

**COMPREHENSIVE SURFACE WATER  
MANAGEMENT PLAN  
FOR THE CITY OF NORTHFIELD, MINNESOTA**

**WSB Project No. 1559-29**

**September 10, 2007**

**PREPARED BY**

**City of Northfield  
801 Washington Street  
City of Northfield, MN 55057  
(507)645-8832**

**WSB & Associates, Inc.  
701 Xenia Avenue – Suite 300  
Minneapolis, MN 55416  
(763) 541-4800**

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed professional engineer under the laws of the State of Minnesota.



---

**Todd E. Hubmer, PE  
Reg. No. 24043**

---

**Katy Gehler-Hess, PE  
Reg. No.**

# TABLE OF CONTENTS

---

- i. TITLE PAGE
- ii. TABLE OF CONTENTS
- iv. LIST OF TABLES
- v. LIST OF FIGURES
- vi. LIST OF APPENDICES
  
- I. EXECUTIVE SUMMARY
- II. INTRODUCTION AND PURPOSE
- III. LAND AND WATER RESOURCE INVENTORY
- IV. ASSESSMENT OF PROBLEMS AND CORRECTIVE ACTIONS
- V. ESTABLISHMENT OF GOALS AND POLICIES
- VI. IMPLEMENTATION PRIORITIES / IMPLEMENTATION PROGRAM
- VII. FINANCIAL CONSIDERATIONS
- VIII. AMENDMENT PROCEDURES

## LIST OF TABLES

---

TABLE NO.		SECTION & PAGE NO.
III-1	Average Monthly Temperature, Precipitation, and Snowfall Data .....	III-2
VI-1	Storm Water Capital Improvement Projects.....	VI-2
VI-2	Storm Water Management Programs.....	VI-3
VI-3	Storm Water Management Studies.....	VI-6
VI-4	Summary .....	VI-10

## LIST OF FIGURES

---

<b>FIGURE NO.</b>		<b>SECTION &amp; PAGE NO.</b>
II-1	Water Management Jurisdiction Map.....	II-2
III-1	1% Chance Rainfall Event in 24-hours within the State of Minnesota .....	III-3
III-2	Annual Normal Precipitation within the State of Minnesota .....	III-4
III-3	City Location .....	III-5
III-4	Subwatershed Delineation .....	III-12
III-5	National Wetland Inventory .....	III-13
III-6	DNR Public Waters, Wetlands and Wild & Scenic Designated Areas .....	III-14
III-7	100-year Floodplain Boundary.....	III-15
III-8	High Priority Water Resource Issues Map.....	III-16
III-9	Water Quality Monitoring Locations .....	III-17
III-10	Ground Water Appropriations Location.....	III-18
III-11	Hydrologic Soils Classification .....	III-19
III-12	Existing Land Use .....	III-20
III-13	Proposed Land Use .....	III-21
III-14	Pollutant Sources Location.....	III-22
III-15	Bedrock Geology .....	III-23
III-16	Depth to Bedrock .....	III-24
III-17	Greenway Corridors.....	III-25

## **LIST OF APPENDICES**

---

- A. Water Resource Related Agreements**
- B. Storm Water System Water Quality Monitoring Information from the Cannon River Watershed Partnership**
- C. FEMA Flood Insurance Studies**
- D. NPDES Phase II Information**
- E. Summary of Water Resource Management Rules and Regulations**
- F. Hydrologic Modeling Review Memo and Existing (1994) Hydrologic Model Summary Information (Barr)**
- G. Proposed Eutrophication Standards for Waterbodies**
- H. Glossary of Terms**
- I. Developer's Handout**
- J. Infiltration Design Options**

# SECTION I

---

## I. EXECUTIVE SUMMARY

This Comprehensive Surface Water Management Plan for the City of Northfield has been developed to meet local and regional environmental and planning requirements. It has also been developed to be in conformance with the requirements of applicable State and Federal laws. This document and its referenced literature is intended to provide a comprehensive inventory of pertinent water resource related information that affects the City and management of those resources.

### Section II

**Section II** of this plan provides an introduction and purpose. The Surface Water Management Plan has been developed to provide the City with direction concerning the administration and implementation of water resource activities within the City. This section also lists the personnel contacts involved in the assistance and implementation of this plan, including the staff from the Rice County SWCD, Rice County Planning Zoning Department, and interest groups.

### Section III

**Section III** of this plan provides an inventory of land and water resources within the City including a general description and summary of data related to precipitation, geology, topography, flood problem areas, existing flood insurance studies, water quality, water management ordinances, surface and ground water appropriations, ground water, soils, land use, public utilities services, public areas for water-based recreation and access, fish and wildlife habitat, unique features, scenic areas and pollutant source locations within the City. A number of maps were also developed as part of the Plan to assist in summarizing this information.

### Section IV

**Section IV** of this Surface Water Management Plan provides an assessment of the existing and potential water resource related concerns within the City. These concerns were identified based on an analysis of the land and resource data collected as part of this plan preparation and through public input. A number of problem areas were identified through the plan development process. This section summarizes the problems and corrective actions that were identified through this process. A summary of the highest priority issues are listed below:

1. Need to pursue inter-community rate control and water quality treatment agreements with neighboring townships.
2. Need to explore pond maintenance at Woodley Street ponds.
3. Need for development to restrict peak discharge rates to address downstream concerns.
4. Need to continue to implement community snow storage management program.
5. Need to work with colleges and interest groups to explore need for water quality monitoring.

## SECTION I

---

6. Need to confirm hydraulic capacity of Lincoln Parkway drainage system.
7. Need to pursue grants to complete flood studies in Heath Creek Watershed.
8. Need to explore options for stormwater management in industrial areas.
9. Need to explore local partnership to manage trout stream.
10. Need to preserve Hauberg Woods Fen.
11. Need to explore alternative stormwater Best Management Practices (BMPs) in downtown redevelopment projects.

### **Section V**

**Section V** of this plan outlines water resource management related goals and policies of the City. Goals and policies have been developed for the City concerning water quantity, water quality, recreation, fish and wildlife management, enhancement of public participation, information and education, public ditch system, ground water, wetlands, and erosion. A summary of some of the significant policies are listed below:

1. Multi-level educational program including hands on training, cost-sharing with residents and using web site;
2. Differing performance standards set for new development and expansion /redevelopment activities;
3. Limits for runoff rates generated by any new development to pre-settlement conditions;
4. Limiting runoff rates generated by expansion /redevelopment to existing conditions;
5. Providing 2 feet separation between basements/low openings and high water elevations;
6. Focusing on measurable standards (not just ponding) for new impervious to reduce phosphorus and sediment;
7. Infiltration required on new development and redevelopment /expansion;
8. Identifying potential low impact development demonstration programs;
9. Inspecting and maintaining stormwater system as identified in City's updated Stormwater Pollution Prevention Plan.

# SECTION I

---

## **Section VI**

**Section VI** outlines implementation priorities and develops an implementation program. This section contains a prioritized listing of the studies, programs and capital improvements that have been identified as necessary to respond to the water resource needs within the City.

The implementation period identified within this report for the programs, studies and capital improvements is for 10 years or more from the adoption of this plan. Many of the improvements noted in the plan will most efficiently be implemented over time, as development occurs in the affected areas. This plan is to be used for planning purposes only. Detailed feasibility analysis has not been completed to develop this section; therefore, cost estimates are subject to change and update as more detailed information is obtained. The summary of some of the significant projects, programs and policies within the implementation program are listed below:

1. In partnership with future development applications, complete feasibility studies and construct /oversize where appropriate regional water quality and flood control ponding in the following areas: Woodley Street /CSAH 28 within Spring Creek Watershed, Lincoln Waterway Watershed, Heath Creek Watershed, Cannon River Watershed;
2. Incorporate a demonstration water quality and low impact development practices into downtown redevelopment projects;
3. Partner with local governments, interest groups and agencies to construct temperature control and trout management stormwater improvements in Rice Creek (aka...Spring Brook) Watershed;
4. Conduct storm water pond and catch basins maintenance projects as needed;
5. Conduct street sweeping on City streets at least once annually;
6. Maintain and update hydrologic/hydraulic model and database;
7. Conduct erosion control inspections on construction sites;
8. Work with neighboring townships and municipalities to develop stormwater management intergovernmental agreements for areas discharging to City;
9. Complete Stormwater financing update.

## **Section VII**

**Section VII** discusses the financial considerations of implementing the proposed regulatory controls, programs and improvements, which have been identified in this plan and their financial impact on the City. Funding sources available for implementing the policies and corrective actions identified within this plan are included. The plan indicates that the majority of funding for the policies and corrective actions will be from the City's Storm Water Utility Fund, General Fund, or developer agreements. Other possible funding sources for the implementation of this plan include special assessments and

## SECTION I

---

grant monies, which may be secured from various local, regional, County, State or Federal agencies. A summary of estimated total project costs is listed below:

- Overall Total Project Cost for 10-year period (includes all funding sources)=\$3.6 Mil.
  - Capital improvement projects = \$2.4 Mil
  - Stormwater management program = \$1.0 Mil.
  - Stormwater studies = \$200,000

### **Section VIII**

**Section VIII** discusses the procedures to be followed in the event this Surface Water Management Plan is amended. Significant changes to the plan shall be made known to the Mayor, City Council, Planning Commission, Environmental Quality Commission, and City Staff.

### **Appendices**

**Appendices** are included in the back of the plan and are summarized below. These documents are included because they provide supporting information to the main body of the plan.

Appendix A	Water Resource Related Agreements
Appendix B	Storm Water System Water Quality Monitoring Information
Appendix C	FEMA Flood Insurance Studies
Appendix D	NPDES Phase II Information
Appendix E	Summary of Water Resource Management Rules and Regulations
Appendix F	Hydrologic Modeling Review Memo and Existing (1994) Hydrologic Model Summary Information (Barr)
Appendix G	Proposed Eutrophication Standards for Waterbodies
Appendix H	Glossary of Terms
Appendix I	Developer's Handout
Appendix J	Infiltration Design Options

Additional material is referenced within this report and is available from the Engineering Department.

This document is expected to be a 10 year Surface Water Management Plan, after which time this plan should be updated. However, if significant changes to the plan are deemed necessary prior to that date the City may revise this plan in its entirety.

## SECTION II

---

### II. INTRODUCTION AND PURPOSE

#### A. General

This Surface Water Management Plan has been developed to provide the City with direction concerning the administration and implementation of water resource activities within the City. This Comprehensive Surface Water Management Plan has been developed to meet local and regional environmental and planning requirements.

In addition to being in conformance with state law, this plan has also been developed to meet the needs, requirements, and direction outlined by the following list:

1. State and Federal laws regarding the need to secure a National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge permit

This plan incorporates the approaches and direction provided in the programs and documents listed above into a comprehensive plan that can be consistently applied across the City.

#### B. Personnel Contacts

To implement this plan, a coordinated water resource management approach must be used. This approach utilizes the services of staff personnel within the City, County and surrounding communities. The primary implementation responsibility will lie with the appropriate staff members at the City. Assistance from the surrounding municipalities and Counties will also be expected. Outlined below are the names, addresses, telephone numbers, and website address for personnel having responsibilities for overseeing or implementing various aspects of the Plan.

Ms. Katy Gehler  
City Engineer  
City of Northfield  
801 Washington Street  
Northfield, MN 55057  
507-654-8832  
[www.ci.northfield.mn.us](http://www.ci.northfield.mn.us)

Rice County Planning and Zoning Office  
320 NW Third Street  
Faribault, MN 55021  
507-332-6113  
[www.co.rice.mn.us/planning](http://www.co.rice.mn.us/planning)

Rice County Soil & Water Conservation District  
1810 NW 30<sup>th</sup> Street  
Faribault, MN 55021  
507-332-5408  
<http://riceswcd.org/>

## SECTION III

---

### III. LAND AND WATER RESOURCE INVENTORY

This section of the plan provides a general description and summary of the climate, geology, surficial topography, surface and ground water resource data, soils, land use, public utilities services, water-based recreation, fish and wildlife habitat, unique features, scenic areas, and pollutant sources. This section also identifies where detailed information can be obtained for many of these areas of concern.

#### A. **Climate and Precipitation**

##### 1. **Climate**

The climate for Rice County, just south of the Minneapolis/St. Paul metropolitan area is described as a humid continental climate with moderate precipitation, wide daily temperature variations, warm humid summers and cold winters. The total average annual precipitation is approximately 32 inches, of which approximately one-third occurs in the months of June, July and August. The annual snowfall average is about 42 inches and is equivalent to approximately 4.2 inches of water. Average monthly temperature and precipitation are shown in **Table III-1**.

##### 2. **Precipitation**

A rainfall event having a 99% chance of occurrence in a 24-hour period is approximately 2.4 inches. A rainfall event having a 1% chance of occurrence in a 24-hour period is approximately 6.1 inches. The 1%, 10-day runoff is 7.0 inches. **Figures III-1** and **III-2** show the 1% rainfall event and the annual normal precipitation within the State of Minnesota. Additional climatological information for the area can be obtained from State Climatologist website at <http://climate.umn.edu/>.

#### B. **Geology and Topographic Information**

##### 1. **Geology:**

The City of Northfield is located in both the northern part of Rice County and the southern part of Dakota County as shown on **Figure III-3**. The City of Dundas lies directly to the southwest. The Townships of Bridgewater, Greenvale, Waterford, and Northfield are located adjacent to the City as shown on **Figure III-3**. Faribault is located about 15 miles to the southwest and Cannon Falls is located about 15 miles to the northeast. The Cannon River runs through Northfield and splits the City almost exactly in half. Total area within the corporate limits is approximately 8 square miles.

According to the Bedrock Geologic Map and Bedrock Topographic Map of Dakota County (Minnesota Geologic Survey, 1990) and the Rice County Water Resource Management Plan, the geomorphology of the uppermost geologic formation is a thin layer of quarternary deposits and, in many places, exposed bedrock.

The current landscape results largely from glacial activity. All of the bedrock formations are marine sedimentary rocks from the Early Paleozoic age when shallow seas covered southeastern Minnesota and

## SECTION III

---

the surrounding regions. The bedrock formations consist mainly of St. Peter Sandstone, Prairie Du Chien Group, Jordan Sandstone, and St. Lawrence and Franconia Formations. Depth to the bedrock varies from 800 feet above sea level to bedrock exposure.

The main aquifers within or near the City are the St. Peter Aquifer, the Prairie Du Chien-Jordan Aquifer, the St. Lawrence-Franconia Aquifer, and the Mt. Simon-Hinckley Aquifer.

Additional geologic information for areas within the City can be found in the following plans:

- Dakota County Geologic Atlas
- Rice County Geologic Atlas
- Rice County Water Resource Management Plan

**TABLE III-1 AVERAGE MONTHLY TEMPERATURE AND PRECIPITATION DATA FOR CITY**

<b>Months</b>	<b>Average Temp (F°)</b>	<b>Precipitation (inches)</b>	<b>Snowfall (inches)</b>
January	11.6	1.05	10.7
February	18.2	0.72	6.6
March	30.6	1.93	7.8
April	45.0	2.81	2.9
May	57.8	3.74	0.0
June	67.5	4.19	0.0
July	71.6	4.29	0.0
August	69.1	4.44	0.0
September	60.1	3.20	0.0
October	48.2	2.23	0.0
November	32.0	2.02	5.6
December	17.8	1.02	8.8
<b>Totals</b>	<b>44.1</b>	<b>31.64</b>	<b>42.4</b>

Source: Midwestern Regional Climate Center, Faribault

## SECTION III

---

### 2. **Topography:**

The City was covered by continental ice sheets during the last two million years, causing an undulating surface. Stormwater runoff is generally directed into the Cannon River, which flows north through the City. The specific drainage patterns, which depict topography for areas within the City, are shown on the subwatershed delineation map on **Figure III-4**. As can be observed from the subwatershed delineation map, the City is divided into many small watersheds. The subwatershed delineations utilized City topographic mapping, storm sewer as-builts, aerial photos, and field investigations.

### C. **Surface Water Resource Data**

Available surface water resource data within the City is summarized in this section. Detailed information has been included either in the appendices to this report or has been identified by reference and is available from the Engineering Department.

The hydrologic system of the City consists of wetlands, streams, and major water bodies as outlined below.

#### 1. **Wetlands**

The general locations of wetlands within the City are shown on **Figures III-5 and III-6**. These figures show the National Wetland Inventory and the DNR Public Waters Map, respectively. These wetlands provide habitat to many species of plants and animals.

#### 2. **Major Bodies of Water**

There are some major water bodies that convey and store water within and through the City. These water bodies are the Cannon River, Heath Creek, Spring Creek, Rice Creek, and Lymon Lakes. They are shown on **Figure III-6**. More information about these water bodies is included in various portions of this section.

#### 3. **Hydrologic Modeling (Water Quantity)**

The City's hydrologic/hydraulic system consists of five major subwatersheds, including the Cannon River, Heath Creek, Lincoln Waterway, Rice creek, and Spring Creek. These are shown on **Figure III-4**.

The existing hydrologic modeling effort quantifies the 10-year and 100-year rainfall events, peak discharge rates, storage requirements, other pertinent hydrologic/hydraulic information for storm water retention areas, and trunk storm water conveyance systems within the City. The existing hydrologic modeling results, along with a review of this information from WSB & Associates, Inc. is included as **Appendix F**.

Additional information regarding water quantity within the City can be found in the following studies:

## SECTION III

---

- City of Northfield Surface Water Management Plan, dated 1995, by Barr Engineering.
- Hydrologic Analysis for the Spring Creek Watershed in Northfield, dated January 2004, by Polaris Group.
- Rice County Water Plan, dated 2005.

### D. Flood Insurance Studies

A Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) was completed for areas within the City in 1981. The Flood Insurance Study consists of a study report, a set of floodway and floodplain delineation maps, and a set of Flood Insurance Rate Maps (FIRM) maps. This study provides the basis for floodplain management regulations and is included in **Appendix C**. The FIRMs are available from the City Engineering Department. The floodplain boundaries for the City are shown in **Figure III-7**. The existing 100-year flood levels and peak discharge rates based on the City's model are included in **Appendix F**.

### E. Water Resource Problem Areas

A number of water resource problem areas, issues or concerns were identified within the City, as identified in **Section IV**. From the list of problem areas, issues and concerns listed in **Section IV**, a shorter list of the highest priority water resource issues was identified through information obtained from City Staff and from the public input process. **Figure III-8** shows the location of these high priority issues, which are listed below:

1. Need to pursue inter-community rate control and water quality treatment agreements with neighboring townships.
2. Need to explore pond maintenance at Woodley Street ponds.
3. Need for development to restrict peak discharge rates to address downstream concerns.
4. Need to continue to implement community snow storage management program.
5. Need to work with colleges and interest groups to explore need for water quality monitoring.
6. Need to confirm hydraulic capacity of Lincoln Parkway drainage system.
7. Need to pursue grants to complete flood studies in Heath Creek Watershed.
8. Need to explore options for stormwater management in industrial areas.
9. Need to explore local partnership to manage trout stream.
10. Need to preserve Hauberg Woods Fen.

## SECTION III

---

11. Need to explore alternative stormwater Best Management Practices (BMPs) in downtown redevelopment projects.

More detailed information about these issues is available in **Section V** of this Plan.

### F. Water Quality Data

#### 1. Overview

Water quality data for the City has been obtained from the MPCA's Environmental Data Access site at

[www.pca.state.mn.us/data/edaWater/index.cfm](http://www.pca.state.mn.us/data/edaWater/index.cfm).

This database is utilized by participating agencies to compile water quality testing data and is almost entirely used for the storage of water quality parameters.

**Figure III-9** shows the location of monitoring sites listed on the MPCA web-site.

#### **2006 List of Impaired Waters (Section 303d):**

The Minnesota Pollution Control Agency lists the following waterbodies/water courses within the City as having impaired uses due to excess pollutant(s):

- Cannon River (*Mercury, Turbidity, Fecal Coliform*)
- Spring Brook (*Turbidity*) (*aka Rice Creek*)

These waterbodies/watercourses have been or will be designated as having a Total Maximum Daily Load (TMDL) for acceptable levels of those pollutants. Furthermore, the EPA has approved a TMDL for fecal coliform in the Cannon River which will require the City to address pollutant load reductions. No other TMDLs have been approved.

**Figure III-9** also shows the location of the impaired waters.

#### 2. Water Quality Monitoring Data

Additional information on water quality within the City has been developed by the Cannon River Watershed Partnership (CRWP) (**Appendix B**).

This information includes pollutant loading information for the subwatersheds within the City.

### G. Floodplain Management

The City has adopted a Floodplain District to provide floodplain management for the City. A copy of these regulations can be found on the City's website at [www.ci.northfield.mn.us](http://www.ci.northfield.mn.us). These regulations prohibit uses or activities within the floodplain or floodway that include structures or fill or that obstruct flood flows or cause increased flood elevations.

## SECTION III

---

### H. Shoreland Management

The City has adopted a Shoreland Overlay District to protect shoreland areas in order to preserve and enhance surface waters. A copy of these regulations can be found on the City's website at [www.ci.northfield.mn.us](http://www.ci.northfield.mn.us). Based on these regulations, the City has classified the following DNR Public Waters/Wetlands:

<b>Water Body Name</b>	<b>Classification</b>
Spring Creek	General Development
Heath Creek	General Development
Rice Creek	Natural Environment
Sibley Marsh	Unclassified
Cannon River	Recreational River

The Cannon River in the City of Northfield has been given a recreational classification under the Minnesota Wild and Scenic Rivers Act and has therefore been assigned special use and land use regulations.

**Figure III-6** shows the location of these water bodies and location of Wild and Scenic designated area, if applicable.

### I. Ground Water Appropriations

Within the City, ground water wells serve the City and private water needs. Each of these wells has a ground water appropriation permit from the DNR. **Figure III-10** shows the types and locations of the DNR permitted ground water appropriation sites within the City.

### J. Ground Water Resource Data

Aquifers provide the groundwater for the City and surrounding areas. Groundwater resource data for areas within the city are available in the Rice County Water Resource Management Plan, as well as the Dakota County and Rice County Geologic Atlas.

The City has recently completed a Wellhead Protection Plan pursuant to State requirements. A copy of this plan and corresponding regulations can be found on the City website at [www.ci.northfield.mn.us](http://www.ci.northfield.mn.us).

### K. Soils Information

The soils within the City area generally have moderate to high infiltration rates and create a high susceptibility to ground water contamination. The hydrologic soil classification map is shown in **Figure III-11**. The four soil classifications are defined as follows:

**Group A** - These soils have high infiltration rates even when thoroughly wetted. The infiltration rates range from 0.3 to 0.5 inches per hour. These soils consist chiefly of deep, well drained to excessively drained sands and gravel. Group A soils have a high rate of water transmission, therefore resulting in a low runoff potential.

## SECTION III

---

**Group B** - These soils have moderate infiltration rates ranging from 0.15 to 0.30 inches per hour when thoroughly wetted. Group B soils consist of deep moderately well to well drained soils with moderately fine to moderately coarse textures.

**Group C** - These soils have slow infiltration rates ranging from 0.05 to 0.15 inches per hour when thoroughly wetted. Group C have moderately fine to fine texture.

**Group D** - These soils have very slow infiltration rates ranging from 0 to 0.05 inches per hour when thoroughly wetted. Group D soils are typically clay soils with high swelling potential, soils with high permanent water table, soils with a clay layer at or near the surface, or shallow soils over nearly impervious material.

The majority of the City is composed of Hayden-LeSueur-Dundas association. This association drains moderately and is made up of loamy soils. The soil near the Cannon River is the Esterville-Colo-Waukegan association, and the surface contains mostly silty loam. The rest of the City is made up of the Racine-Littleton-Lindstrom and Moland-Merton-Maxcreek associations.

Additional information on the geology and soil for the City can be found in the Rice County Water Resource Management Plan, the Rice County Soil Survey, or the Dakota County Soil Survey.

### L. **Land Use and Public Utilities Services**

The City's land use practices include residential, commercial, industrial, agricultural, and public and private open space areas. **Figure III-12** is a representation of the existing land use. **Figure III-13** shows the future land use.

Most of the residences and businesses in the City are served by public water and sewer systems. The City does, however, contain some Individual Sewage Treatment Systems (ISTS). Some of these sites are anticipated to be abandoned and converted to city services in the next 10-20 years.

### M. **Public Areas for Water Based Recreation and Access**

There are a number of water bodies that offer active recreation such as fishing and passive recreation such as walking. These recreational resources are outlined below:

**Cannon River:** Cannon River provides excellent fishing and boating opportunities. Hiking trails, cross country ski trails, and picnic areas are also found near the river. The Cannon River is a State Canoe Route operated by the DNR.

**Lyman Lakes:** This popular recreational area offers open park areas. The lakes are often used for canoeing, ice skating, and other activities.

**Rice Creek:** Rice Creek is a designated trout stream that provides angling.

## SECTION III

---

Additional information regarding recreational opportunities within the City is available at [www.ci.northfield.mn.us](http://www.ci.northfield.mn.us) or at [www.dnr.state.mn.us](http://www.dnr.state.mn.us).

### **N. Fish and Wildlife Habitat**

The City provides habitat for a variety of small mammals, reptiles, birds, amphibians, and insects. Maintenance of habitat for wildlife species is important in maintaining ecological stability of the City's natural areas.

Information from the DNR and the Rice County Water Resource Management Plan indicate there is a variety of unique plant and animal life within the City, much of which is located near the Cannon River. Many of these species are rare, threatened, or endangered.

The City recently completed work on a Greenway Corridor Action Plan which identifies proposed greenway corridors and trails to be pursued by the City and adjacent local governments and partners as the area develops. Information about the Greenway Corridors can be found in **Figure III-17**.

### **O. Unique Features and Scenic Areas**

Unique features and scenic areas include State designated Scientific and Natural Areas, designated scenic areas, areas containing rare and endangered species, biologically diverse areas, and historic areas.

The City has many natural areas, water bodies, and city/regional parks. Some of these areas contain a moderate significance of biodiversity and special habitats. The City contains the Cannon River, which is classified as a wild and scenic river. The City has no Scientific and Natural Areas.

The City has a number of historical and architectural resources as identified by the Minnesota State Historical Preservation Office. The sites and locations of these resources can be found in the water resource library.

### **P. Pollutant Source Locations**

Information from the MPCA is shown on **Figure III-14**. This figure shows the approximate locations of a variety of pollutant sites. Many of the sites on the figure have been cleaned up or are in the process of being cleaned up. The MPCA should be contacted for site-specific details.

### **Q. NPDES Phase II**

The Minnesota Pollution Control Agency (MPCA) implemented the National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater Program in March 2003. Phase II requires (as amended in 2006) municipal separate storm sewer systems (MS4's) in urban areas with populations over 10,000 to obtain an NPDES permit. Permits for construction sites greater than one acre will also be required as part of the Phase II. The City of Northfield is required to submit its Stormwater Pollution Prevention Plan (SWPPP) and Notice of Intent (NOI) in conformance with the MPCA guidelines by February 15, 2007. Information about the City's SWPPP is included in **Appendix D**.

## SECTION IV

### IV. PROBLEMS AND CORRECTIVE ACTIONS

Outlined below is an assessment of existing and potential water resource-related problems that are known at this time. These problems have been identified based on an analysis of the land and water resource data collected as part of this plan preparation and through information from the City. A description of any existing or potential problem within the topic area has been listed and future corrective actions have been incorporated into an implementation plan.

<b>A. Lake and stream water quality problems</b>		
	<b>Identified Problem, Issue, or Concern</b>	<b>Corrective Action</b>
1	<p>The following water bodies have been listed as impaired by the MPCA:</p> <ul style="list-style-type: none"> <li>• Cannon River (<i>Mercury, Turbidity, Fecal Coliform</i>)</li> <li>• Rice Creek (<i>Turbidity</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• The City will participate in the process of working with the MPCA and other relevant agencies in discussions related to required TMDL studies anticipated to be completed for the Spring Creek and Cannon River located within the City.</li> </ul>
2	Water quality issues and related land use impacts are a concern on Heath Creek.	Complete watershed flood study and feasibility and diagnostic study to determine design options, and necessary controls for future industrial areas within the Heath Creek Watershed.
3	The need for additional water quality monitoring data on lakes and streams in the City has been identified.	Encourage monitoring program at two area colleges to conduct volunteer monitoring on key waterbodies.
4	Because of the close proximity of bedrock to the surface in several areas of the City, providing sufficient water quality treatment and infiltration is a concern.	Complete feasibility, geotechnical analysis and diagnostic study to determine design options and possible future City policies for management of high bedrock areas.
5	Maintenance of the regional ponds located north of Woodley Street associated with Spring Creek has been identified as a concern.	Construct stormwater improvements and pond maintenance as part of Woodley Street reconstruction project.
6	The City is required to continue to regulate illicit discharges in the City consistent with the SWPPP.	Develop and implement a City ordinance related to illicit and non-stormwater discharges consistent with City SWPPP.

## SECTION IV

<b>B. Flooding and storm water rate control concerns</b>		
	<b>Identified Problem, Issue, or Concern</b>	<b>Corrective Action</b>
1	The City has reviewed its existing hydraulic and hydrologic modeling information as part of this Plan. Based on this review, it was determined that an updated hydrologic model needs to be developed for the five major subwatersheds within the City.	The City will maintain and update hydrologic/hydraulic model and GIS database.
2	Based on the City's review of its existing hydraulic and hydrologic information, there is a lack of information on the hydraulic capacity of Lincoln Parkway drainage system.	<ul style="list-style-type: none"> <li>• Complete hydraulic study to investigate storm system capacity and need for additional storage/capacity in Greenvale Drainageway.</li> <li>• Construct stormwater improvements as part of Greenvale School Corridor and Trail project.</li> </ul>
3	Additional flood storage and possibly additional water quality treatment is needed upstream of Spring Creek, Heath Creek, Lincoln Waterway and Cannon River watersheds.	<ul style="list-style-type: none"> <li>• In partnership with future development applications, construct and oversize where appropriate, regional water quality and flood control ponding area upstream of Woodley Street/CSAH 28 within Spring Creek Watershed.</li> <li>• In partnership with future development applications, construct and oversize where appropriate regional water quality and flood control ponding upstream of ponding area in Lincoln Waterway watershed.</li> <li>• In partnership with future development applications, local government and interest groups, construct and oversize where appropriate regional water quality and flood control ponding in area upstream of ponding in Heath Creek watershed.</li> <li>• In partnership with future development applications, construct and oversize where appropriate regional water quality and flood control ponding area upstream of ponding in Cannon River watershed.</li> </ul>

## SECTION IV

<b>B. Flooding and storm water rate control concerns</b>		
	<b>Identified Problem, Issue, or Concern</b>	<b>Corrective Action</b>
4	There is a lack of inter-community water resource related agreements for rate control and water quality treatment with neighboring municipalities and townships.	The City will work with neighboring municipalities and townships to develop water resource related agreements for rate control and water quality treatment for water discharged into the City.
5	There are limited opportunities and land available to treat storm water in the downtown area. This area discharges storm water directly to the Cannon River and treatment of this water has been identified as a concern.	<ul style="list-style-type: none"><li>• The City will explore alternative storm water Best Management Practices and investigate incorporating a Low Impact Development (LID) demonstration project into downtown redevelopment projects where feasible.</li></ul>
6	Based on the City's stormwater modeling information, water will overtop Woodley Street in events greater than the 25-year event.	Construct stormwater improvements and pond maintenance as part of Woodley Street reconstruction project.

## SECTION IV

---

### C. Impacts of water quantity or quality management practices on recreational opportunities

	Identified Problem, Issue, or Concern	Corrective Action
1	No issues have been identified.	Not applicable

### D. Impacts of storm water quality on fish and wildlife resources

	Identified Problem, Issue, or Concern	Corrective Action
1	The City has identified the need to preserve Hauberg Woods Fen and that future storm water discharges in the area could impact the fen.	City will complete feasibility and management study to determine protection strategies for the Hauberg Woods Fen.
2	Rice Creek has been identified as a Class IIa trout fishery by the DNR. Protection of this trout stream from storm water impacts has been noted as a concern.	<ul style="list-style-type: none"><li>The City will partner with Rice County, local townships, and interest groups to pursue grants and develop trout management plan and investigate possible land protection techniques in Rice Creek Watersheds.</li></ul>

## SECTION IV

<b>E. Impacts of erosion and sedimentation on water resources</b>		
	<b>Identified Problem, Issue, or Concern</b>	<b>Corrective Action</b>
1	Suspended sediment carried by the Cannon River and its tributary waterways has been noted as a concern.	<ul style="list-style-type: none"> <li>• The City will develop and implement a post-construction site ordinance to address erosion and sedimentation issues as part of construction.</li> <li>• The City will sweep the streets at least once annually. Areas that need more frequent sweeping will be swept as required by the SWPPP.</li> </ul>

<b>F. Impact of land use practices and development on water resource issues</b>		
	<b>Identified Problem, Issue, or Concern</b>	<b>Corrective Action</b>
1	The City is interested in expanding policies and provide demonstrations for the use of Low Impact Development (LID) practices.	<ul style="list-style-type: none"> <li>• City will develop/investigate ordinance language and retrofit existing neighborhoods with LID stormwater features as part of selected City street reconstruction projects where feasible.</li> </ul>
2	The City's storage of snow from the downtown area near the Cannon River was noted as a concern.	City will develop snow storage BMP demonstration project on City Park property.
3	The long-term costs and responsibilities of maintenance and inspection of these LID features, such as rain gardens and infiltration areas, is a concern.	City will develop maintenance and inspection policy for stormwater ponds, raingardens, and related LID projects as part of post-construction site ordinance update.
4	The City needs to develop a Low Impact Development (LID) education and training program.	<ul style="list-style-type: none"> <li>• City will pursue work with interest groups to host two hands-on training sessions to educate residents on the benefits and uses of rainwater gardens, rain barrels and related onsite alternative BMPs.</li> <li>• The City will establish a cost share program for residents allocating funding for residents to build LID practices.</li> </ul>

## SECTION IV

<b>G. Adequacy of existing regulations to address adverse impacts on water resources</b>		
	<b>Identified Problem, Issue, or Concern</b>	<b>Corrective Action</b>
1	The City is a designated MS4 community for the NPDES permit.	The City has developed a Storm Water Pollution Prevention Plan (SWPPP) in conformance with MPCA rules and has incorporated the SWPPP into this Plan and will implement general SWPPP administration as needed.
2	The Cannon River within the City of Northfield has been identified as a “Wild and Scenic River” and therefore has special zoning requirements pursuant to Rice County shoreland ordinance and State law.	The City will review its shoreland and greenway standards and greenway overlay ordinances to determine consistency with the intent of the “Wild and Scenic” State requirements.
3	Storm water pond maintenance and inspection of post-construction storm water treatment and erosion/sediment control features has been noted as an issue.	<ul style="list-style-type: none"> <li>• City staff will inspect post-construction storm water treatment and erosion/sediment control features as required by NPDES requirements.</li> <li>• Conduct storm water pond and catch basins maintenance projects as needed based on inspections and consistent with SWPPP.</li> <li>• City will inspect storm water treatment basins at least every five years and sump catch basins every year.</li> </ul>
4	City wishes to expand its existing organic pest management program.	<ul style="list-style-type: none"> <li>• The organic pest management program will be continued/expanded in City parks and City property. An OPM education program will be established with City Parks Department.</li> </ul>

## SECTION IV

<b>H. Identification of potential problems which are anticipated to occur in the next 20 years based on growth projections and planned urbanization</b>		
	<b>Identified Problem, Issue, or Concern</b>	<b>Corrective Action</b>
1	There are concerns about funding the implementation of this Plan.	City will review and update its storm water utility and stormwater ponding and conveyance fee to address financing the implementation of this Plan.
2	As areas are annexed into the City, impact of development on water resources has been noted as a concern.	The City has developed policies to address storm water management as areas develop. These policies will be incorporated into ordinance.
3	Need to continue to develop and update the website and newsletters to keep residents informed of ever changing surface water issues and policies.	<ul style="list-style-type: none"> <li>• The City will develop and distribute an annual newsletter aimed at fostering responsible water quality management practices.</li> <li>• Update City website with water resource management information.</li> </ul>

<b>I. Availability and adequacy of existing technical information to manage water resources</b>		
	<b>Identified Problem, Issue, or Concern</b>	<b>Corrective Action</b>
1	There is a need to update the City's GIS database for water resource related data, studies and hydrologic information and models.	City will develop a storm sewer system map of all identified City-owned storm sewer pipes (24" or larger) and conveyances. This will also identify all outfalls and discharge points leaving the City. Annually review and update the storm sewer map.

## SECTION V

---

### V. ESTABLISHMENT OF GOALS AND POLICIES

The City has developed a number of goals, strategies, and policies for the management of storm water within the City. These goals and policies have been developed to complement any county, regional, or state goals and policies. The goals of the City are as follows:

#### Goals

1. Minimize public capital expenditures needed to correct flooding and water quality problems.
2. Identify and plan for means to effectively protect and improve surface and groundwater quality.
3. Prevent erosion and sedimentation of soil into surface water systems.
4. Promote groundwater recharge.
5. Protect and enhance fish and wildlife habitat and water recreational facilities to greatest extent feasible.
6. Secure the other benefits associated with the proper management of surface and ground water.

In order to achieve the City's goals for managing storm water, four strategies were developed. These strategies will assist the City in targeting its main audiences for the purposes of storm water management as follows:

#### Strategies

**Cooperation with other agencies:** This strategy recognizes that the City is not alone in managing storm water within its boundaries. There are a number of other local, state, and federal agencies that also continue to partner with the City to manage storm water. Through this strategy, the City has recognized these other agencies' role in this endeavor and will cooperate and coordinate with these agencies as necessary.

**Education:** This strategy includes educating various groups within the City about proper storm water management. Education of residents, City Staff, City Elected Officials, business owners, and developers is included in this strategy to assist in meeting the City's goals.

**Regulation:** Much of storm water management comes in the form of regulations put on new or redevelopment within the City. These regulations will also assist the City in achieving its water management goals. Policies related to the management of storm water are included in the regulation strategy.

**Internal operations:** The final strategy relates to the internal operations of the City. By outlining policies related to how the City's operations will treat and manage storm water, the City can work to achieve its storm water management goals.

## SECTION V

---

The City has identified target audiences for the policies outlined in each strategy. The target audiences and strategies are as follows:

### **AUDIENCE**

Public – Residents and Business Owners  
City Staff and Elected Officials  
Developers  
Review Agencies

### **STRATEGY**

Education, Regulation  
Cooperation, Education, Operation  
Education, Regulation  
Cooperation

Based on the target audience and the strategy, the City has developed a number of policies. These policies are outlined below.

#### **A. COOPERATION WITH OTHER AGENCIES AND INTEREST GROUPS**

There are a number of other local, state, and federal agencies that partner and work in collaboration to manage storm water in the City of Northfield. There are also citizen groups and interest groups interested in stormwater management. Through this strategy, the City recognizes these other agencies' and groups' role in this endeavor and will cooperate and coordinate with these agencies as necessary.

This Plan is in conformance with but does not restate all other agency rules that are applicable to water quality and natural resource protection. The other agency rules and policies include rules, policies, and guidelines associated with the following organizations:

- Minnesota Department of Health [www.health.state.mn.us](http://www.health.state.mn.us)
- Minnesota Pollution Control Agency [www.pca.state.mn.us](http://www.pca.state.mn.us)
- Board of Water and Soil Resources [www.bwsr.state.mn.us](http://www.bwsr.state.mn.us) and the Wetland Conservation Act [www.bwsr.state.mn.us/wetlands/wca/index.html](http://www.bwsr.state.mn.us/wetlands/wca/index.html)
- Minnesota Department of Natural Resources [www.dnr.state.mn.us](http://www.dnr.state.mn.us)
- US Army Corps of Engineers [www.mvp.usace.army.mj](http://www.mvp.usace.army.mj)
- Minnesota Department of Agriculture [www.mda.state.mn.us](http://www.mda.state.mn.us)
- Rice County Soil and Water Conservation District [www.riceswcd.org](http://www.riceswcd.org)
- US Fish and Wildlife Service [www.fws.gov](http://www.fws.gov)
- Rice County Planning and Zoning Office [www.co.rice.mn.us/planning](http://www.co.rice.mn.us/planning)

The requirements of many of the programs administered by these agencies are summarized in **Appendix E**. Additionally, the Cannon River Watershed Partnership is actively involved in stormwater issues in the region. Additional information regarding the Cannon River Watershed Partnership can be found at [www.crowp.net](http://www.crowp.net).

## SECTION V

The City may coordinate with adjacent townships in development of stormwater plans, rate and volume control standards for runoff discharged into the City, and on key intercommunity issues that affect both entities. The City may also work in partnership with other local governments or interest groups to pursue grant funding to identify and address programs for management of the Spring Creek, Rice Creek and Heath Creek watersheds, which have large watershed areas outside of the City.

While these other agency rules, policies, and guidelines are not restated in this Plan, they are applicable to projects, programs, and planning within the City. The Minnesota Stormwater Manual, which is a document intended to be frequently updated, is incorporated by reference into this Plan and can be found at [www.pca.state.mn.us/water/stormwater/stormwater-manual.html](http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html).

### B. EDUCATION

The purpose of the education strategy in meeting the City’s goals is to foster responsible water quality management practices by educating residents, business owners, City Staff, City Elected Officials, and developers about proper storm water management. If these targeted audiences recognize their role in responsible storm water management in their homes, businesses, and practices, it is another means for the City to meet its goals. This education strategy has also been designed to be in conformance with the NPDES requirements.

<b>STRATEGY: EDUCATION</b>		
<b>Policy No.</b>	<b>Policy</b>	<b>Target Audience</b>
1	The City will implement public education as part of the National Pollutant Discharge Elimination System (NPDES) Phase II program and its MS4 permit. A summary of the City’s SWPPP has been provided in <b>Appendix D</b> .	Residents, Business Owners, Developers, Staff and Elected Officials
2	The City will incorporate public information on surface water management on the City’s website. The web page would specifically describe the goals and actions planned by the City, provide links to BMPs, articles on each control measure in the City’s MS4 permit, track the number of visitors, and collect feedback from site visitors.	Residents, Staff, Business Owners, Developers and Elected Officials
3	The City will partner with relevant agencies to host training sessions with residents to educate them on the benefits and uses of rainwater gardens, rain barrels and Best Management Practices for landowners.	Residents, Elected Officials, Staff, Business Owners, Agencies
4	The City will promote and encourage all landowners adjacent to streams and wetlands to establish a vegetative buffer strip consisting of native non-mowed vegetation through education efforts.	Residents, Elected Officials, Business Owners and Staff

## SECTION V

<b>STRATEGY: EDUCATION</b>		
<b>Policy No.</b>	<b>Policy</b>	<b>Target Audience</b>
5	The City will continue to implement the existing Organic Pest Management Policy, which includes organic weed treatment and fertilizer use in parks and public property.	Residents, Business Owners, Elected Officials, and Staff
6	The City will develop and distribute through water utility bills or direct mailings an annual newsletter aimed at fostering responsible water quality management practices. Topics may include, but not be limited to: <ul style="list-style-type: none"> <li>● Groundwater quality and protection</li> <li>● Wellhead protection plan and related standards</li> <li>● Controlling invasive species</li> <li>● Water conservation and the water cycle</li> <li>● Proper hazardous waste disposal</li> <li>● Yard waste management</li> <li>● Pet waste disposal</li> <li>● Pollution prevention</li> </ul>	Residents, Business Owners, Developers
7	The City will investigate the possibility of working collaboratively with the Rice County Soil & Water Conservation District, Dakota Soil & Water Conservation District, and Cannon River Watershed Partnership in distributing educational materials and promoting/supporting outreach programs. Local partners offer a number of education opportunities, including the following: <ul style="list-style-type: none"> <li>● Citizen Stream Monitoring</li> <li>● River Clean-Up</li> <li>● Storm Drain Stenciling</li> <li>● Educational Field Day</li> <li>● General conservation practice information</li> </ul> These organizations provide many other educational opportunities. The City will continue to promote and support the educational efforts of these organizations.	Business Owners, Developers, City Staff and Elected Officials, Rice and Dakota Soil & Water Conservation Districts, Cannon River Watershed Partnership
8	The City will investigate implementing a cost-share program for City residents to implement alternative storm water management techniques on their land, such as rain garden, pervious pavement, etc.	Residents, Business Owners, City Staff, Elected Officials, Agencies

### C. REGULATION

The policies developed performance standards for new in this strategy outline specific storm water management elements that are required to be implemented through the development and/or permitting process. The regulation strategy is targeted at the public, developers, City Staff, and City Elected Officials.

## SECTION V

A summary of the rate control, water quality treatment and infiltration requirements identify in this section are provided below. Different policies for different types of activities have been developed. To provide clarification for when these policies affect different activities, the following definitions have been developed:

**New Development:** New Development projects are new residential, institutional, commercial/retail, office, or industrial projects that will subdivide land or disturb land as part of development in the existing non-urbanized areas of the City.

**Expansion/Redevelopment:** Expansion and Redevelopment projects include the expansion or redevelopment of existing commercial, industrial, or institutional uses within the existing urbanized areas of the City.

<b>STRATEGY: REGULATION</b>		
<b>No.</b>	<b>Policy</b>	<b>Target Audience</b>
<b>Rate Control</b>		
1	<p>For <b>Expansion/Redevelopment</b>, rate control must be provided to limit runoff from the project to existing conditions.</p> <p>As part of the evaluation of the expansion/redevelopment plans, the site will be evaluated based on the opportunity to meet these standards by the City Engineer, Planning Commission and City Elected Officials. This evaluation will take into consideration that a downstream system may have been constructed to accommodate newly or redeveloping areas and therefore eliminate the need for expanded on-site improvements.</p>	Developers, City Staff, Elected Officials
2	<p>For <b>New Development</b>, rate control must be provided to limit runoff to pre-settlement conditions for the 2- and 100-year critical events. Pre-settlement conditions shall be defined as the estimated land cover in the area before European settlement. This can be determined by use of historic topographic and photographic data.</p>	Developers, City Staff, Elected Officials
3	<p>For <b>New Development or Expansion/Redevelopment</b> with the Rice Creek subwatershed, rate control must be provided to limit runoff from the project to a maximum of 0.1 cfs per acre for the 100-year critical storm event. The 100-year critical storm event is either the 100-year, 24-hour or the 10-day snowmelt, whichever is greater.</p>	Developers, City Commissioners, Elected Officials
4	<p>The City may work with neighboring townships and municipalities to develop an agreement that provides rate control to existing conditions for runoff generated from any new development that discharges to Northfield.</p>	Staff, Elected Officials, Developers, Neighboring Communities

## SECTION V

<b>STRATEGY: REGULATION</b>		
<b>No.</b>	<b>Policy</b>	<b>Target Audience</b>
5	When property is annexed into the City, existing developed properties should comply with polices in this Plan to the maximum extent practical.	Staff, Elected Officials, and Developers
6	<p>The design of the storm drainage system shall be sized to accommodate the following rainfall events:</p> <ul style="list-style-type: none"> <li>● Local storm sewer - 20% chance event (5 year event)</li> <li>● Trunk storm sewer - 10% chance event (10-year event)</li> <li>● Storm ponds and open channels - 1% chance event (100-year)</li> </ul> <p>Capacity requirements may be varied if regional ponding system is located downstream.</p>	Developers
7	For storm water collection systems not designed to meet rate control standards (i.e., catch basins), a clogging factor of 50% will be used to size intake structures.	Developers
8	No orifice having a diameter less than 8" is allowed in the design of rate control structures within the City. If a structure having an opening less than 8" is required to meet rate control requirements, the required rate control for a site will be increased to allow a rate consistent with an opening of this size.	Developers
9	An emergency spillway (emergency outlet) from ponding areas shall be installed at a minimum of 1 foot below the lowest building opening and shall be designed to have a capacity to overflow water at an elevation below the lowest building opening at a rate not less than 3 times the 100-year peak discharge rate from the basin or the anticipated 100-year peak inflow rate to the basin, whichever is higher.	Developers
<b>Flood Control</b>		
10	The lowest floor elevation for all projects within the City will be 2 feet above the elevation of the highest known historic high groundwater elevations for the area and 2 feet above the 100-year high surface water elevation in the area. Information on historic high groundwater elevations can be derived from any reasonable sources including piezometer data, soil boring data, percolation testing logs, etc.	Developers

## SECTION V

<b>STRATEGY: REGULATION</b>		
<b>No.</b>	<b>Policy</b>	<b>Target Audience</b>
11	Any project within the City will maintain a minimum building opening elevation 2 feet above the projected 100-year high water elevation for the area. The applicant may apply for a freeboard requirement of less than 2 feet for secondary structures if calculations identify the structure can be protected, consent is provided from affected landowners, and there is no risk to water contamination from the items to be stored in the structure.	Developers
12	Final grading plans submitted to the City shall identify all required overland overflow routes and these routes shall be contained within a drainage and utility easement. Each individual lot included on the final grading plan shall contain proposed spot elevations within the overflow route to document required specific lot grades.	Developers
13	The City will comply with FEMA requirements. The City prohibits activities within the 100-year floodplain unless compensatory floodplain mitigation is provided at a 1:1 ratio by volume. Activities in the 100-year floodplain shall not cause an increase in the stage of the 100-year or regional flood or cause an increase in the flood damages in the reach affected. In addition, no filling within the designated floodway of a drainage channel shall be allowed. Suitable calculations must be submitted and approved demonstrating that filling the flood fringe will not impact the 100-year flood profile. Additional detail is provided in the City's floodplain ordinance on the City's web-site at: <a href="http://www.ci.northfield.mn.us">www.ci.northfield.mn.us</a> .	Residents and Developers
15	Projects that alter floodplain boundaries, such as bridge crossings and regional ponds that increase upstream high water levels are allowed provided that they were accounted for in the detailed study or provided that the applicant submits easements or other documentation in a form acceptable to the City demonstrating and recording the consent of the owner of any land affected by the increased high water levels; the action is consistent with Local, State and Federal Regulations; and the upstream impacts, riparian impacts and habitat impacts of the proposed action are analyzed and no detrimental impacts result, or adverse impacts are mitigated.	Residents and Developers
16	The City will continue to work with Rice County (the Ditch Authority) to assist where necessary in management of public ditches discharging into the City pursuant to Minnesota Ditch Law MS Chapter 103E and relevant management standards and laws.	Residents, Staff, County staff and Elected Officials

**SECTION V**

<b>STRATEGY: REGULATION</b>		
<b>No.</b>	<b>Policy</b>	<b>Target Audience</b>
<b>Water Quality Treatment</b>		
17	<p>Developments must incorporate effective non-point source pollution reduction Best Management Practices to achieve 90% total suspended solids removal and 60% phosphorous removal from the runoff generated by a 2.5 inch rainfall. The runoff volume reduction requirement may be considered and included in the calculations showing compliance with achieving these removal requirements. Water quality calculations, documentation and/or water quality modeling shall be submitted to verify compliance with the standard.</p> <p>OR</p> <p>For New Development and Expansion/Redevelopment projects, treatment of storm water to National Urban Runoff Protection (NURP) guidelines is required prior to storm water discharge to a lake, stream, or wetland and prior to discharge from the site as part of development. The NURP guidelines for the design of storm water treatment basins are as follows:</p> <ol style="list-style-type: none"> <li>a. A permanent pool (“dead storage”) volume below the principal spillway (normal outlet) which shall be greater than or equal to the runoff from a 2.5-inch storm over the entire contributing drainage area assuming full development.</li> <li>b. A permanent pool average depth (basin volume/basin area) which shall be <math>\geq 4</math> feet, with a maximum depth of <math>\leq 10</math> feet.</li> <li>c. Basin side slopes above the normal water level should be no steeper than 3:1, and preferably flatter. A basin shelf with a minimum width of 10 feet and 1 foot deep below the normal water level is recommended to enhance wildlife habitat, reduce potential safety hazards, and improve access for long-term maintenance.</li> <li>d. The pond should be wedge shaped with the inlet at the narrowest end and the outlet at the widest end. A length to width ratio of 3:1 or greater shall be used whenever possible. Distance between outfalls and outlets should be maximized.</li> </ol>	Developers
18	Two-foot sump catch basin inlets are required for all new or redevelopment within a street. A 3-foot sump catch basin or manhole is required within the street just prior to discharge to a wetland, lake, or stream.	Developers

**SECTION V**

<b>STRATEGY: REGULATION</b>		
<b>No.</b>	<b>Policy</b>	<b>Target Audience</b>
19	The City may work with neighboring townships and municipalities to develop an agreement that provides a 60% phosphorus and 90% total suspended solids reduction prior to the discharge of storm water into the City	Staff, Elected Officials, Neighboring Communities
20	The City will continue to explore multi-purpose regional treatment pond areas that provide an opportunity to enhance habitat and aesthetic features of the pond. These ponds will be designed to treat stormwater levels consistent with the use classifications of the downstream receiving water while also providing upland buffers and habitat improvements around the ponds.	Staff, Elected Officials and Developers
21	The City requires skimmers or other devices in the construction of new pond outlets and the addition of skimmers to existing systems whenever feasible and practical. The designs shall provide for skimmers that extend a minimum of 4 inches below the water surface and minimize the velocities of water passing under the skimmer to less than 0.5 feet per second for rainfall events having a 99% frequency.	Developers
22	The City encourages the design of storm water management features provide an opportunity to enhance the habitat and aesthetics of the area. This includes providing upland buffers around ponds, seeding the area with native vegetation, and designing the slopes flatter than 3:1	Developers
23	City has a process to establish waterbody Eutrophication standards as defined in <b>Appendix G</b> . In coordination with local partners, the City may explore water quality monitoring programs conducted by trained professional staff to evaluate water quality and assign use classification consistent with MPCA requirements for critical waterbodies in City. Based on the evaluation of this data, additional classification categories may be added to the City's requirements.	Staff and Elected Officials
<b>Infiltration/Volume Control</b>		
24	<b>New Development and Expansion/Redevelopment projects</b> are required to infiltrate storm water runoff except where it is demonstrated the risk to groundwater quality is significant, the land use is incompatible, or soils are not conducive to infiltration. Other Best Management Practices may be recommended by City Staff if the site is not conducive for infiltration. For projects that use infiltration, the following policies apply:	Developers, City Staff, Elected Officials

## SECTION V

<b>STRATEGY: REGULATION</b>												
<b>No.</b>	<b>Policy</b>	<b>Target Audience</b>										
	<ul style="list-style-type: none"> <li>● Pretreatment of storm water to water quality treatment standards outlined in this Plan will be required prior to discharge to an infiltration basin.</li> <li>● The infiltration system will be sized to infiltrate the runoff from the impervious surface area from a 0.34 inch rainfall event (median annual storm) in 72 hours. <b>Expansion/Redevelopment projects</b> will be required to meet these standards to the maximum extent practical.</li> <li>● Within the Spring Brook watershed, the infiltration system will be sized to infiltrate the runoff from the impervious surface area from a 1-inch rainfall event in 72 hours.</li> <li>● Infiltration rates of the soil shall be calculated using the following guidelines based on the soil's hydrologic group: <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Hydrologic Soil Group</th> <th style="padding: 5px;">Infiltration Rate</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">A</td> <td style="padding: 5px;">0.50 in/hr</td> </tr> <tr> <td style="padding: 5px;">B</td> <td style="padding: 5px;">0.25 in/hr</td> </tr> <tr> <td style="padding: 5px;">C*</td> <td style="padding: 5px;">0.10 in/hr</td> </tr> <tr> <td style="padding: 5px;">D*</td> <td style="padding: 5px;">0.03 in/hr</td> </tr> </tbody> </table> <p style="margin-left: 20px;">Actual infiltration data for the soils on the site obtained from percolation tests conducted by a qualified engineer or soils scientist may be used instead of the rates outlined here, if available.</p> </li> <li>● Any infiltration practices shall provide for 3 feet of separation between the bottom of the system and highest observed groundwater or bedrock elevation. These systems would not be required in high bedrock areas.</li> </ul> <p style="margin-left: 20px;">*Areas where infiltration features are not required.</p>	Hydrologic Soil Group	Infiltration Rate	A	0.50 in/hr	B	0.25 in/hr	C*	0.10 in/hr	D*	0.03 in/hr	
Hydrologic Soil Group	Infiltration Rate											
A	0.50 in/hr											
B	0.25 in/hr											
C*	0.10 in/hr											
D*	0.03 in/hr											
<b>Wetlands</b>												
25	The City promotes and encourages the establishment of wetland buffers within the City where feasible.	Developers, Residents										
26	The Rice County Soil and Waters Conservation District will continue to implement the Local Government Unit responsibilities pursuant to the Wetland Conservation Act within the City.	Rice Soil & Water Conservation District, Developers, Residents										

## SECTION V

<b>STRATEGY: REGULATION</b>		
<b>No.</b>	<b>Policy</b>	<b>Target Audience</b>
27	The City will require assessment of property to determine if restoration of drained wetlands in agricultural areas is feasible.	Developers, Residents
<b>Groundwater</b>		
28	The City will use the Minnesota Department of Health's document "Evaluating Proposed Storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas" as a guidance manual in evaluating all proposed infiltration projects within or adjacent to the vulnerable Drinking Water Supply Management Areas (DWSMA) consistent with the SWPPP.	Staff
29	The City has developed a spill prevention, control, and counter measure plan that is consistent with state and federal regulations.	City Staff and Elected Officials
30	The City will continue to implement its Wellhead Protection Plan.	Staff
31	The City requires that the design, installation and inspection of individual sewage treatment systems shall be in conformance with State standards. The City will work with Rice County to continue to identify necessary County review of applications and appropriately inspect these systems.	Staff, residents
32	For areas within shallow bedrock areas, geotechnical investigation is required for all proposed storm water facilities. Shallower depths or other storm water Best Management Practices such as constructed wetlands and bio-retention area will be considered in these areas.	Developers and staff
<b>Erosion and Sediment Control</b>		
33	The City requires submission and implementation of erosion and sediment control plans for land disturbance activities of one acre or more in size. These plans shall conform to the criteria outlined in the Minnesota Pollution Control Agency NPDES Permit, Surface Water Management Ordinance, and the NPDES Construction Site permit. The City will inspect sites that require an NPDES permit for erosion and sedimentation control.	Developers
<b>Greenway, Shoreland and Land Protection Areas</b>		
34	Storm water runoff from proposed New Development and Expansion/Redevelopment must be treated as outlined in this Plan prior to discharge into a designated greenway corridor area.	Developers, Staff, and Elected Officials

## SECTION V

<b>STRATEGY: REGULATION</b>		
<b>No.</b>	<b>Policy</b>	<b>Target Audience</b>
35	The City will work with DNR staff to update the shoreland ordinances. The City will manage the Cannon River in conformance with the requirements of the Wild and Scenic River program. The City will incorporate required local standards in conformance with Minnesota Statute 103F for consistency with the intent of the Wild and Scenic State requirements for the Cannon River.	Developers, Staff, and Elected Officials
36	As part of the update of the City's Comprehensive Plan, the City will identify necessary updates to the land use standards to facilitate implementation and protection of the greenway corridor system.	Staff and Elected Officials
<b>Trout Stream Management</b>		
37	The City will work with Rice County and other local partners to seek grant funding to develop a Trout Stream Management Plan for the Rice Creek watershed.	Staff, Developers, Other Agencies
<b>Low Impact Development</b>		
38	New Development and Expansion/Redevelopment projects will be encouraged to reduce the amount of impervious surface and use Low Impact Development (LID) techniques to the greatest extent reasonable taking into consideration land use, zoning, topography, previous site uses, and site constraints.	Staff, Developers, and Elected Officials
39	The City will explore the need to update ordinances to provide incentives, where appropriate, for the use of low impact development practices on projects in the City.	Staff, Developers, and Elected Officials
40	City will draft a Low Impact Development policy document for Elected Officials for review and possible incorporation into a pilot project as part of an upcoming street reconstruction /downtown redevelopment project.	Staff, Developers, and Elected Officials
41	The City will develop a Developer's Guide for alternative Best Management Practices, infiltration techniques, and Low Impact Development.	Staff, Developers, and Elected Officials

## SECTION V

### D. INTERNAL OPERATIONS

The City's internal operations can have a significant impact on storm water management. This strategy is targeted primarily at the City with some areas targeted at the public and/or another agency. These policies are aimed at operation and maintenance activities associated with water resource management within the City.

<b>STRATEGY: INTERNAL OPERATIONS</b>		
<b>No.</b>	<b>Policy</b>	<b>Target Audience</b>
1	The City will sweep the streets at least once annually. Areas that need more frequent sweeping will be swept as needed.	City Staff
2	The City will develop a storm sewer system map of all City-owned storm sewer pipes (24" or larger) and conveyances. This will also identify all outfalls and discharge points leaving the City. The City will annually review and update the storm sewer map.	City Staff
3	The City will review any Total Maximum Daily Load (TMDL) studies for impaired waters and coordinate this review with the MPCA and other relevant agencies.	Staff, Elected Officials Agencies
4	The City will continue to implement and review the community snow management program for snow removal and disposal approaches.	City Staff
5	The City will develop and implement a City ordinance related to illicit and non-stormwater discharges consistent with City SWPPP.	Staff, Elected Officials
6	The City will inspect post-construction BMPs then evaluate inspection records for determining the corrective maintenance actions (if necessary) for the long-term operation of all storm water management facilities.	City Staff
7	The City will inspect storm water treatment basins at least every 5 years and sump catch basins/manholes every year. Maintenance will be conducted as necessary.	City Staff
8	New storm water management ponds that are constructed as part of private development shall be covered by an outlet and deeded to the City for areas up to the elevation of the critical 100-year critical storm event (100-year, 24 hour or 10-day snowmelt) and should incorporate adequate access for future maintenance on at least one side of a pond.	Staff, Developers

## SECTION V

<b>STRATEGY: INTERNAL OPERATIONS</b>		
<b>No.</b>	<b>Policy</b>	<b>Target Audience</b>
9	Overland emergency spillways and designated drainage conveyances shall be covered by a drainage and utility easement that are dedicated to the City. The areas within the drainage and utility easement shall be maintained as outlined in these policies.	Developers, Staff
10	<p>The City requires individual homeowners and/or the homeowners association (HOA) to assume all responsibility for “routine” maintenance within drainage and utility easements. “Routine” maintenance is defined as litter removal, mowing, and maintenance of the property. In the case of drainage swales, routine maintenance includes the removal of obstructions from the swale, as necessary, to maintain proper drainage in addition to the aforementioned items.</p> <p>The City shall be responsible for “non-routine” maintenance within the easements any maintenance of the storm water inlet(s) and outlet(s) pipes, and erosion control at outlet and inlet locations. Such maintenance shall be completed as deemed necessary by the City.</p>	Developers, Staff
11	For on-site volume reduction systems installed as part of <b>New Development and Expansion/Redevelopment projects</b> , the maintenance responsibilities must be assumed by the applicant and the applicant must record this maintenance agreement acceptable to the City unless otherwise noted in the required drainage and utility easements (dedicated to the City). This recordable executed agreement details the methods, schedule, acceptable uses and responsible parties for maintenance of stormwater management facilities and shall be submitted to the City prior to construction.	Staff, Developers
12	The City will develop a storm water pond maintenance program to identify and record each pond within the City and to develop a pond priority maintenance schedule based on a subwatershed priority ranking system.	Staff, Developers
13	Landlocked depressions that presently do not have a defined outlet and do not typically overflow may be allowed a positive outlet to protect adjacent properties. This outlet must be in conformance with current wetland regulations and demonstrate that downstream properties are not adversely affected by the flows.	Developers and Staff
14	The City requires as-builts of all ponding areas and designated emergency overflows.	Staff and Developers

## SECTION VI

---

### VI. IMPLEMENTATION PRIORITIES/IMPLEMENTATION PROGRAM

Based on the information developed in **Sections III through V**, the City has developed a Surface Water Management Plan that reflects the needs and concerns of the City Council, City Staff, citizens, and the funding capabilities of the City. A prioritized listing of the studies, programs and capital improvements that have been identified as necessary to respond to the water resource needs within the City is outlined on the following tables. The City anticipates implementing at least to some extent the regulatory programs, studies, or improvements identified within this plan within the next 10 years.

**Table VI-1** contains Storm Water Capital Improvement Projects (CIP), **Table VI-2** contains Storm Water Management Programs (SMP), and **Table VI-3** contains Storm Water Management Studies (SMS). **Table VI-4** summarizes the information from all of these tables. The costs associated with these items reflect year 2007 costs and do not take into account inflation. These tables are for planning and budgeting purposes and are considered rough estimates. It is anticipated that these cost estimates will be reviewed annually and updated as needed.

**SECTION VI**

TABLE VI-1											
CAPITAL IMPROVEMENT PROJECTS											
Capital Improvement Projects					Proposed Expenses for Year						
No.	Priority	Project Description	Cost Estimate <sup>1</sup>	Potential Funding Sources	2007	2008	2009	2010	2011	2012-2016	Comments
CIP-1	High	In partnership with future development applications, construct and oversize where appropriate regional water quality and flood control ponding area upstream of Woodley Street /CSAH 28 within Spring Creek Watershed	\$500,000	Ponding Fee, Development Agreements				\$50,000	\$50,000	\$400,000	City's share of project will be \$50,000. Amount will vary based on final results of necessary studies.
CIP-2	High	In partnership with future development applications, construct and oversize where appropriate regional water quality and flood control ponding upstream of ponding area in Lincoln Waterway watershed	\$500,000	Ponding Fee, Development Agreements				\$50,000	\$50,000	\$400,000	City's share of project will be \$50,000. Amount will vary based on final results of necessary studies.
CIP-3	High	In partnership with future development applications, local government and interest groups, construct and oversize where appropriate regional water quality and flood control ponding area upstream of ponding in Heath Creek watershed	\$500,000	Ponding Fee, Development Agreements				\$50,000	\$50,000	\$400,000	City's share of project will be \$50,000. Amount will vary based on final results of necessary studies.
CIP-4	High	In partnership with future development applications, construct and oversize where appropriate regional water quality and flood control ponding area upstream of ponding in Cannon River watershed	\$500,000	Ponding Fee, Development Agreements				\$50,000	\$50,000	\$400,000	City's share of project will be \$50,000. Amount will vary based on final results of necessary studies.

**SECTION VI**

<b>CAPITAL IMPROVEMENT PROJECTS</b>											
<b>Capital Improvement Projects</b>					<b>Proposed Expenses for Year</b>						
<b>No.</b>	<b>Priority</b>	<b>Project Description</b>	<b>Cost Estimate<sup>1</sup></b>	<b>Potential Funding Sources</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012-2016</b>	<b>Comments</b>
CIP-5	High	Incorporate a demonstration water quality and LID practices into downtown redevelopment project.	\$100,000	Grants, Stormwater Utility, General Fund		\$50,000	\$50,000				Part of overall project storm sewer costs
CIP-6	Medium	The City will develop snow storage BMP demonstration project on City Park property.	\$10,000	Grants, Stormwater Utility					\$10,000		Grant dependent
CIP-7	Medium	Partner with local governments, interest groups and agencies to construct temperature control stormwater improvements in Rice Creek (aka...Spring Brook) Watershed.	\$50,000	Developer's Agreement, Grants, Stormwater Utility						\$50,000	Grant dependent, City's share of project costs.
CIP-8	Medium	Construct stormwater improvements and pond maintenance as part of Woodley Street reconstruction project.	\$75,000	Resident Assessment, Stormwater Utility		\$75,000					Scheduled for 2008
CIP-10	Medium	Construct stormwater improvements as part of Greenvale School Corridor and Trail project.	\$75,000	Grants, Stormwater Utility						\$75,000	Storm sewer costs only.
CIP-11	Medium	City will retrofit existing neighborhoods with LID stormwater features as part of selected City street reconstruction projects where feasible.	\$50,000	Grants, Stormwater Utility, Resident Assessment Cost-Share				\$10,000	\$10,000	\$30,000	
			<b>\$2,370,000</b>	<b>TOTAL</b>	<b>\$0</b>	<b>\$125,000</b>	<b>\$50,000</b>	<b>\$210,000</b>	<b>\$220,000</b>	<b>\$1,765,000</b>	

1) Cost estimates provided are for planning purposes only and may vary greatly for final actual costs. Detailed feasibility analyses have not been completed for these projects; therefore, cost estimates are subject to change upon final design

**SECTION VI**

TABLE VI-2											
STORM WATER MANAGEMENT PROGRAMS											
Storm Water Management Programs					Proposed Expenses for Year						Comments
No.	Priority	Project Description	Cost Estimate <sup>1</sup>	Potential Funding Sources	2007	2008	2009	2010	2011	2012-2016	
1	High	City will pursue work with interest groups to host two hands on training sessions to educate residents on the benefits and uses of rainwater gardens, rain barrels and related onsite alternative BMPs.	\$10,000	In Kind Grants, General Fund, Stormwater Utility			\$5,000	\$5,000			Cost share with CRWP.
2	High	The City will sweep the streets at least once annually. Areas that need more frequent sweeping will be swept as required by the SWPPP.	\$300,000	Storm Water Utility	\$20,000	\$20,000	\$20,000	\$20,000	\$120,000	\$100,000	Operating costs and mechanical replacement.
3	High	The City will maintain and update hydrologic/hydraulic model and GIS database	\$75,000	General Fund, Stormwater Utility		\$35,000	\$5,000	\$5,000	\$5,000	\$25,000	2008 costs represent a rough estimate of full modeling update.
4	High	Update City website with water resource management information	\$10,000	General Fund	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$5,000	
5	High	Inspect storm water treatment basins at least every five years and sump catch basins every year.	\$25,000	Storm Water Utility/General Fund	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$12,500	

**SECTION VI**

TABLE VI-2											
STORM WATER MANAGEMENT PROGRAMS											
Storm Water Management Programs					Proposed Expenses for Year						Comments
No.	Priority	Project Description	Cost Estimate <sup>1</sup>	Potential Funding Sources	2007	2008	2009	2010	2011	2012-2016	
6	High	Conduct storm water pond and catch basins maintenance projects as needed based on inspections and consistent with SWPPP	\$750,000	Storm Water Utility/General Fund	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$375,000	Expenses assumes implementation of updated stormwater financing system
7	High	Conduct erosion control inspections on construction sites	\$190,000	Developer's agreement	\$10,000	\$20,000	\$20,000	\$20,000	\$20,000	\$100,000	
8	High	General SWPPP administration.	\$30,000	Stormwater Utility	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	
9	High	Develop stormwater utility and pond fee justification report	\$42,000			\$37,000			\$5,000		
10	Medium	Encourage existing volunteer monitoring programs at two area colleges and pursue grant opportunities for volunteer monitoring at key waterbodies City-wide.	\$2,000	Grants			\$1,000	\$1,000			Expenses does not include other possible revenues from interest groups and agencies
11	Medium	The City will establish a cost share program to fund residents to build LID practices.	\$3,750	Stormwater Utility, Grants		\$750	\$750	\$750	\$750	\$750	Grant dependent

**SECTION VI**

TABLE VI-2											
STORM WATER MANAGEMENT PROGRAMS											
Storm Water Management Programs					Proposed Expenses for Year						Comments
No.	Priority	Project Description	Cost Estimate <sup>1</sup>	Potential Funding Sources	2007	2008	2009	2010	2011	2012-2016	
12	Medium	The City will develop and distribute an annual newsletter and regular mailings as well as pursue interactive educational opportunities aimed at fostering responsible water quality management practices.	\$10,000	Storm Water Utility, Grants	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$5,000	Grant dependent
13	Medium	City will develop a storm sewer system map of all identified City-owned storm sewer pipes (24" or larger) and conveyances. This will also identify all outfalls and discharge points leaving the City. Annually review and update the storm sewer map.	\$9,000	Storm Water Utility/Pond Fee	\$5,000		\$1,000		\$1,000	\$2,000	Timeline will be modified based on State schedule. City costs will be for staff time to review.
14	Medium	The organic pest-management program will be continued /expanded in City parks and City property. An OPM education program will be established with City Parks Department.	\$0	Volunteer Program							EQC volunteer program.
		<b>TOTAL</b>	<b>\$1,456,750</b>		<b>\$119,500</b>	<b>\$197,250</b>	<b>\$137,250</b>	<b>\$136,250</b>	<b>\$236,250</b>	<b>\$630,250</b>	

1) Cost estimates provided are for planning purposes only and may vary greatly from final actual costs. Cost estimates are subject to change and/or updates.

**SECTION VI**

TABLE VI-3											
STORM WATER MANAGEMENT STUDIES											
Water Resources Studies					Proposed Expenses for Year						Comments
No.	Priority	Project Description	Cost Estimate <sup>1</sup>	Potential Funding Sources	2007	2008	2009	2010	2011	2012-2016	
1	High	Complete hydraulic study to investigate storm system capacity and need for additional storage/capacity in Greenvale Drainageway.	\$25,000	General Fund/ Storm Water Utility						\$25,000	
2	High	City will work with neighboring townships and municipalities to develop stormwater management intergovernmental agreements for areas discharging to City	\$7,000	Developer's Agreements, General Fund, Storm Water Utility		\$7,000					
3	High	Review and update City shoreland, greenway standards and greenway overlay ordinances to determine consistency with the intent of the Wild and Scenic State requirements	\$12,500	General Fund, Storm Water Utility	\$12,500						
4	High	The City will develop/ investigate ordinance language to incorporate LID practices into future developments/ redevelopments.	\$5,000	Storm Water Utility, General Fund		\$5,000					The CRWP has received grant from MPCA to assist the City

**SECTION VI**

<b>STORM WATER MANAGEMENT STUDIES</b>											
<b>Water Resources Studies</b>					<b>Proposed Expenses for Year</b>						
<b>No.</b>	<b>Priority</b>	<b>Project Description</b>	<b>Cost Estimate<sup>1</sup></b>	<b>Potential Funding Sources</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012-2016</b>	<b>Comments</b>
5	High	The City will partner with Rice County, local townships, interest groups and DNR to develop trout management plan and investigate possible land protection techniques in Rice Creek (aka. Spring Brook) Watersheds.	\$25,000	General Fund/ Storm Water Utility, Grants				\$25,000			Grant dependent.
6	High	Develop and implement a City ordinance related to illicit and non-stormwater discharges consistent with City SWPPP.	\$10,000	Storm Water Utility	\$5,000	\$5,000					
7	High	Develop and implement post construction site ordinance	\$10,000	Storm Water Utility		\$5,000	\$5,000				
8	Medium	City will develop maintenance and inspection policy for stormwater ponds, rain gardens and related LID projects as part of post-construction site ordinance update.	\$5,000	Storm Water Utility		\$5,000					
9	Medium	Complete watershed flood study and feasibility and diagnostic study to determine design options, and necessary controls for future industrial areas within the Heath Creek Watershed.	\$20,000	General Fund/ Storm Water Utility			\$20,000				

**SECTION VI**

<b>STORM WATER MANAGEMENT STUDIES</b>											
<b>Water Resources Studies</b>					<b>Proposed Expenses for Year</b>						
<b>No.</b>	<b>Priority</b>	<b>Project Description</b>	<b>Cost Estimate<sup>1</sup></b>	<b>Potential Funding Sources</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012-2016</b>	<b>Comments</b>
10	Medium	City will complete feasibility and management study to determine protection strategies for the Hauberg Woods Fen	\$10,000	Grants, Park Fund				\$10,000			
11	Medium	Complete flood and storage capacity study in Cannon River Watershed.	\$20,000					\$20,000			
12	Medium	The City will work with MPCA and local partners to review and conduct data collection if necessary for TMDL studies anticipated to be completed within the Rice Creek (aka. Spring Brook) and Cannon River watershed located within the City.	\$15,000	Grants		\$5,000		\$5,000		\$5,000	Timeline will be modified for State schedule. City costs will be before staff time to review.
13	Low	Complete feasibility, geotechnical analysis and diagnostic study to determine design options and possible future City policies for management of high bedrock areas.	\$20,000	General Fund/ Storm Water Utility				\$20,000			
			<b>\$164,500</b>	<b>TOTAL</b>	<b>\$17,500</b>	<b>\$32,000</b>	<b>\$25,000</b>	<b>\$60,000</b>	<b>\$0</b>	<b>\$30,000</b>	

1) Cost estimates provided are for planning purposes only. Cost estimates are subject to change and/or updates.

SECTION VI

TABLE VI-4								
SUMMARY								
		Proposed Expenses for Year						
Improvements, Programs, and Studies	Totals <sup>1</sup>	2007	2008	2009	2010	2011	2012-2016	Comments
Totals for Capital Improvements:	\$2,370,000	\$0	\$125,000	\$50,000	\$210,000	\$220,000	\$1,765,000	
Totals for Management Programs:	\$1,456,750	\$119,500	\$197,250	\$137,250	\$136,250	\$236,250	\$630,250	
Totals for Management Studies:	\$164,500	\$17,500	\$32,000	\$25,000	\$60,000	\$0	\$30,000	
<b>Grand Totals:</b>	<b>\$3,991,250</b>	<b>\$137,000</b>	<b>\$354,250</b>	<b>\$212,250</b>	<b>\$406,250</b>	<b>\$456,250</b>	<b>\$2,425,250</b>	

1) Cost estimates provided are for planning purposes only. Detailed feasibility analyses have not been completed for these projects, programs, and studies; therefore, cost estimates are subject to change upon final design and/or updated information.

## SECTION VII

### VII. FINANCIAL CONSIDERATIONS

Implementation of the proposed regulatory controls, programs and improvements that are identified in this plan will have a financial impact on the City. To establish how significant this impact will be, a review of the means and ability of the City to fund these controls, programs and improvements is necessary. Toward this end, please find outlined below a listing of various sources of revenue that the City will endeavor to implement the water resource management efforts outlined in this plan.

For the next ten years, the capital improvement projects are estimated to cost approximately \$2,370,000. The storm water management program costs are estimated at about \$1,456,750. The storm water studies are estimated to cost about \$164,500. Over this 10-year period, these projects, programs, and studies are estimated to cost about \$3,991,250. Any projects, studies, and programs and the associated funding are subject to City Council approval.

<u>DESCRIPTION OF FUNDING SOURCE</u>	<u>REVENUE GENERATED</u>
1. Revenue generated by City's Storm Water Utility.	Variable
2. Project paybacks.	Variable
3. Special assessments for local improvements made under the authority granted by Minnesota Statutes Chapter 429.	Variable depending on activities undertaken
4. Revenue generated by Watershed Management Special Tax Districts provided for under Minnesota Statutes Chapter 473.882.	Variable depending on activities undertaken
5. Grant monies that may be secured from various local, regional, County, State, or Federal agencies. This would include the County, Mn/DOT, MPCA, the DNR and others.	Variable depending on activities undertaken
6. Other Sources: These may be other sources of funding for storm water activities such as tax increment financing, state aid, etc. The City will continue to explore additional revenue sources as they become available.	Variable depending on activities undertaken
7. Tax abatement	Variable

## SECTION VIII

---

### VIII. AMENDMENT PROCEDURES

It is the intention of the City to have this Storm Water Management Plan approved by the City Council. Once approved, no significant changes to this plan can be facilitated without the approval of the proposed revisions. Significant changes to the local plan shall be made known to the following parties:

1. Mayor and City Council
2. City Administrator and City Engineer
3. Public within the City through a public hearing process
4. City of Northfield Environmental Quality Commission
5. City of Northfield Planning Commission

Minor changes to the Plan shall be defined as changes that do not modify the goals, policies, or commitments expressly defined in this plan by the City. Adjustment to subwatershed boundaries will be considered minor changes provided that the change will have no significant impact on the rate or quality in which storm water runoff is discharged from the City boundaries. Minor changes to this plan can be made by the staff at the City without outside review. It is the intention of the City that this Plan be updated by the year 2016 unless significant changes to the plan are deemed necessary prior to that date.