

**IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF ILLINOIS  
WESTERN DIVISION**

THE UNITED STATES OF AMERICA and )

THE STATE OF ILLINOIS )

Plaintiffs, )

v. )

THE CITY OF ROCKFORD, ILLINOIS, )

Defendant. )

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Civil Action No. 3:15cv50250

**CONSENT DECREE  
APPENDIX A**

# SWAMP

## Stormwater Master Plan

### FINAL



**CITY OF ROCKFORD**  
**MUNICIPAL SEPARATE STORM SEWER SYSTEM**  
**STORMWATER MASTER PLAN**

NPDES Permit No. ILS000001



Submitted

August 10, 2015

Prepared by:

Missman, Inc.

City of Rockford

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## 1.0 INTRODUCTION

The purpose of a Stormwater Master Plan is to develop a comprehensive planning approach to manage stormwater quality and quantity throughout the City. Planning helps to mitigate potential damage to property and infrastructure and ensure public safety and health.

The City of Rockford Stormwater Master Plan (SWMP) was developed as part of municipal separate storm sewer system (MS4) requirements by the State of Illinois of the National Pollution Discharge Elimination System (NPDES) stormwater discharge permit program. This SWMP outlines the City of Rockford's objectives, goals, programs, and standard operating procedures to provide policy and management guidance for activities affecting stormwater throughout the City of Rockford.

### **Background**

The City of Rockford (City) is located along both banks of the Rock River in northeast Illinois occupying a total area of 64.67 square miles of which, approximately 0.87 square miles is water. The City consists of a population of approximately 150,000 residents who experience the typical Midwestern climate experiencing the four seasons. As referenced in the *Multi-Hazard Mitigation Plan, Winnebago County, Illinois*, the general climate in the region consists of an annual temperature of 53.51°F with an average precipitation of 40.09 inches most occurring in the spring and summer months. In addition, there is an average annual snowfall of approximately 15 inches and consisting of an average annual humidity of 80.84%.

The City is comprised of 17 watersheds including creeks, drainage-ways, and detention basins, 450 miles of storm sewer, 928 outfall structures, four dams (3-city owned; 1-ComEd owned), and one levee. Due to the size and topography of the City and the Rock River running through the center of the City there is a relatively high potential for stormwater issues to arise. In light of this, there is a greater emphasis of need for local management of urban stormwater and waterways to help protect water quality and control flooding. This is especially important since the City consists of significant and concentrated urban development.

The National Pollutant Discharge Elimination System (NPDES) Stormwater program began in 1990 and required MS4 communities like the City of Rockford to obtain NPDES coverage concerning stormwater regulations from the State of Illinois which is enforced by the Illinois Environmental Protection Agency (IEPA) and federally by the Environmental Protection Agency (EPA). The City of Rockford obtained its first NPDES Permit in 1996 to meet the requirements of the Clean Water Act. The most recent NPDES permit issued to Rockford was in 2004. Staff has been working with the Illinois Environmental Protection Agency (IEPA) since 2009 to renew this permit. The City hopes for a renewed permit in August 2015. A copy of the latest NPDES permit can be found in Appendix B. Based on its population and that the storm sewer system is separate from the sanitary sewer system Rockford qualified as a Phase 1 NPDES permit. It is the only municipality in Illinois that holds a Phase 1 permit.

There are 10 stormwater management program requirements under the Phase 1 permit.

- Structural Controls
- Erosion & Sediment Control: Construction Site Runoff & Post Construction Stormwater Management
- Roadways
- Flood Control
- Pesticide, Herbicide & Fertilizer Application
- Illicit Discharges and Improper Disposal
- Spill Prevention and Response
- Industrial and High Risk Runoff
- Public Education, Pollution Prevention and Good Housekeeping
- Monitoring: Wet Weather and Dry Weather

At the end of every year the City is required to submit an annual report to the Illinois Environmental Protection Agency on its efforts towards compliance with the NPDES permit. The 2014 Annual Report can be found in Appendix C.

## **2.0 LEGAL AUTHORITIES**

To comply with the Clean Water Act the City has developed the following stormwater related Ordinances to manage stormwater runoff and to help reduce pollutants from the MS4 to the maximum extent practicable:

1. Chapter 17 – Nuisances
2. Chapter 26 – Streets, Sidewalks and Other Public Places
3. Chapter 109 – Stormwater Management Ordinance
4. Chapter 2 Division 4 – General Ordinance Violation
5. Chapter 121 – Subdivision Ordinance

It is noted that all City and/or private proposed projects shall refer to the following resources for planning and design guidance or as required by the City for stormwater management and flood control:

- Rockford Engineering Design Criteria Manual
- Rockford Stormwater Technical Guidance Manual
- *Design and Construction of Sanitary and Storm Sewers*. American Society of Civil Engineers and the Water Pollution Control Federation. 1986.
- *Illinois Urban Manual*. United States Department of Agriculture – Natural Resources Conservation Service. 1995.
- <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm> - U.S. EPA's website for stormwater BMPs
- Standard Specifications for Water and Sewer Construction in Illinois – latest edition

- Illinois Department of Transportation Standard Specifications for Road and Bridge Construction – latest edition

### **3.0 STORMWATER MANAGEMENT STANDARD OPERATING PROCEDURES**

One main objective of the stormwater management program is to achieve compliance with the City's NPDES permit. Several Standard Operating Procedures (SOPs) were developed that state the process for City staff to manage and inspect various aspects of the stormwater management program. They provide guidance on who is responsible, equipment needed, training required, inspection process and documentation required to perform specific operations. The individual SOPs can be found in Appendix D.

#### **a. Detention Basin SOP**

Describes the inspection process and maintenance requirements for both City-owned and privately owned detention basins. Maintenance efforts include mowing, removal of debris (trees, brush, garbage and silt) and erosion repairs. For point of reference the City owns and/or maintains the following detention ponds:

- Lowes Distribution Center
- Elliot Golf Course (City owns & maintains structure itself; Park District minor maint.)
- Arden Court
- Greater Rockford Industrial Park
- Logistics Park
- Mulford Village Dr.
- Newtowne & Javelin Drs.
- Marchesano @ Fire Station 3
- Linden Pointe (Park District owns & minor maint.; City maintains structure itself)

#### **b. Erosion & Sediment Control Plan Review and Regulatory Inspections SOP**

This document addresses the City's procedures for reviewing erosion and sediment control plans, Stormwater Pollution Prevention Plans (SWPPP) and performing regulatory site inspections. An important component of any stormwater management program is the reduction of pollutants from construction sites that may discharge to the municipal separate storm sewer system or waters of the state. A proactive program to identify and inspect all permitted construction sites can significantly reduce pollutants entering the municipal storm drainage system.

#### **c. Erosion & Sediment Control Guidance Manual for City of Rockford Projects**

This document explains to City staff for City of Rockford projects the requirements for plan reviews, General NPDES permit requirements, SWPPP content, site inspections and allowable discharges.

#### **d. Right-of-Way & Drainageway Inspection & Maintenance SOP**

It is the responsibility of the City to ensure the proper operation and maintenance of the storm sewer system, including city-owned and timely enforcement of privately-owned stormwater structures. The City shall inspect, maintain, clean, and repair all city owned components of the storm sewer system including storm inlets, pipes, culverts, manholes, detention ponds, drainageways and all other stormwater structures to the maximum extent practicable. The City shall inspect, track and take



necessary action to require that privately-owned stormwater structures are adequately maintained. This document outlines the SOPs for completing the inspections and maintenance of the storm sewer system.

**e. Street Sweeping SOP**

It is the responsibility of the City to provide street sweeping services to its citizens in an effort to enhance the overall storm water quality, health, and aesthetic beauty of the City. This SOP describes the protocol for street sweeping activities.

**f. Pesticide, Herbicide and Fertilizer (PHF) Applications SOP**

The City of Rockford holds a General NPDES Permit for Pesticide Application Source Discharges that is issued by the IEPA. The SOP addresses the City's procedures when applying PHFs of City owned properties.

**g. Illicit Discharge Detection and Elimination (IDDE) Program**

An illicit discharge is defined as any discharge that enters the storm sewer system that is not comprised entirely of stormwater, except discharges pursuant to a NPDES permit or identified as permissible in the City's ordinance. This SOP outlines how to detect and investigate a potential illicit discharge.

**h. Spill Prevention and Response SOP**

The SOP discusses procedures to prevent, contain, and respond to spills that may discharge to the City's storm sewer system. The Dept. of Public Works works closely with the Rockford Fire Department, who is the "First Emergency Responder" for spill response incidents, to maintain an accurate database. The Fire Department serves as the Incident Commander in spill scenarios.

**i. Industrial High Risk Runoff (IHRR) Facility Inspection Program SOP**

The goal of this SOP is to reduce the amount of polluted runoff from industrial and commercial facilities entering the City's storm sewer system. This document addresses how industrial facilities are identified for inspections and the procedures for performing them.

**j. Stormwater & Environmental Education SOP**

This document outlines how the City staff and the public will be educated regarding the City's stormwater programs. Various brochures on best management practices have been developed for educating the public.

**k. Monitoring & Sampling Program SOP**

It is important for the City to monitor the water quality within its storm sewer system in order to reduce and eliminate contaminants to the City's groundwater and waterways. This document addresses the procedures for the collection of water quality samples in varying conditions and locations for Representative Monitoring, Industrial High Risk Runoff and Illicit Discharge & Elimination monitoring.

#### **4.0 STORMWATER MANAGEMENT GOALS AND STRATEGIES**

The Stormwater Master Plan provides guidance to help manage stormwater, reduce urban runoff sources of pollution, protect the City's river, creeks and watersheds and protect the City's groundwater. The City's source of drinking water is through wells so protecting the groundwater is very important to the health and safety of its citizens. This plan guides stakeholders and decision-makers to look at stormwater comprehensively to ensure stormwater management and the health of our watersheds. The City has taken an integrated planning approach to stormwater management and have included goals and strategies into the Countywide Multi-Hazard Mitigation Plan and into its 2020 Implementation Plan. As the various organizations have formed to revitalize the City these goals and strategies are incorporated into those discussions and plans as well. Enforcing the concept that mitigating stormwater hazards plays an integral component in rebuilding Rockford.

The City has established goals that are key to an effective and sustainable stormwater management program.

**Goal 1** – Reduce the potential for stormwater threats to public health, safety and property.

**Goal 2** – Improve water quality and habitat conditions in the City's watersheds.

**Goal 3** – Encourage site planning and stormwater techniques, such as low-impact development and green infrastructure, that best replicate pre-development hydrologic conditions.

**Goal 4** – Comply with City, State and Federal regulations for stormwater, water quality and floodplain management.

The City has developed various strategies to meet the goals stated above, along with tactical activities and performance measures to implement those strategies. Each year the City states in its Stormwater Annual Report the actions it has taken to meet the goals and reports the performance measure data as noted in the SOPs. As technology, regulations and community understanding of stormwater management challenges evolve and change, the City will need to respond with new strategies and tactics. These strategies will be used in prioritizing projects and the status of each strategy will be evaluated and updated annually.

**Strategy 1** – Preserve and enhance natural and environmentally sensitive areas

- a. Update codes and regulations to regulate development and encourage development outside of environmentally sensitive areas.
- b. Use topography to direct land development.
- c. Establish a "green infrastructure" program to link, manage and expand existing parks, preserves and greenways.
- d. Complete watershed assessments to identify the environmentally sensitive areas and enhancement projects.

**Strategy 2** – Support regulations to improve on site stormwater management and reduce flooding damage

- a. Update codes and regulations to regulate development and require post construction management plans of the stormwater systems on site.
- b. Promote best management practices to reduce the effects of stormwater runoff.
- c. Conduct regular inspections of the stormwater system for proper maintenance, including detention basins, creeks, inlets, dams/levees, and other structural controls.

- d. Develop an open space acquisition reuse and preservation plan targeting hazard areas.

**Strategy 3** – Protect the groundwater supply and enhance drinking water quality

- a. Provide a program to inspect industrial and commercial properties to reduce illicit discharges into the ground and streams.
- b. Provide a program to inspect outfalls into the creeks and river to detect illicit discharge.
- c. Provide a monitoring and sampling program to evaluate the water quality within the watersheds.

**Strategy 4** – Maintain and enhance local watershed protection

- a. Complete watershed studies and plans.
- b. Develop a community engagement process to identify and prioritize stormwater improvement projects.
- c. Identify wetland sites for restoration projects.
- d. Complete waterway planning for Kent and Keith Creeks.

**Strategy 5** – Protect floodways and floodplains

- a. Update Codes and regulations to enhance development and building standards within floodplains
- b. Maintain compliance with the National Flood Insurance Program
- c. Work with FEMA and the Illinois State Water Survey to complete revisions to the Flood Insurance Rate Maps to more accurately define the floodways and floodplains.
- d. Develop and inventory of best practices to support neighborhoods impacted by the floodplain limits on the Flood Insurance Rate Maps.
- e. Develop a creek inspection program to evaluate the condition of the channels and prioritize bank restoration projects.

**Strategy 6** – Improve existing stormwater management facilities and construct new facilities

- a. Complete retrofits as needed on city-owned detention basins to improve water quality and increase the detainment area for stormwater runoff.
- b. Complete maintenance items noted in the Army Corp of Engineers and Illinois Department of Natural Resources inspection reports.
- c. Remove and/or widen existing bridges as needed to reduce the restrictions to water flow in the creeks.

**Strategy 7** – Provide ongoing public outreach and engagement on the stormwater management program.

- a. Update educational brochures to the community on the stormwater program.
- b. Attend various community events to inform and engage the citizens about potential impacts of pollutants on the stormwater system and groundwater.
- c. Support water quality monitoring programs
- d. Inform and engage the community about potential impacts of climate change of the City's stormwater infrastructure

## 5.0 WATERSHED INFORMATION

As previously mentioned, the City consists of a vast watershed and waterway network. Historic modifications to natural drainage patterns and increase in impervious area have contributed to ongoing stormwater and flooding problems throughout the community. Watershed assessments identify past and current flooding and water quality problems, overall current stormwater management and flood control issues and provides watershed-specific data and reference information. It is expected that as watershed assessments are completed the information will be utilized by planners, developers, engineers and residents to design and construct various sites throughout the City. The City has identified 17 watersheds (includes Rock River) due to the presence of a major creek system (reference Appendix A-1 for the Rockford Watersheds Map). Reference Table 1 below for a list of the City watersheds and general description. In addition, the table identifies the year a Hydrology and Hydraulic (H & H) modeling/assessment was completed for the watershed (if applicable). The City has prioritized four of the watersheds for a full watershed assessment. The goal is to complete one assessment every other year.

**Table 1 – City of Rockford Watersheds**

<b>Watershed</b>	<b>Approximate Acres</b>	<b>H &amp; H Study Completion</b>	<b>Assessment Completed</b>	<b>Priority for Completing Full Assessment</b>
Airport East	3,700	In process- Completion Summer 2016	Preliminary in 2009	1 - Underway
Blackhawk	1,190	NA	Preliminary in 2009	
Buckbee Creek (South East)	5,450	2013	Full Assessment in 2013	
Forest Hills	840	2013	Preliminary in 2009	
Fuller Creek	2,970	2013	Preliminary in 2009	
Keith Creek	9,000	2011	Preliminary in 2009	2
Kent Creek	29,980	2013	Preliminary in 2009	3 – North Kent
Kilbuck Creek		NA		
Kishwaukee North	8,410	NA	Preliminary in 2009	
Klehm	1,030	NA	Preliminary in 2009	
Madigan Creek	4,120	NA	Full Assessment in 2013	
Manning Creek	1,480	NA	Preliminary in 2009	
North Main	2,822	NA	Preliminary in 2009	
Riverside	4,620	NA	Preliminary in 2009	
Sinnissippi	1,490	NA	Preliminary in 2009	
South Main	1,200	NA	Preliminary in 2009	
Spring Creek	3,550	2013	Preliminary in 2009	4
Rock River	No Data	2013	NA	

NA – Not applicable or no study performed

It is noted that the watersheds listed above (with the exception of the Rock River and Kilbuck Creek watersheds) have had a Stormwater Management/Flood Control Assessment completed in 2009. These assessments are basic but a detailed description of each assessment can be viewed at the following link: <http://www.rockfordil.gov/11569.aspx>. Data such as detention facilities and outfalls are out of date. The individual assessments discuss stormwater drainage and/or flooding issues along with potential projects to fix the issues. It is also noted that each assessment includes individual maps of the watershed boundary depicting the location of issues/complaints, possible projects, along with the locations of the watershed outfalls, detention, and storm sewer piping. Reference below for a list of watersheds and their associated issues, complaints, and the future, proposed and/or completed projects (if applicable). Two of the assessments (Buckbee Creek & Madigan Creek) have been revised through a cooperative effort with Winnebago County through a Sec. 319 grant from the Illinois Environmental Protection Agency. Stakeholders of the Kishwaukee River completed a Kishwaukee River Corridor Green Infrastructure Plan for which Kilbuck Creek is located. As the creeks are evaluated the noted erosion concerns will be included within the assessments listed below and repairs will be prioritized according to the Standard Operating Procedures for Drainageways.

**Based on the 2009 Watershed Assessments completed by MWH**

**Airport East**

*Camp Grant Army Barracks* – To improve area drainage in an area with flat topography and the lack of storm sewers, ditch regrading will be required. (2014-2015 the Airport Dr/Falcon Rd Reconstruction Project installed a storm sewer system and improved grading throughout the area around the Rockford Airport)

*Milford Avenue and 11<sup>th</sup> Street* – To utilize two existing culverts that are underutilized at these two intersections, regrading of the channel upstream and reroute the stream flow to these culverts is proposed. (IDOT is designing culvert improvements under 11<sup>th</sup> St in the area. A property owner has designed a channel relocation to the culverts)

*N.E. of Chesterfield Avenue and Blackwell Drive* – Localized/nuisance flooding was reported at this location.

*Channel clearing needed along creek from 20<sup>th</sup> Street to 11<sup>th</sup> Street*

The City has retained Willett Hofmann & Associates to survey and complete a hydraulic and hydrology study of this watershed.

**Blackhawk**

*Intersection of Harrison Avenue and Kishwaukee Street* – Illinois Department of Transportation (IDOT) has completed a project where (2) 48-inch storm sewers were installed under Kishwaukee Street.

**Buckbee/South East**

A watershed assessment was completed for Buckbee Creek through a Section 319 grant *Harmon Park Drainage Improvements* – Proposed 10-year plan for stormwater detention and conveyance projects following stormwater study. A regional detention facility has been conceptually designed for construction, early 2016. Several phases of the project have been completed to date.

*Sandy Hollow and 11<sup>th</sup> Street Area* – This area of the watershed is heavily urbanized and lacks adequate drainage due to nonexistent storm sewer or ditch infrastructure. Various street and drainage improvements have been completed and will continue.

*Rock River Outfall Repairs* – The outfall at RRWRD is in need of repairs. Project is designed and construction begin August 2015.

*RRWRD Overflow Basin* – An overflow basin has been designed and is under construction

*Retrofit of the Greater Rockford Industrial Park Detention Pond* – The pond is a wet pond that was partially constructed and in need of maintenance. Pond shall be cleared of trees and brush and expanded to plan.

*Concrete Channel Repairs* – The City has repaired several sections of the concrete channel over the past several years. Additional repairs were made in 2015 and will continue. Major repairs and bridge replacement will be completed as part of the Harrison Avenue Reconstruction Project.

*Yale Drive Channel Improvements* – The City has completed several gabion basket stabilization projects within this channel. More are needed but funding will be required through grants and by the property owners as this channel is owned by private property.

### **Fuller Creek**

*Lowes Distribution Center* – Localized/nuisance erosion and more frequent flooding was reported south of this location due to its development.

*S.W. of Beltline Road and U.S. Highway 20* – Future channel realignment is proposed at this location.

### **Keith Creek**

*Channel Widening from 18<sup>th</sup> Street to 5<sup>th</sup> Street* – To date the City has applied twice for grants and have not been approved.

*Backflow Preventers at Outfalls to Creek are needed*

*Alpine Dam Repairs* – Repairs are needed at Alpine Dam. Design has been completed and the City is awaiting funding for construction.

*Alpine Road Box Culverts* – The north and south branch box culverts are under design for reconstruction.

*Continued Creek Clearing of Debris and Silt*

*Continued Wall Repairs and Stabilization* – Repairs have been completed Hunter Ave. and at 5<sup>th</sup> Street

*Box Culvert Under Charles Street* – The box culvert requires repairs or replacement due to both the bottom and the top heaving

*Bridge Removals Between 18<sup>th</sup> St and 5<sup>th</sup> St* – The City is programming bridge removals of 5<sup>th</sup> St, 8<sup>th</sup> St, 10<sup>th</sup> St and 12<sup>th</sup> St. The railroad bridge at 18<sup>th</sup> St will be programmed for removal as well.

*Acquire and Demolish Properties in the Floodplain from 18<sup>th</sup> St to 9<sup>th</sup> St* – This has been completed through Hazard Mitigation Grant Funds and DCEO CDBG and IKE Buyout Grant Funds.

**Kent Creek**

*Safford Road and Springfield Avenue* – Area is proposed for a future 400-acre mixed use development. (Not developed to date)

*Riverside Boulevard and Rockton Avenue* – Area proposed for future development. (Various phases have been under development)

*Rockton Avenue and John Wesley Road* – The area has the potential for a future regional detention facility to be constructed.

*State Street In-Kind Culvert Replacement* – IDOT completed this culvert replacement.

*ACOE Channel Widening* – The project to widen the channel to a 15-foot wide bottom along the north and south branches of Kent Creek has been completed.

*ACOE Channel Widening* - The project to widen the northwest channel to a 15-foot wide bottom of Kent Creek has been completed.

*ACOE Diversion Channel/Levee* – Project has been completed.

It is also noted that a portion of this watershed is inspected by the ACOE. Following a 2012 inspection, it was determined that the channel system consisted of a number of issues and is considered unacceptable. The ACOE has made the following recommendations to the City to correct the issues:

1. Woody vegetation along the banks was noted at many locations which need to be removed.
2. Minor shoaling observed which should be removed (along with debris) to prevent erosion on the opposite channel bank.

3. Reestablish and protect the bank caving that is occurring along the right bank of the North Branch channel near North Central Avenue and along the left bank of the South Branch downstream of S. Central Avenue.

### **Klehm**

*Elizabeth Center (N.W. of Heath and Main Streets)* – Localized/nuisance flooding was reported due to poor drainage.

*S.E. of Forsythia Drive and Ogilby Road* – Maintenance of a 60-foot grassed drainage easement in this area is proposed.

*Barbara Coleman Complex (Loomis and Main Streets)* – The area is proposed for future redevelopment. (No development to date)

### **Madigan Creek**

A watershed assessment was completed through a Section 319 grant and can be found in the Appendices

*Tulip Lane* – Localized/nuisance flooding was reported.

*Intersection at Argus and Sundae Drives* – Localized/nuisance flooding occurs. (This is flooding due to maintenance issues of a private pond. City has been working through maintenance enforcement with the property owner)

*S.E. of Woodbine and Gordon Avenue* – Area has completed maintenance.

*N.E. of Newburg Road and Gordon Avenue* – Channel cleaning and regrading in this area has been completed.

*N.W. of Greenleaf Way and Einor Avenue* – Channel cleaning and regrading in this area has been completed.

*Stoney Creek Way and Madigan Creek* – Localized/nuisance flooding occurs due to undersized culverts. (Developer to upsize the culverts during next phases of development)

*Wood Creek Bend and Madigan Creek* – Localized/nuisance flooding reported. Storm sewer in area will need to be upsized to keep runoff to the road.

*Trainer Road and Madigan Creek* – Maintenance is need on a 78-inch culvert at this location along with slope stabilization.



*Madigan Creek*– Major flooding at the intersection of E. State St. and Trainer Rd. Culverts under E. State St are undersized. This is an IDOT roadway. Future developments shall provide additional detention storage along State Street between Mulford and Perryville Roads.

*Quarry S.W. of Charles Street and Mulford Road* – A proposed plan to deepen quarry and increase the pump rate that discharges to the creek has the potential for water quality impacts.

*N.E. of Brady Lane and Stone Bridge Crossing* – Construction of a bridge for an additional access road is proposed.

### **North Main**

*Main Street Between Elm and Mulberry Streets* – Street improvements are proposed in this area. (This project has been completed)

*Ford Avenue and Latham Street* – Localized/nuisance flooding was reported.

*Willoughby Avenue and Douglas Street* – Localized/nuisance surface flooding was reported.

*South of Fulton Avenue and Harlem Boulevard* – The installation of a new 12-inch storm sewer and inlet in a low point of the roadway is proposed.

*Country Club Beach* – Substantial over-bank flooding occurs in this area due to its location within the 100-yr floodplain. Backflow prevention has been installed to delay the flooding

*Browns Beach* – Substantial over-bank flooding occurs in this area due to its location within the 100-yr floodplain

### **Sinnissippi**

*N.E. of Chamberlain and Longwood Streets* – Localized/nuisance flooding was reported for several blocks.

*2<sup>nd</sup> St and Lower Jefferson Streets* – Localized/nuisance ponding was reported on the roadway.

*Longwood and Benton Streets* – Localized/nuisance ponding was reported on the roadway.

*Parkview Avenue and Spring Creek Road* – Due to major surface flooding that occurs at this intersection from an unnamed tributary, a project to retrofit the detention facility north of the crossing is proposed.

*Parkwood Avenue and Rural Street* – Channel restoration is proposed between James and Parkwood Avenues.

### **South Main**

*Springfield Avenue and Beltline Road* – Future development is proposed in this area. (No development to date)

**Spring Creek**

*Ryebrook Street* – Future development is proposed in this area.

*Parkview Avenue and Spring Creek Road* – Localized/nuisance flooding occurs in this area.

*Camella Court* – Streambank stabilization maintenance in this area is needed.

*S.W. of Spring Creek Road and Alpine Road* – Residents in this area are experiencing major surface flooding in the backyards.

*S.E. of Spring Creek Road and Alpine Road* – Residents in this area are experiencing major surface flooding in the backyards.

*S.W. of Weymouth and Spring Lake Drives* – The pond in this area has water quality impacts from elevated coliform count.

*N.W. of Weymouth and Spring Lake Drive* – Dredging maintenance of the channel is needed in this area. Installation of a trash rack at the pond's outlet is proposed.

*S. of Muirfield Land and Fireside Drive* – Maintenance in this area is needed.

Throughout the planning process all watershed Stormwater Management/Flood Assessments shall be reviewed and reevaluated. The existing list of potential stormwater management projects shall be edited and prioritized in order of severity of need based on the inspections completed on the creeks, drainageway and detention ponds. Nuisance drainage and flooding problems received throughout the year will be prioritized based on funding available and after life safety and flow obstruction issues are remedied. To achieve this the City shall hold a public meeting to explain watershed priority project list, and to gather input with respect to the public's interests/needs for completion.

## **6.0 FLOODING AND FLOODPLAIN MANAGEMENT**

Flooding is a significant natural hazard in the City; therefore proper management of the floodplains can help reduce the impacts of stormwater. Flood damage in Winnebago County results from three types of floods, flash flooding, overbank or riverine flooding, and urban flooding. Flash floods arise with very little warning and often result in locally intense damage. Flash flooding could affect any low-lying location or areas of poor drainage within the City. Overbank/Riverine flooding typically are associated with precipitation events that are of relatively long duration and occur over large areas. Flooding is caused by water overflowing the banks of the channels. Urban flooding involves the overflow of storm drain systems and can result from inadequate drainage combined with heavy rainfall or rapid snowmelt. Floods on the Rock River generally are associated with spring snowmelt combined with ice jams and rain storms. Floods on the much smaller tributaries of the Rock River in Winnebago County are usually caused by intense thunderstorms which occur in the late summer, or early fall.

All floodplains are susceptible to flooding in the City of Rockford. The floodplain of concern is for the 100-year flood event which is defined as areas that have a 1% change of flooding in any given year. However, flooding is dependent on various local factors including, but not limited to, impervious surfaces, amount of precipitation, river-training structures, etc.

Flood peaks have been increased by recent urbanization of uplands. Urbanization often is accompanied by floodplain filling or encroachment which reduces the channel conveyance capacity and increases the rainfall runoff. Increased flooding on the main channels can produce backwater effects up tributaries thus increasing the flood hazard. Additional flood runoff is unable to flow through restricted culverts and bridges which often are clogged with sediment and debris from new construction.

Reducing floodplain development is crucial to reducing flood-related damages. Areas with recent development may be more vulnerable to drainage issues. Storm drains and sewer systems are usually most susceptible to drainage issues. Damage to these can cause back-up of water, sewage, and debris into homes and basements, causing structural and mechanical damage as well as creating public health hazards and unsanitary conditions.

Flooding is a significant natural hazard. The type and severity of flooding are functions of the magnitude and distribution of precipitation over a given area, the rate at which precipitation infiltrates the ground, the geometry and hydrology of the catchment, and flow conditions in and along the river channel.

Unmanaged stormwater can cause flooding and erosion. When flooding occurs and water overflows onto roads and other areas containing materials such as trash and industrial waste, these pollutants are carried into the streams and creeks. Properly managed stormwater protects land and streams from flooding, pollutants, erosion, and can recharge groundwater.

The City has developed local and regional partnerships to coordinate implementation of flood control measures including the:

- Rockford Park District
- Winnebago County

- Illinois Emergency Management Agency (IEMA)
- Illinois Department of Natural Resources (IDNR)
- Federal Emergency Management Agency (FEMA)
- US Army Corp of Engineers (ACOE)
- Resilient Neighbors Network (RNN) within the National Hazard Mitigation Association
- United States Geological Survey (USGS)

#### Best Management Practices

Best management practices are useful measures to control and reduce the effects of flooding. Below is just a few methods the City has undertaken to make improvements to its storm system:

1. Constructing new and retrofitting existing detention basins to help reduce volume and rate of stormwater released during storm events into streams.
  - a. *Elliot Detention Basin* – The City has reconstructed this basin to include a sediment trap. Inspections show that additional work is needed to account for the continued sediment buildup.
  - b. *Logistics Park Basin* – With partnership with a construction company needing material this pond has been expanded. In July 2015 the City installed dry wells in the bottom of the basin.
  - c. *Linden Pointe Basin* – Though not owned by the City the City is responsible for the structural components of the basin. This basin has been restudied because rain events since construction of this pond has shown it does not hold the required rain event. The goal is to expand the volume of the pond and repair the seeping walls.
  - d. *Harmon Park Basin* – The City is partnering with the Rockford Park District to construct a detention pond in a large neighborhood built without considering the impacts of stormwater. Properties have been acquired and demolished to create in-series detention and storm systems.
2. Utilize stormwater infiltration methods such as porous and permeable pavements and infiltration trenches to reduce and store stormwater runoff
  - a. The City has constructed an alley downtown using porous pavement and is looking to continue use of porous pavement in alleys.
  - b. The City has worked with various developments to include permeable pavements within the parking lots.
3. Continue investigations and education of nuisance flooding on private property.
  - a. The City investigates flooding complaints and works to educate the property owners on methods to reduce flooding on their property. Most property owners do not realize they have drainage easements on the property and that they are responsible for the maintenance of those easements.
  - b. The City monitors known flood risk areas both public and private as noted in Table 2. These

are monitored due to continuous obstructed inlets, flooding of streets due to undersized storm system and known flash flood areas, flooding of basins that overtop the adjacent roadway, and flooding along the river.

**Table 2. Known Flood Risk Areas**

<b>Flood Risk Areas</b>	<b>Project Location</b>	<b>Project Description</b>
1	Sandhutton Ave & Danburry Dr - Harrison Park Assoc.	Detention basin - flooding risk
2	Turnberry Ridge Drainage (Citadel, Samuelson)	Job complete- monitor for flooding
3	Linden Pointe Detention Basin (Scarlet Oak Dr)	Detention basin - flooding risk
4	Leland Place (NE Rote & Divine)	Detention basin - flooding risk
5	Red Oak Estates (SE Rote & Eden)	Drainage ditch needs maintenance
6	Mill Rd & Highgrove Pl	Detention basin - flooding risk
7	Alpine Dam	monitor water level, trash rack, inspect dam
8	Churchill Park - 6th Ave, 7th Ave street flooding	monitor streets for flooding
9	Harmon Park - Eastgate, Sexton, McArthur, Log Cabin	monitor streets for flooding
10	Arden Court Detention Basin	monitor water level, trash rack
11	Red Oak Lane & Ramsey Clos	monitor streets for flooding
12	Country Club Beach Rd	Monitor river level, streets for flooding
13	Browns Beach Rd	Monitor river level, streets for flooding
14	Rote Rd, Bell School Rd	monitor streets, ditches, basins for flooding
15	University Dr.	monitor street, ditches, basins for flooding
16	Broadway Viaduct	monitor street for flooding
17	Keith Creek at Schnucks on Charles St (2642 Charles St)	monitor water level in creek, bridges
18	Shirley Rd	monitor water level in creek
19	Levings Lake Dam	monitor water level, inspect dam
20	Page Park Dam	monitor water level, inspect dam
21	Montague St & West St	clean out inlets, chronic problem area
22	15th Ave & 13th St	clean out inlets, chronic problem area
23	Parkview Ave and Crabapple Ln	monitor open top inlet, culvert on Parkview Ave
24	Kishwaukee St and Sandy Hollow Rd	inspect trash racks
23	1733 Homewood Dr	inspect trash racks
24	N Central Ave & Liberty Dr	monitor for street flooding
25	3000 Alida St	monitor manhole cover
26	700 Parkwood, Rural, James	monitor new drainage system, street flooding
27	Charles St & 9th St	monitor street for flooding

## 7.0 WATER QUALITY MONITORING PROGRAM

In order to improve the general water quality within the City and that enters the Rock River, the City has developed a stormwater sampling/monitoring program that was created in 2003. Tributary sampling is completed at the locations in Table 3 and Representative monitoring at outfall locations is shown in Table 4. The City takes samples during storm events and during dry weather events. The frequency and parameters the City must test for are noted in Table 5. Results of the monitoring and trends are reported in the annual report. Historically, the City has not seen majors concerns in the sample results. Any anomalies have been investigated and found to not be of concern.

**Table 3 – Representative Tributary Monitoring Locations**

Site ID	Locations*
T1	North Kent Creek @ Fairgrounds Park
T2	South Kent Creek @ Tay & Corbin St.'s
T3	Keith Creek @ Tenth Avenue Park
T4	Keith Creek @ Dahlquist Park
T5	Spring Creek @ Starkweather Avenue

\*Reference Appendix A-2 for a map exhibit of the tributary monitoring locations.

**Table 4 - Representative Outfall Monitoring Locations**

<i>Source: Rockford Stormwater NPDES Permit No. ILS000001</i>		
Outfall ID	Location*	Watershed Description
Station R1	Paradise Boulevard	225 ac residential & open space
Station R2	Market St. & N. Water St.	50 ac commercial, offices & residential
Station R3	Fairview Blvd & Crosby St.	510 ac residential
Station R4	8 <sup>th</sup> Street & Wills Avenue	780 ac industrial, commercial & residential
Station R5	Forest View Rd & 28 <sup>th</sup> Ave	80 ac light industrial

\*Reference Appendix A-2 for a map exhibit of the outfall monitoring locations.

### Mitigation Goals

- Mapping City wells and cone of influence
- Mapping groundwater ordinances and plume of contamination
- Installation of additional sampling locations

**Table 5 – Stormwater Sampling Schedule & Parameters**

PARAMETER	MONITOR FREQUENCY				
	Year 1	Year 2	Year 3	Year 4	Year 5
BOD5 (mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
COD (mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
TSS (mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
Total Nitrogen (mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
Total Kjeldahl Nitrogen (mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
Total Phosphorus (mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
Fecal Coliform (per mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
Oil and Grease (mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
Total Cadmium (mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
Total Copper (mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
Total Lead (mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
Total Zinc (mg/l)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
pH (S.U.)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
Hardness (as CaCO <sub>3</sub> )	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr
Temperature (C°)	2x/yr	2x/yr	2x/yr	2x/yr	2x/yr

## 8.0 ENFORCEMENT PROCEDURES

The intent of this document is to provide guidance to City officials and staff in enforcing the Stormwater Management Ordinance. The provisions of this enforcement response plan are not intended to limit the judgment and flexibility of the administrator in determining an appropriate response.

Actual enforcement procedures should consider any unusual aspects of a violation or condition, as well as special characteristics of an enforcement action, in determining the proper response.

Minor infractions may be resolved by a verbal notice, telephone call, or warning letter advising the owner/operator/person of the nature of the violation. If such action fails to generate an adequate response by the owner/operator/person, further enforcement actions as provided by the ordinance may be taken.

The City has developed a Stormwater Enforcement Response Plan that can be referenced in Appendix E.

## **9.0 ANNUAL REPORT REQUIREMENTS**

The City shall prepare an annual system-wide report to be submitted by no later than April 1 of each year, in accordance with the city permit (ILS000001, Appendix B-1). A copy of the 2014 Annual Report can be found in Appendix C. The report shall include a brief overview of the entire Municipal Separate Storm Sewer System and the following separate sections:

1. Status of implementing the stormwater management program(s) – provide summaries for individual permit components as detailed in Part III – Schedules for implementation of, and compliance with, SWMP.
2. Proposed changes to the stormwater management program(s).
3. Revisions, if necessary, to the assessments of controls and the fiscal analysis reported in the permit application under 40 CFR 122.26(d)(2)(iv) and (d)(2)(v).
4. An overall summary of the data, including monitoring data, accumulated throughout the reporting year.
5. Annual expenditures for the reporting period, with a breakdown for the major elements of the stormwater management program and the budget for the year following each annual report.
6. A summary describing the number and nature of enforcement actions, inspections, and public education programs.
7. Identification of water quality improvements or degradation.
8. Provide the Latitude and Longitude of the Representative Monitoring Outfalls listed in Table V.A.1.b, along with a map identifying their locations within the city.
9. A brief summary of what the city has experienced and evaluated in the past year about its programs regarding stormwater and pollution prevention, and a list of any proposed changes to their programs and/or additional actions they feel would be beneficial.
10. A summary of the effectiveness and accuracy of the monitoring results obtained as a result of the current requirements of the Permit. The City should provide suggestions and justifications for any possible improvements to the current monitoring locations and/or frequency as well as information indicating reasons why certain monitoring requirements should be modified or eliminated.



## **10.0 SWMP CITY RESOURCES**

### **a. City Staff Stormwater Responsibility**

The stormwater activities and functions related to permit compliance of the SWMP are divided among multiple personnel within the City's Department of Public Works (DPW). The following is a list of the responsible Public Works City staff and titles:

Marcy Leach – Stormwater Administrator & Engineering Operations Manager

Dean Kurth – Stormwater Program Manager

Brad Holcomb – Stormwater Program Manager

Jason Irvin – Project Manager (Storm & Water)

Ryan Lundberg – Stormwater & Environmental Coordinator

Justin Emerson – Sr. Project Manager (GIS/Facilities Mngt)

Warren Stahl – Sr. Engineering Technician

Justin Kink – Sr. Engineering Technician

Vacant – (2) Sr. Engineering Technician

Interns/temps

A full and more detailed breakdown of the stormwater program staff, respective responsibilities, and personnel requirements is located in Appendix F.

### **b. Fiscal Expenditures**

To operate the SWMP annually, the City has to develop a projected budget for program activities. The projected 2015 budget for SWMP activities is presented on Table 6 below.

**Table 6 – SWMP Fiscal Information**

<b>Item</b>	<b>Budget Source</b>	<b>2015 (Budgeted)</b>
Street Sweeping	Street	\$473,335
Sewer Repair/Inlet Cleaning	Street	\$693,002
Bridge, Dam, Ditch Maintenance	Street	\$91,000
City-Wide Inlet Repair	CIP	\$150,000
Stormwater City-Wide Drainage Fund	CIP	\$450,000
Stormwater Sampling & Testing	General	\$25,000
Stormwater (Other)	CIP	\$560,000
Stormwater Maintenance & Monitoring	CIP	\$120,000
City-Wide Bank Stabilization	CIP	\$500,000
Stormwater Miscellaneous Consultant Contract	General	\$50,000

Additional funding options that should be evaluated to maintain the stormwater program and continue compliance with the City's NPDES permit. Stormwater program funding sources include:

- Stormwater utility
- State Revolving Fund loans
- Stormwater Fees
- Property taxes or sales tax
- Grants
- Debt financing
- Local improvement districts
- Developer participation
- System development fees/connection charges

The City maintains equipment for use in various stormwater operations. The latest list is below.

<b>City of Rockford Public Works Equipment List (May 2015)</b>		
<b>Type of Vehicle</b>	<b>Description</b>	<b>Quantity</b>
Light Duty Trucks	1/2 to 1 Ton w/ arrow-board	12
John Deere Backhoes	Class 410	8
Case Backhoe	Class N590	1
Wheel Loader	Model 644R - 4 yd bucket	1
Caterpillar Wheel Loader	Model 950G - 4 yd bucket	1
Truck Mounted Clam Loader	(Tree & Brush Loaders)	2
Street Sweepers	Vacuum Style	2
Vermeer Wood Chippers	Model 1800 (3 w/ winches)	3
Bobcat Skid Street Loaders	1 model 863; 2 Model 773	3
Aerial Bucket Trucks - Forestry	1 - 50' Reach; 1 - 60' Reach	2
Aerial Bucket Trucks - Traffic	Used for Signal Repair	4
GMC Tanker Truck	2200 Gal. Capacity	1
Tandem Axle Dump Trucks *	10 yd Capacity Dump Bodies	32
Single Axle Dump Trucks *	7 yd Capacity Dump Bodies	16
* Of the 45 dump trucks, 30 are quipped for Snow & Ice Operations		
Mini Salt & Plow		2
Pothole Patch Trucks		4
Stake Bed Trucks		2
Storm Sewer Vacuum Truck		1
Trailers	Various sizes (5); Loaded w/ shoring matl(4)	9
Compressors		3
Passenger Buses	Avg Passenger Seating - 35	17
Drivers - Approximately 70 CDL licensed drivers within Public Works		
Mechanics - 6 Heavy Equipment & 2 Light Duty		
Equipment Operators - 13		
Tree Trimmers - 7		
24 - 2 man crews (Street/Water/Traffic/Property)		

**11.0 STORMWATER MASTER PLAN REVIEW AND MODIFICATION TIMING**

The City's Stormwater Administrator & Engineering Operations Manager will review annually.

**12.0 ORDINANCE REVIEW SCHEDULE**

The City's Stormwater Administrator & Engineering Operations Manager will review annually.

**13.0 DEFINITIONS**

Reference Appendix G for a list of relevant definitions.

**14.0 REFERENCE MATERIAL LIST**

Reference Appendix H for the City Yards Stormwater Plan.

Reference Appendix I for a list of references.

**15.0 DECREE**

A copy of the decree can be found in Appendix J.