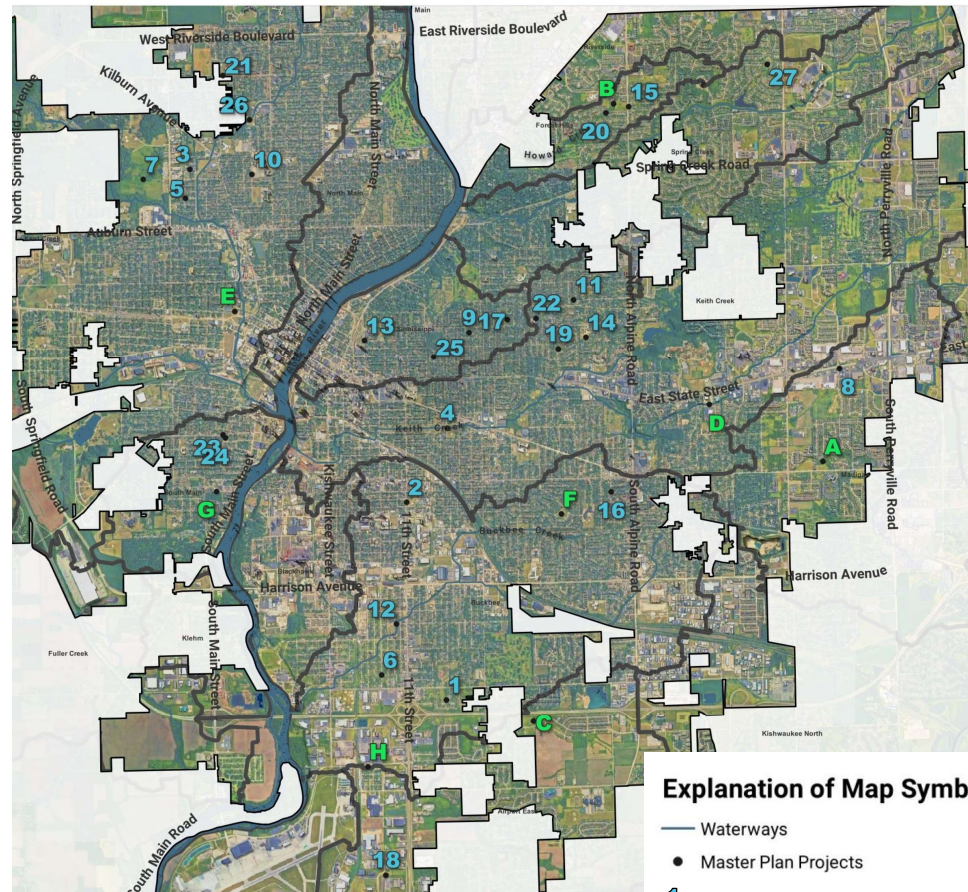
4. PLANNING DRAINAGE IMPROVEMENTS

Projects Included in this Plan

The City prioritizes improvements in its Capital Improvement Program annually. Areas with severe flooding and without a suitable project to reduce flood risk were modeled and evaluated. Dozens of projects were conceptualized within Rockford as a part of this analysis. The projects were reviewed and compared based on their cost effectiveness, constructability, potential for grant funding, effectiveness at reducing risk of flood damage to buildings, and the neighborhood's vulnerability to recover from flood damages.

The table on the following page lists all projects that were conceptualized during this Master Plan, their costs, and an estimated cost benefit ratio if applicable. Benefits were estimated based on number of homes or major roadways with reduced flood risk. Detailed modeling, survey of structures, damage estimation, and calculation of costs was not completed for this study and all figures are presented as a planning level estimate based on the information available and data generated within the scope of this project.

Stormwater Project Locations



Explanation of Map Symbols

- Waterways
- Master Plan Projects
- 1 Flood Mitigation Projects
- A Water Quality Projects

4. PLANNING DRAINAGE IMPROVEMENTS

Projects with numbers are ranked by the estimated cost-benefit ratio based on the number of major roadways with reduced flooding and the number of homes/buildings with reduced flood risk. Projects with letters are primarily intended to improve water quality, so cost-ratios were not estimated.

The table below details all projects from the Master Plan and previous studies.

Project No.	Region	Watershed	Project	Project Cost	Arterial Ponding Reduced	Road Benefit	Estimated Buildings w/ Reduced Flood Risk	Socioeconomic Factor	Building Benefit Amount	Cost Benefit Ratio
1	Southeast	Buckbee	Ed Vera Drive Overflow	\$ 23,400			3	1.0	\$ 450,000.00	19.2
2	Southeast	Buckbee	11th Street and 21st Park Storage	\$ 1,051,440			30	2.2	\$ 10,086,206.90	9.6
3	Northwest	North Kent	Garfield and Belden Storm Sewer	\$ 596,700			15	2.6	\$ 5,741,379.31	9.6
4	East	Keith	Keith Creek Flood Mitigation	\$ 15,233,400			220	2.2	\$ 71,689,655.17	4.7
			Churchill Park Channel Improvements	\$ 4,001,400						
			Dahlquist Compensatory Storage	\$ 8,424,000						
			9th St Culvert	\$ 1,872,000						
			11th St Culvert	\$ 936,000						
5	Northwest	North Kent	Blackstone and Rockwell Storm Sewer	\$ 356,850			3	2.6	\$ 1,148,275.86	3.2
6	Southeast	Buckbee	Roosevelt and Sawyer Storm Sewer	\$ 1,365,000	1	150000	12	1.4	\$ 2,482,758.62	1.9
7	Northwest	North Kent	North Fork Kent Creek Reservoir	\$ 23,400,000			100	2.6	\$ 38,275,862.07	1.6
8	East	Madigan	State and Trainer Storm Sewer	\$ 115,830	1	150000	0	1.0	\$ -	1.3
9	East	Sinnissippi	Sinnissippi Neighborhood Buy-Outs and Storage	\$ 5,028,972			35	1.2	\$ 6,336,206.90	1.3
			Rome and Greenwood	\$ 2,761,200			19	1.2	\$ 3,439,655.17	
			Bohm and Smith	\$ 871,260			7	1.2	\$ 1,260,000.00	
			Woodlane and Rural	\$ 1,396,512			9	1.2	\$ 1,629,310.34	
10	Northwest	North Kent	Rockton Ave Storage	\$ 3,847,000			9	2.6	\$ 3,444,827.59	0.9
11	East	Keith	Arden Court Basin and Storm Sewer - Alt A	\$ 3,112,200			16	1.0	\$ 2,400,000.00	0.8
12	Southeast	Buckbee	Buckbee Channel Replacement	\$ 25,740,000			60	2.2	\$ 20,172,413.79	0.8
13	East	Sinnissippi	Whitman Interchange and Greenwood Storm Sewer	\$ 3,744,390	1	150000	15	1.2	\$ 2,700,000.00	0.8
14	East	Keith	Arden Court Basin and Storm Sewer - Alt B	\$ 3,789,240			16	1.0	\$ 2,400,000.00	0.6
15	Northwest	Howard	Alpine and Pepper Storm Sewer	\$ 832,650			3	1.1	\$ 481,034.48	0.6
16	Southeast	Buckbee	Harmon Park Phases 5-7	\$ 4,173,390			8	2.2	\$ 2,640,000.00	0.6
17	East	Sinnissippi	Woodlane and Rural Underground Storage	\$ 2,265,120			8	1.2	\$ 1,448,275.86	0.6
18	Southeast	Airport	Blackhawk Road Channel and Culvert Replacement	\$ 1,630,645			5	1.0	\$ 750,000.00	0.5
19	East	Keith	Fairview Boulevard Storm Sewer	\$ 1,526,070			5	1.0	\$ 750,000.00	0.5
20	Northeast	Howard	Tallwood Avenue Box Culvert	\$ 624,000			2	1.1	\$ 320,689.66	0.5
21	Northwest	North Kent	Halsted Drainage Improvements	\$ 1,271,400	1	150000	3	1.0	\$ 450,000.00	0.5
22	East	Keith	Roland Ave Storm Sewer	\$ 1,510,314			3	1.0	\$ 450,000.00	0.3
23	Southwest	South Main	Montague and West Storm Sewer	\$ 735,150	1	150000	0	2.2	\$ -	0.2
24	Southwest	South Main	Montague and West Storage	\$ 653,250	1	150000	0	2.2	\$ -	0.2
25	East	Sinnissippi	Gardner and Prospect Buy-Outs and Storage	\$ 1,359,072			2	1.0	\$ 300,000.00	0.2
26	Northwest	North Kent	North Fork Kent Creek Tributary Channel	\$ 12,074,400			7	2.0	\$ 2,100,000.00	0.2
27	Northeast	Spring Creek	Haddon and Lansdale Storm Sewer	\$ 404,820			0	1.1	\$ -	0.0
A	East	Madigan	Madigan Creek Stabilization - Mulford to Trainer	\$ 2,496,000						*
B	Northeast	Howard	Howard Creek Stabilization - Gambino Park	\$ 499,200						*
C	Southeast	Airport	Scarlet Oak Drive Detention Expansion	\$ 1,271,400						*
D	East	Keith	Javelin Drive In-Line Detention	\$ 1,624,740						*
E	Northwest	North Kent	West State Police Station Naturalized Detention	\$ 66,300						*
F	Southeast	Buckbee	Harmon Park Naturalized Detention	\$ 101,400						*
G	Southwest	South Main	Marchesano Drive Naturalized Detention	\$ 18,720						*
H	Southeast	Buckbee	39th Avenue Naturalized Detention	\$ 46,800						*



4. PLANNING DRAINAGE IMPROVEMENTS

Study Considerations

Planned improvements presented in this study are based on modeling and simplified methods for estimating project benefits. The project areas were not surveyed in detail and modeling was performed in a manner consistent with master planning studies. **Referencing the graphic on this page, this Master Plan is a part of the feasibility study phase of the overall project life-cycle.** The intent is to provide planning level cost estimates and benefits of capital improvement projects. Additional analysis should be performed during preliminary design to confirm the feasibility of constructing improvements. Changes to conceptual improvement configurations such as storm sewer layout, storage locations, and overland flow routes may be required to meet performance goals of the City and feasibly construct the stormwater features.

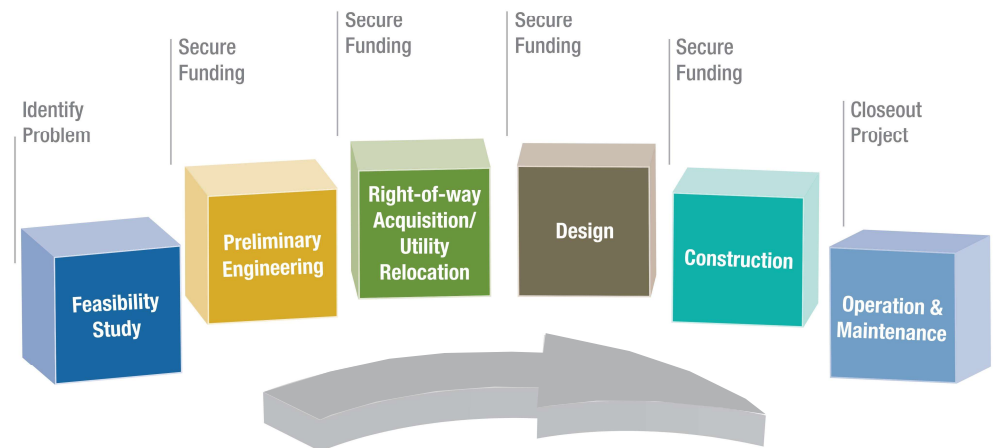
Costs were estimated using the quantities of major construction components, such as storm sewer length or storage volumes. Unit costs were generalized to cover related items that make up the entirety of the work that could be attributed to these base items. Construction contingencies, engineering, and legal were assumed as percentages of total project cost. This method gives a ballpark estimate of cost to complete a project in each area but were not refined to account for specific breakdowns of all construction line items and any economies of scale. Costs may change significantly as the design and implementation process progresses. Costs are in 2024 dollars.

Improvements included in this plan meet a minimum of 25-year storm protection. Certain areas were more easily configurable to provide higher protection levels. The City has yet to do an evaluation of the design criteria for their flood protection projects that includes detailed analysis of costs and benefits of differing levels of protection. Such analysis may change the scope and extent of proposed projects.

Some locations require acquisition of property not owned by the City. Locations shown on project maps may not be available or desirable. Relocation of these storage facilities may occur during the design phase as the project moves through phases of implementation.

Upstream and downstream impacts of project implementation were modeled in a manner consistent with master planning studies. Detailed modeling and permitting will be required for many, if not all, projects included in this Master Plan.

Flood Damage Reduction Project Lifecycle



5. Stormwater Program Cost of Service

5. COST OF SERVICE

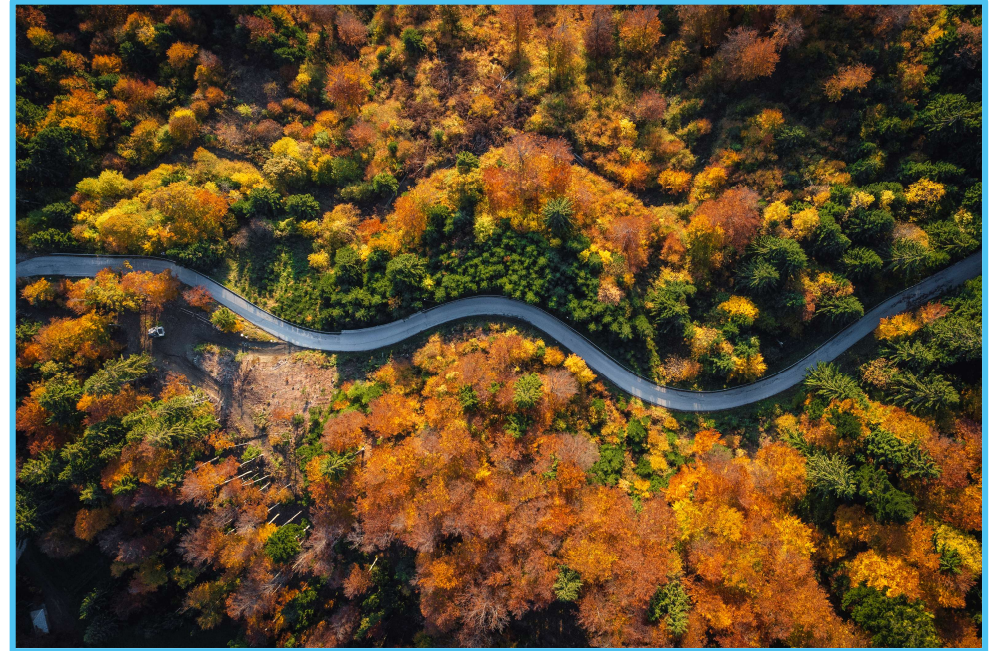
Operations and Maintenance

The City manages a large network of infrastructure that represents the drainage system. Management activities related to operations and maintenance include the following.

- ▶ Inlet Cleaning
- ▶ Sewer Repair
- ▶ Bridge, Dam, Ditch Maintenance
- ▶ Bank Stabilization

In order to complete tasks related to operations and maintenance, the City employs dedicated staff and owns and operates equipment. Equipment utilized by the stormwater program and shared with the public works department includes backhoes, wheel loaders, street sweepers, skid steer loaders, aerial bucket trucks, dump trucks, storm sewer vacuum truck, and trailers.

Expenditures for the last 6 years were reviewed to determine average expenditures as shown in the table on this page.



Average Operations and Maintenance Expenditures

Item	Expenditure
Inlet Cleaning/Sewer Repair	\$700K
Bridge, Dam, Ditch Maintenance	\$150K
Bank Stabilization	\$450K
Staff	\$450K
Total Operations and Maintenance	\$1.8M

5. COST OF SERVICE

MS4 Program Requirements

The City maintains a permit with the Illinois Environmental Protection Agency to discharge separate storm sewer flows. It is referred to as the MS4 permit, which stands for municipal separate storm sewer system. The permit requires detailed documentation of the City's efforts to maintain water quality throughout its watersheds. There are a variety of activities related to the MS4 permit that require staff time and additional equipment and services.

Rockford performs water quality tests within several watersheds to document the pollutants that are present within its storm sewers and waterways. The test results and recommendations are summarized by an engineering consultant and included in the annual MS4 report.

The City sweeps streets in the fall each year to reduce the amount of road debris in downstream waters. Roads accumulate leaves and sticks from yards, which are phosphorus rich materials that can contribute to stream impairments and algal growth. Rocks, sediment, and other inorganic particulates are also reduced with street sweeping.

The City inspects all its outfalls each year to check for illicit connections to the storm system. The staff also inspects a certain portion of detention basins each year. These annual undertakings are overseen and performed by City staff. The level of effort is estimated in the MS4 annual costs table on this page.

Average Annual MS4 Program Expenditures

Item	Expenditure
Sampling and Testing	\$50K
Street Sweeping	\$600K
Annual Reporting	\$50K
Staff	\$100K
Total MS4 Program	\$0.8M



5. COST OF SERVICE

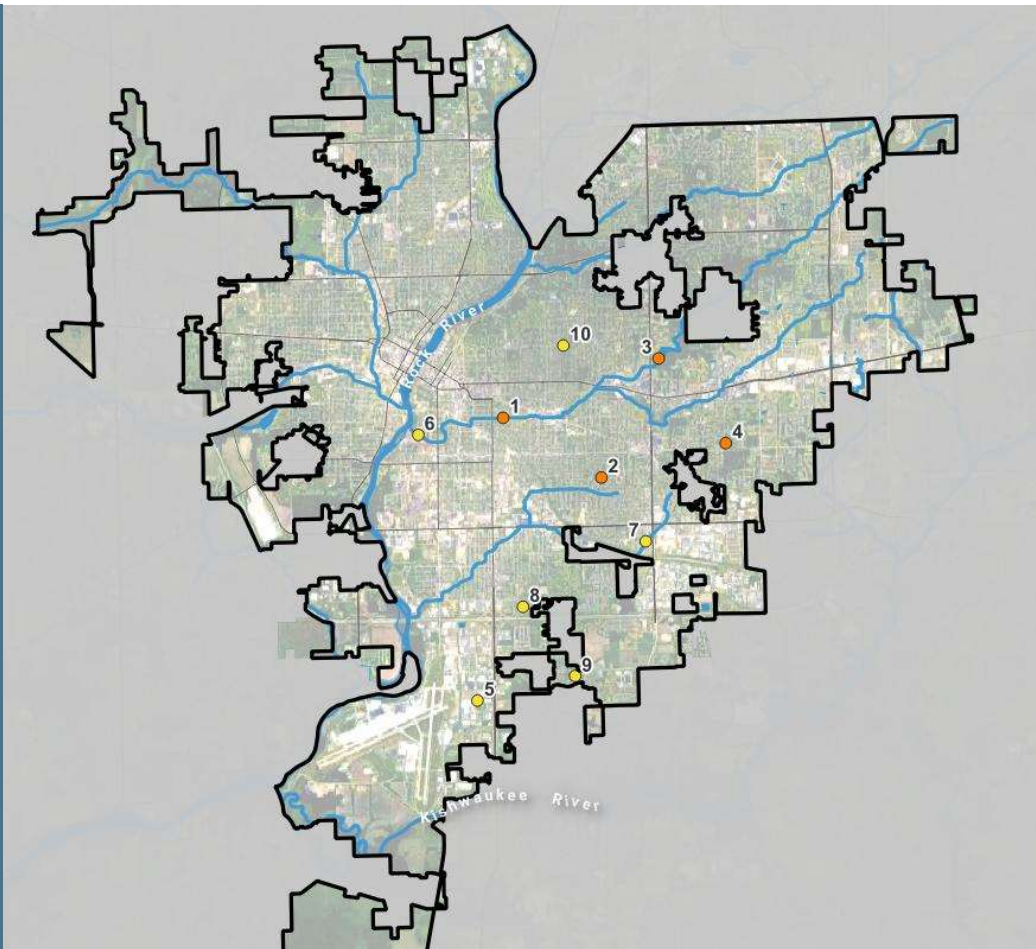
Past Stormwater Capital Improvements

The City oversees the design and construction of stormwater projects that replace aging components and improve system capacity. The recently completed projects are shown on the map. The projects vary in size and complexity. Projects shown in orange are multi-year large scale investments in areas of high need. Projects in yellow are typically smaller and less costly. Capital expenditures vary from year to year, but the average amount is \$4 million per year. This spending includes drainage infrastructure for roadway projects, which accounts for \$2.8 million of the annual capital improvement spending.

Recent Capital Improvement Projects

ID Name

- 1 Keith Creek Flood Mitigation
- 2 Harmon Park Storage Basin and Drainage Improvements
- 3 Alpine Dam Repairs
- 4 Gregory Heights Drainage Improvements
- 5 Logistics Drive Extension and Drainage Improvements
- 6 Seminary Street Over Keith Creek Bridge Reconstruction
- 7 Yale Drive Culvert Replacement
- 8 Ed Vera Storm Sewer Replacement
- 9 Citadel Drive Drainage Improvements
- 10 Rural and Parkwood Storm Sewer



5. COST OF SERVICE

Stormwater Program Annual Expenditures Today

In total, the City spends an average of \$6.6 million on their stormwater program. This funding is taken from several sources. Most of the funding, around \$3 million, comes from the General Fund. This is money that is shared between engineering and other city departments. An additional \$1 million comes from the infrastructure sales tax. On average \$1.2 million from MFT funding is spent by the street department as either maintenance activities or drainage portions of roadway projects. Finally, outside sources provide \$1.4 million on average, which is typically federal or state grants that pay for improvements on their roadways or contribute grant moneys to local projects.

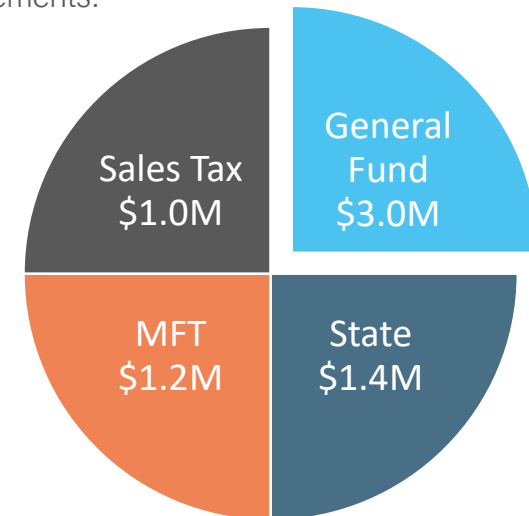
Alpine Dam Improvements



Total Average Annual Expenditures

Item	Average Annual Expenditure
Operations and Maintenance	\$1.8M
MS4 Program	\$0.8M
Capital Improvements	\$4.0M*
Total Cost of Service	\$6.6M

* This is average spending. Current budgeted capital improvement funds for stormwater specific projects is \$500,000 plus \$2.8 million for roadway drainage replacements.



Rockford Stormwater Funding Sources

5. COST OF SERVICE

Proposed Program Expenditures

The City has a lengthy list of capital needs, and the current budget would not provide adequate funding for funding roadway drainage projects, future capital needs not identified in this plan, and constructing the conceptualized projects within the next 30 years. This cycle forms the basis of the recommendations for additional funding needs. The following table provides a summary of the additional spending proposed as a part of this plan over the next 30 years. The budget shortfall is \$3.2M annually with this plan. Additional funding sources can be explored to reduce the impact to property owners and residents.

Cost of Service Summary

Item	Current Spending	Identified Needs	Proposed Spending	Potential Grant/Loan Funding	Proposed Budget
Operations and Maintenance	\$1.8M		\$1.8M		\$1.8M
MS4 Program	\$0.8M		\$0.8M		\$0.8M
Capital Improvements:					
Roadway Infrastructure	\$2.8M		\$2.8M		\$2.8M
Stormwater Projects	\$0.5M	\$3.7M	\$3.7M	\$1.0M	\$2.7M
Total Cost of Service	\$5.9M	\$3.7M	\$9.1M	\$1.0M	\$8.1M



5. COST OF SERVICE

Potential Grant and Loan Funding

The City has a lengthy list of capital needs. Active pursuit of grant and loan funding will be a critical component of minimizing the revenue sourced from tax-payers and property owners. Grants and loans applicable to the stormwater program goals are listed below and a 30-year estimate of funding amounts is assigned for each source. Available grants and loans could reduce the budget by \$1.0 million annually over the next 30 years if the City can leverage programs effectively. Stormwater utility fees or additional taxes are the most common sources of additional revenue to pay for the program.

A grant funding informational table is included in Appendix D: Technical Report that provides grant eligibility, timing, and program requirements for each of the grants listed on this page.

Potential Grant and Loan Funds – Next 30 Years

Item	Potential 30-Year Funding
TIF	\$4.0M
GIGO Grants	\$7.5M
Section 319 Grants	\$4.0M
BRIC Grants	\$5.0M
OSLAD Grants	\$2.0M
FEMA Buy-Out Grants	\$5.0M
IDNR Buy-Out Grants	\$3.0M
IEPA SRF Principal Forgiveness	\$2.25M
IEPA SRF Loans	\$15M



Appendices

A. MS4 Permit

B. City of Rockford MS4 Permit Program

C. Technical Report

Provided under a separate cover

D. Standard Operating Procedures