LOCAL SURFACE WATER MANAGEMENT PLAN

CITY OF SHAKOPEE, MN

Final November 2019

WSB Project No. 011510-000

Title Page

Certification

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BMPs – Best Management Practices

BWSR – Board of Water and Soil Resources

CAMP – Citizen Assisted Monitoring Program

CFS – Cubic Feet per Second

City – City of Shakopee

CIP – Capital Improvement Projects

CLMP – Citizen Lake Monitoring Program

DO – Dissolved Oxygen

DWSMA – Drinking Water Supply Management Area

EOF – Emergency Overflow

EPA – Environmental Protection Agency

EQB – Environmental Quality Board

FEMA – Federal Emergency Management Agency

FES – Flared End Section

FID – Flood Insurance Study

GRAPS – Groundwater Restoration and Protection Strategies

IDDE – Illicit Discharge Detection and Elimination

IESF – Iron-Enhanced Sand Filter

LiDAR – Light Detection and Ranging

LGU – Local Governing Unit

LMRWD – Lower Minnesota River Watershed District

MCBS – Minnesota County Biological Survey

MCM – Minimum Control Measures

MDA – Minnesota Department of Agriculture

MDH – Minnesota Department of Health

MIDS – Minimal Impact Design Standards

MLCCS – Minnesota Land Cover Classification System

MnDNR – Minnesota Department of Natural Resources

MnDOT – Minnesota Department of Transportation

MnRAM – Minnesota Routine Assessment Method for Evaluating Wetland Functions

MOA – Memorandum of Agreement

MPCA – Minnesota Pollution Control Agency

MS4 – Municipal Separate Storm Sewer System

NPDES – National Pollutant Discharge Elimination System

NOAA – National Oceanic and Atmospheric Administration

NRCS – National Resources Conservation Service

NRI – Natural Resources Inventory

NWI – National Wetland Inventory

NWS – National Weather Service

OHW – Ordinary High Water Level

PAHs – Polycyclic Aromatic Hydrocarbons

PLOC – Prior Lake Outlet Channel

PLSLWD – Prior Lake – Spring Lake Watershed District

PPB – Parts Per Billion

SMSC- Shakopee Mdewakanton Sioux Community

SNA – Scientific and Natural Area

SOP – Standard Operating Procedure

SPUC – Shakopee Public Utility Commission

SSTS – Subsurface Sewage Treatment System

SWAMP – Stormwater Asset Management Program

SWCD – Soil and Water Conservation District

SWMP –Surface Water Management Plan (also called the Plan)

SWPPP – Storm Water Pollution Prevention Plan

TCMA – Twin Cities Metropolitan Area

TMDL – Total Maximum Daily Load

TP – Total Phosphorus

TSS – Total Suspended Solids

USACE – US Army Corps of Engineers

USFWS – US Fish and Wildlife Service

USGS – US Geological Survey

WCA – Wetland Conservation Act

WD – Watershed District

WHPP – Wellhead Protection Plan

WMO – Watershed Management Organization

WRAPS – Watershed Restoration and Protection Strategies

1. EXECUTIVE SUMMARY

1.1. Surface Water Management Plan Purposes

This Surface Water Management Plan (SWMP, Plan) will serve as a comprehensive planning document to guide the City of Shakopee in conserving, protecting, and managing its water resources and associated activities. This plan has been created to meet the requirements detailed in Minnesota Statutes 103B and Minnesota Rules 8410, administered by the Minnesota Board of Water and Soil Resources. This plan is also consistent with the goals and policies of the Metropolitan Council's *Water Resources Policy Plan*, and the three watershed management organizations having jurisdiction within the City: Lower Minnesota River Watershed District (LMRWD), Prior Lake-Spring Lake Watershed District (PLSLWD), and Scott Watershed Management Organization (Scott WMO). This plan will be amended, as necessary, in response to WD or WMO rule revisions and may be periodically amended to remain current with other local practices and policies. The purposes of the water management programs are to:

- Protect, preserve, and use natural surface and groundwater storage and retention systems;
- Minimize public capital expenditures needed to correct flooding and water quality problems;
- Identify and plan for means to effectively protect and improve surface and groundwater quality;
- Establish more uniform local policies and official controls for surface and groundwater management;
- Prevent erosion of soil into surface water systems;
- Promote groundwater recharge, where beneficial;
- Protect and enhance fish and wildlife habitat and water recreational facilities; and
- Secure the other benefits associated with the proper management of surface and groundwater.

The Shakopee Surface Water Management Plan addresses these purposes.

1.2. Executive Summary

The Shakopee Surface Water Management Plan is organized as follows:

- ***Section 1.0 Executive Summary*** provides background information and summarizes the plan's contents.
- ***Section 2.0 Land and Water Resource Inventory*** describes the physical setting, the history, natural resources, and land uses within the City.
- ***Section 3.0 Agency Cooperation*** outlines other governmental controls and programs that affect stormwater management.
- ***Section 4.0 Assessment of Problems and Issues*** presents the City's existing and potential water resource related concerns. Corrective actions are identified for each identified concern.
- ***Section 5.0 Goals and Policies*** outlines the City's goals and policies pertaining to water resource management.

- ***Section 6.0 Implementation Program*** presents the implementation program for the City of Shakopee, including 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.

- ***Section 7.0 Financial Considerations*** outlines the financial considerations of implementing the proposed regulatory controls, programs, and improvements which have been identified in this plan.

- ***Section 8.0 Amendment Procedures*** discusses the procedures to be followed in the event this Plan is amended.

- ***Appendices*** are included in the back of the plan and contain a variety of background information. These documents are included because they provide supporting information to the main body of the plan, are useful information, and/or are required by Minnesota Rules. Direct website links to relevant reports or documents are provided throughout the report as appropriate.

    - Appendix A – Figures
    - Appendix B – Hydrologic/Hydraulic Modeling Results
    - Appendix C – Ordinances
    - Appendix D – Design Criteria
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1.3. 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 and surrounding communities as well as staff personnel associated with the various watershed districts and water management organizations having jurisdiction over areas within the City. The watershed districts and watershed management organizations having jurisdiction in the City are shown on **Figure 1.**

The primary implementation responsibility will lie with the appropriate staff members at the City. Assistance from the surrounding municipalities and watershed organizations will also be expected. Outlined below are the names, addresses, and telephone numbers for personnel having responsibilities for overseeing or implementing various aspects of this Surface Water Management Plan.

City of Shakopee:
Steve Lillehaug
City Engineer/Public Works Director

Kirby Templin
Water Resources – Environmental Engineer
129 Holmes Street
Shakopee, MN 55379-1376
(952) 233-9361

Lower Minnesota River Watershed District

Linda Loomis, Administrator
112 E. 5th St.
Chaska, MN 55318
(952) 856-5880

Prior Lake - Spring Lake Watershed District
Diane Lynch, Administrator
4646 Dakota Street SE
Prior Lake, MN 55372
(952) 447-4166
***Contact for information on the Prior Lake Outlet Channel (PLOC)**

Scott Watershed Management Organization
Kate Sedlacek, Environmental Services Manager
200 Fourth Ave West – Room A200
Shakopee, MN 55379
(952) 496-8054

Scott Soil and Water Conservation District
Troy Kuphal, District Director
7151 West 190th Street Suite 125
Jordan, MN 55352
(952) 492-5425

2. LAND AND WATER RESOURCE INVENTORY

2.1. Location and History

The City of Shakopee is located in the southwest portion of the Twin Cities metropolitan area within Scott County and along the Minnesota River, as shown on **Figure 2, Appendix A**. There are several major transportation corridors within Shakopee, including Highway 169 and County Road 101. The Met Council has designated Shakopee as a Diversified Rural and Suburban Edge community and is anticipated to grow in population through 2040. Additional information regarding Shakopee's population growth can be found in the Envision Shakopee Comprehensive Plan.

2.2. Physical Setting

2.2.1. Topography and Geology

The general geology of the City, and to a greater extent the areas within Scott County, has been studied and the results outlined in the Scott County Geologic Atlas. The study provides information on the geology and hydrogeology for areas within the City of Shakopee.

The document indicates that the bedrock within the City of Shakopee is of the Prairie du Chien, Jordan Sandstone, St. Lawrence formation, and the Franconia formation. The bedrock elevations can vary depending on type from 450 feet to 750 feet above sea level. The surficial geology for the City varies in depth over the bedrock formations as a result of the cover being outwash deposits.

The City contains four surficial geologic regions. The first region is the lower terrace. The lower terrace lies 30 to 50 feet above the present flood plain of the Minnesota River. This terrace is cut in the outwash deposit of ice-contacted stratified drift, till, and bedrock. The second geologic region is the middle terrace. This is very similar to the lower terrace but is 75 to 115 feet above the present flood plain of the Minnesota River. The third geologic region is the upper terrace. It is again very similar to the lower terrace, but its surface is 120 to 180 feet above the present flood plain and the terrace is not cut into the bedrock. The fourth terrace lies above the upper terrace and is comprised of till forming irregular hills. These irregular hills typically have a relief range of 15 feet to 60 feet.

Stormwater generated from areas within the City is generally directed from the south to the north into the Minnesota River. The specific drainage patterns which depict topography for areas within the City are shown on the watershed delineation map on **Figure 3**. As can be observed from the delineation map, land within the City boundary has been divided into the following eight major watersheds:

- Blue Lake Watershed
- Downtown Watershed
- Eagle Creek Watershed
- Louisville Watershed
- Mill Pond Watershed
- Minnesota River Watershed
- Rice Lake Watershed
- Sand Creek Watershed

An eighth major watershed has been noted on **Figure 3** outside of the City boundary that drains to the west into Louisville Township. The Minnesota River on the northern City border is the low point of the City at approximately 700 feet above sea level. The high point for the City of

Shakopee is located on the southern border with an approximate elevation of 1050 feet above sea level.

Figure 4 shows the areas defined as steep slopes with areas greater than 12% slope. LMRWD recently updated the threshold for steep slopes greater than 18%, which is also shown on **Figure 4**. These areas are regulated in the City's Shoreland Ordinance and Erosion Control Ordinance.

2.2.2. Soils

Detailed soil information is available from the Scott County Soil Survey. This survey was prepared by the U.S. Department of Agriculture Soil Conservation Service. Using the Scott County Soil Survey, the hydrologic soil classification map for the City was developed and is shown on **Figure 5.** The soils for the City of Shakopee have been classified into four hydrologic soil groups which are defined as follows:

Group A - These soils have high infiltration rates even when thoroughly wetted. The infiltration rates range from 0.8 to 1.63 inches per hour. These soils consist chiefly of deep, well drained to excessively drained sands and gravel. These soils have a high rate of water transmission, therefore resulting in a low run-off potential.

Group B - These soils have moderate infiltration rates ranging from 0.3 to 0.45 inches per hour when thoroughly wetted. These 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 0.06 to 0.2 inches per hour when thoroughly wetted.

Group D - These soils have very slow infiltration rates ranging from 0 to 0.06 inches per hour when thoroughly wetted. These 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.

Some soils within the City are assigned to a dual hydrologic group (A/D, B/D, or C/D). If a soil is assigned to a dual hydrologic group, the first letter is assigned for drained conditions and the second is for undrained conditions.

Additional soil information for the City of Shakopee can be found on the USDA Web Soil Survey.

2.2.3. Climate and Precipitation

The climate within the Twin Cities Metropolitan Area is typical of a continental climate. Without the buffering influence of large bodies of water, cold winters and hot summers predominate. It is generally understood that global climate change has an effect on the Twin Cities Metropolitan Area's local climate. One area where climate change manifests itself is in rainfall intensities and rainfall depths. The Twin Cities Metropolitan Area has seen more intense rainfalls the last two decades and even the average rainfalls seem more intense. The implications are clear:

- Flood control facilities, if designed for the 100-year rainfall, may get larger as the statistical 100-year rainfall gets larger. Other mitigating impacts might need to also be considered such as providing safe overflow routes and larger easements.
- Smaller events, such as the 1-inch to 2.5-inch rainfalls, are occurring more frequently throughout a given year.
- Ordinances, permitting, policies and standards may need to be evaluated and updated to accommodate the change in rainfall and to safely mitigate any potential impacts.

Table 2.2 provides a summary of average temperature, precipitation, and snowfall data for Shakopee. The total average annual precipitation in the Twin Cities Metropolitan Area is approximately 30.6 inches. The total average annual snowfall is approximately 54.4 inches.

Table 2.2 Average Monthly Climate Data 1981-2010

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Daily Temperature (°F)	15.6	20.8	32.8	47.5	59.1	68.8	73.8	71.2	62.0	48.9	33.7	19.7
Average Precipitation (in.)	0.90	0.77	1.89	2.66	3.36	4.25	4.04	4.30	3.08	2.43	1.77	1.16
Average Snowfall (in.)	12.2	7.7	10.3	2.4	0.1	0.0	0.0	0.0	0.0	0.6	9.3	11.9

Source: Minnesota Climatology Working Group

Additional climatological information for the area can be obtained from the Minnesota State Climatology Office website.

Rainfall frequency estimates are used as design tools in water resource projects. Rainfall frequencies are summarized in *Technical Paper No. 40, Rainfall Frequency Atlas of the United States*, published by the U.S. Weather Bureau in 1961. This document was updated in 2013. Atlas 14 is the new document used as reference for rainfall frequencies. It has been adopted by all watershed agencies in their respective stormwater management rules. **Table 2.3** lists rainfall frequencies for Shakopee. Additional Atlas 14 rainfall data can be found on the National Oceanic and Atmospheric Administration (NOAA) website.

Table 2.3 Atlas 14 Rainfall Depths and Frequency

Recurrence Interval (yrs)	24-hr Rainfall Depth (in)
1	2.5
2	2.9
5	3.6
10	4.3
25	5.4
50	6.3
100	7.4

The City of Shakopee uses the Atlas 14 10-year storm event for storm sewer design and the Atlas 14 100-year storm event for evaluating freeboard. These are the current design standards listed in the Design Criteria and are used for new and reconstructed storm facilitates. Existing facilities were designed for different rules at the time of construction and may or may not meet this standard today. As storm facilities are improved on a project-by-project basis, the feasibility of updating existing storm facilities is analyzed and the current design standards are used to the highest practicable extent.

Additional precipitation information for the area can be obtained from the NOAA website.

2.2.4. Land Use and Public Utilities Services

Existing and proposed land use for areas within the City is fully described in the Envision Shakopee Comprehensive Plan Section 3. This Section provides figures showing the City's existing and proposed land use and provides descriptions of potential growth, redevelopment and opportunity areas. The 2040 Comprehensive Plan will be adopted by the City by the end of June 2019.

The Shakopee Public Utility Commission (SPUC) supplies municipal water service to the City. Public utility services available for lands within the City have also been clearly described in the City's Comprehensive Plan.

The City has entered into an orderly annexation agreement with Jackson Township. Toward that end, the City has included the Jackson Township area in its Comprehensive Plan and this SWMP. As areas are annexed, they will need to comply with these plans. Louisville Township and other areas outside of the city limits that contribute drainage to Shakopee have also been taken into consideration and included in the Comprehensive Plan and this SWMP.

Land use data is an important factor for estimating surface water runoff. The hard or impervious surface areas associated with each land use greatly affect the amount of runoff generated from an area. Future land use projections indicate those areas that may be available for water resource enhancement and where improvements should be a priority. Significant changes in land use can increase runoff due to added impervious surfaces. However, changes in land use also allow for the construction of stormwater BMPs.

2.3. Water Resources Data

2.3.1. Wetlands

Wetlands provide several valuable functions. They are a critical part of the natural storm drainage system, help maintain water quality, reduce flooding and erosion, provide food and habitat for wildlife, and provide open spaces and natural landscapes for residents. Thus, wetlands are important physical, educational, ecological, aesthetic, recreational, and economic assets to the City.

The City contains over 200 wetlands of various sizes and types. These wetlands have been identified by the U. S. Fish and Wildlife Service utilizing aerial photography as the inventory resource. Each area that appeared to be a wetland on the aerial photo was mapped and a National Wetland Inventory (NWI) was created. **Figure 6** presents the National Wetland Inventory (NWI) for Shakopee. The NWI map provides guidance on where wetlands occur in the City, though the NWI wetland boundaries cannot replace wetland delineations for determining legal wetland boundaries. The City serves as the Local Government Unit (LGU) for the Wetland Conservation Act. LGU authority is delegated to the City in each of the three Watershed Management Plans, which is consistent with compliance of Minnesota Rules 8420 for WCA LGU delegation. Regardless of the LGU authority, Minnesota's statutory wetland protection standards provide uniform wetland protection throughout the City. Wetlands and lakes under Minnesota Department of Natural Resources (MnDNR) jurisdiction have an added level of protection.

The City will enforce wetland requirements based on WCA and City wetland criteria. These requirements are implemented through the City ordinance and the City of Shakopee Design Criteria. The City wetland requirements also comply with each of the three watershed districts depending on what area of the City the project is to occur.

2.3.2. Major Bodies of Water

The following list provides the major bodies of water that convey and store water within the City.

- Minnesota River
- Quarry Lake
- Dean Lake Wetland (formally Dean Lake)
- Blue Lake
- Fisher Lake

- O'Dowd Lake
- Prior Lake Outlet Channel

Major bodies of water are shown in each figure located in **Appendix A**.

2.3.3. Monitored Water Quality and Quantity Data

The City will continue to support monitoring of surface waters within its jurisdictional boundaries and for waters to which the City discharges that are outside these boundaries. Water quality monitoring within the City has been undertaken in the past by the Metropolitan Council, the Minnesota Pollution Control Agency, the Minnesota Department of Natural Resources, the Lower Minnesota River Watershed District, Prior Lake-Spring Lake Watershed District, Scott WMO and the City of Shakopee. Water quality information can be found on the following websites:

- Water quality data generated from various sampling programs. Information is available at the Minnesota Pollution Control Agency.
- Metropolitan Council monitoring information, including the Citizen-Assisted Monitoring Program (CAMP), can be found on the Water Quality Management webpage.
- Minnesota Pollution Control Agency's Citizen Lake Monitoring Program (CLMP) webpage.
- Prior Lake-Spring Lake Watershed Monitoring Program
- Lower Minnesota River Watershed River & Stream Monitoring
- Scott Watershed Management Organization Water Quality Monitoring

Figure 7 shows monitoring stations located within the City that have been used in the past to collect water quality or quantity data.

As part of the 1999 Comprehensive Plan update, Shakopee created a P8 model for existing and future water quality within the City. The results of the P8 water quality modeling effort can be requested from the City.

The City's 2005 P8 model has not been updated as part of this plan effort. To effectively monitor Best Management Practice (BMP) performance and water quality, the City of Shakopee has adopted the Stormwater Asset Management Program (SWAMP). This program uses construction as-builts, pond inventory, drainage areas, field inspections, and storm sewer maps to rank BMPs based on cost/benefit pollutant removal efficiency. Basins are prioritized based on a set of parameters and a schedule can be determined for maintenance needs. The program is continually updated to include new BMPs, updated stormwater infrastructure, or changed drainage areas. The City has incorporated SWAMP to include the following:

- Scheduling, tracking, and storing MS4 infrastructure inspections
- Budgeting stormwater inspection and maintenance activities
- Tracking TSS and TP load reductions
- Prioritizing inspection and maintenance activities through a ranking system
- Providing information to the public on BMP maintenance priorities and schedules
- Demonstrating compliance for written procedure and treatment effectiveness requirements as part of the MS4 permit

The SWAMP will be done in coordination with the watershed agencies to remain consistent with

their Total Maximum Daily Load (TMDL) and Watershed Restoration and Protection Strategies Report (WRAPS) studies and other water quality reports. PLSLWD currently has a Public Infrastructure Partner Program available for enhancement of stormwater management BMPs beyond MS4 maintenance requirements identified from the SWAMP. City inspection and monitoring of County or State projects within Shakopee will only be for those locations where they tie into the City's infrastructure.

2.3.4. Impaired Waters

The MPCA is required to publish a list of impaired waters, which are lakes and streams in the state that are not meeting federal water quality standards. For each water body on the list, the MPCA is required to conduct a study to determine the allowable Total Maximum Daily Load (TMDL) for each pollutant that exceeds the standards. Impaired waters in Shakopee, or those receiving discharge from Shakopee, are summarized in **Table 2.5**. Impaired waters are shown on **Figure 8**, **Appendix A**.

Table 2.5 – Impaired Waters

Impaired Water	Affected Use	Pollutant	Year Added	Completion
O'Dowd Lake (70-0095-00)	Aquatic Consumption, Aquatic Life	Mercury in Fish Tissue, Fishes Bioassessments	1998, 2018	2008, Not Complete
Unnamed Creek (Prior Lake Outlet Channel) (07020012-728)	Aquatic Life	Aquatic Macroinvertebrate Bioassessments, Fishes Bioassessments	2018	Not Complete
Pike Lake (70-0076-00)	Aquatic Recreation	Excess Nutrients	2002	Not Complete
Eagle Creek (07020012-519)	Aquatic Recreation	Fecal Coliform	2018	Not Complete
Minnesota River (07020012-505)	Aquatic Consumption, Aquatic Recreation	Mercury, PCB's, Turbidity, Dissolved Oxygen (DO)	2004, 2008	TMDL approved for Mercury and DO, Turbidity/TSS not complete
Minnesota River (07020012-506)	Aquatic Consumption, Aquatic Life	Mercury in Fish Tissue and Water Column, PCBs, Turbidity, Nutrient/eutrophication biological indicators	1998, 1998, 1998, 2016	2008 TMDL approved for Mercury, Turbidity/TSS not complete
Thole Lake (70-0120-01)	Aquatic Consumption, Aquatic Recreation	Mercury in Fish Tissue, Excess Nutrients	2002, 2008	2008 TMDL approved for Mercury, Not Complete

Impaired Water	Affected Use	Pollutant	Year Added	Completion
Schneider Lake (70-0120-02)	Aquatic Consumption	Mercury in Fish Tissue	2008	2008 TMDL approved for Mercury
Picha Creek (07020012-579)	Aquatic Life	Aquatic Macroinvertebrate Bioassessments, Fishes Bioassessments	2004, 2018	Not Complete

A Total Maximum Daily Load (TMDL) study was completed for the Lower Minnesota River Dissolved Oxygen impairment in 2004. This study is available on the MPCA's website. Much of this study affects phosphorus discharges from various wastewater treatment plants. However, it does require a 30% reduction in non-point source phosphorus loading from the City of Shakopee.

The Minnesota River and Greater Blue Earth River Basin Total Suspended Solids TMDL is in the process, but not yet complete. This TMDL will address the turbidity impairment for the Minnesota River and the Greater Blue Earth River basin. The City of Shakopee was included in the categorical wasteload allocation for those portions of the Lower Minnesota River within City limits. The categorical MS4 TSS load reductions for the relevant reaches to the City based on the draft TMDL are that TSS loadings are not required to be reduced but are not allowed to increase.

In addition, a small portion of the City drains to Pike Lake (impaired by excess nutrients) which is located just south of the City limits. The City will participate in the development of the Pike Lake TMDL. The Pike Lake TMDL is expected to be completed by 2019.

The MPCA approved the Twin Cities Metropolitan Area (TCMA) Chloride Management Plan in 2016. This plan is intended to discuss the impacts of chloride on water quality, set performance-based goals, and provide implementation strategies to communities to reduce salt runoff and usage. This plan can be obtained from the MPCA website.

Lake Pepin was added to the Impaired Waters list in 2004 for high nutrient levels and turbidity. In 2011, the MPCA published the Lake Pepin Site Specific Eutrophication Criteria to provide custom water quality goals for the lake and other river pools. The Lake Pepin criteria are not stand-alone goals to be pursued in isolation. Rather, they are part of the goals for the Mississippi River system, which includes the Minnesota River within Shakopee. The South Metro Mississippi River TSS TMDL has been adopted and describes the allowable sediment loads for the Mississippi River just upstream of Lake Pepin. The South Metro project, and the various Minnesota River TSS TMDLs are all related to the Lake Pepin TMDL in that together they describe sediment sources, transport mechanisms, and large-scale reduction strategies to reduce sediment loading.

The City will be required to update this LSWMP to incorporate the findings of each completed TMDL study and will also be required to amend their MS4 permit and SWPPP. This must be done within 18 months of the approved TMDL date.

For more information on impaired waters and TMDL plans, visit the MPCA website.

2.3.5. Hydrologic System

Figure 9 shows the major and minor subwatersheds within the City along with the location of the storm sewer system that hydraulically connects the retention basins. A coordination effort is

currently underway between the City of Shakopee, the watershed agencies, and neighboring communities to update the legal boundaries of the regulating watershed agencies to better align with the actual drainage boundaries of stormwater, which would include overland flow and flow through stormwater infrastructure (shown in **Figure 1**).

The City contains seven major watersheds. The Mill Pond Watershed (**Figure 9-A**) receives stormwater run-off from western Shakopee and eastern Jackson Township. This watershed drains approximately 14.3 square miles of Shakopee, Jackson Township and Louisville Township. This watershed generally carries water from the south to the north discharging into the Minnesota River at the Mill Pond via overland flow and within the Upper Valley Drainageway.

The Blue Lake Watershed (**Figure 9-B**) receives stormwater run-off from the eastern two-thirds of Shakopee and from portions of Prior Lake. This watershed generally carries water from the south to the north through Dean Lake Wetland outletting into Blue Lake which discharges to the Minnesota River. The Prior Lake Outlet Channel is the primary conveyance route to Blue Lake for this watershed. The outlet channel directs water from Prior Lake to the north through Pike Lake and then to Shakopee via Dean Lake Wetland and the Dean Lake Wetland bypass channel. The outlet channel eventually discharges water to Blue Lake and the Minnesota River. The Prior Lake Outlet Channel is managed through a Memorandum of Agreement by the Cities of Prior Lake, Shakopee, the Mdewakanton Sioux Community, and the Prior Lake-Spring Lake Watershed District.

The Sand Creek Watershed (**Figure 9-C**) receives water from several municipalities and townships located south and west of Shakopee. Shakopee contributes approximately 1,000 acres in south Central Shakopee to the Sand Creek Watershed. This watershed carries water from southern Shakopee to the southwest into the Sand Creek conveyance system and ultimately discharges into the Minnesota River.

A portion of northern Shakopee drains directly into the Minnesota River through a series of outlet pipes (**Figure 9-D**). The Minnesota River Watershed consists of approximately 1,400 acres.

The very eastern edge of Shakopee, which borders the City of Savage, is drained by two separate watersheds. The first watershed directs water northeasterly through the intersection of T.H. 169 and County Road 18 then flows to the east into Rice Lake (**Figure 9-E**). This watershed consists of about 585 acres and is drained as part of the T.H. 169 bypass drainage system. The second watershed directs water easterly to Eagle Creek in the City of Savage (**Figure 9-F**). Eagle Creek Watershed consists of approximately 1,830 acres.

The downtown area of Shakopee (**Figure 9-G**) was modeled as a separate watershed to reflect specific drainage to the Minnesota River in this area.

All areas within the City and annexation areas that drain to the City have been hydraulically modeled. An update to this model was completed in 2018. As part of this modeling effort, watershed areas were delineated, existing and proposed stormwater retention and treatment facilities were defined, and a hydrologic/hydraulic analysis was performed to quantify the 1-year, 2-year, 10-year and 100-year Atlas 14 peak discharge rates, storage requirements, and other pertinent hydrologic/hydraulic information for the stormwater retention areas and trunk conveyance systems within the City. Results of this modeling effort are included in **Appendix B.**

The hydraulic modeling effort was completed in coordination with the Lower Minnesota River Watershed District, Prior Lake-Spring Lake Watershed District, Scott Watershed Management Organization and the Shakopee Mdewakanton Sioux Community. The hydrologic modeling for the City was completed using the following criteria:

- The peak rate of stormwater run-off entering the City from Jackson Township was limited to either 1/3 cfs per contributing acre of drainage area or pre-

settlement discharge rates.

- The peak discharge rate from subwatersheds within the City was limited to at least 1/3 cfs per contributing acre of drainage area for Mill Pond, Eagle Creek, Minnesota River, Rice Lake, Sand Creek, and Blue Lake watersheds from Dean Lake Wetland to the Minnesota River. The Blue Lake watershed upstream of Dean Lake Wetland was limited to 0.1 cfs/acre of contributing drainage area. In areas where adequate stormwater storage is available in the form of natural wetlands and depressions the peak discharge rates were limited to the average daily run-off rate of a 10-day, 100-year snowmelt event. Further discussion of allowable peak discharge rates is included in **Section 5.**

- Storm water storage was provided to accommodate the run-off generated from a 100-year 24-hour storm event above the retention outlet elevation, while allowing a peak discharge rate of no greater than 1/3 cfs per acre of contributing drainage area.

2.3.6. Groundwater

Primary groundwater resource data for areas within the City is available by reviewing the content from three sources. A brief description and web link for the three sources is provided below.

1. The Scott County Geologic Atlas completed in 1982 contains information on aquifers, depth to ground water table, and areas sensitive to ground water pollution.

2. The Scott WMO Comprehensive Water Resources Management Plan contains groundwater information, issues and policies for Scott County.

3. SPUC monitors aquifer levels through the use of 14 wells located throughout the City. Information can be requested from SPUC.

Shakopee Public Utilities, along with the Minnesota Department of Health (MDH), developed a Wellhead Protection Plan (WHPP) that is designed to protect groundwater aquifers and municipal wells by identifying potential sources of contamination. The WHPP delineates drinking water supply management areas (DWSMAs) and wellhead protection areas. **Figure 10** shows the Drinking Water Supply Management Areas (DWSMAs) for the City, a few of which are generally described below.

The City will be required to incorporate the requirements of the Wellhead Protection Plan into their SWPPP for areas located within vulnerable source water protection areas (NPDES MS4 General Permit). Vulnerable Source Water Protection areas are those areas susceptible to water supply contamination from activities at the land surface and are based on the following three components: geologic sensitivity, well construction maintenance and use, and water chemistry and isotopic composition. **Figure 10** shows the DWSMA vulnerability locations within the City. The DWSMA vulnerability is determined using geologic, soils and groundwater chemistry information.

For areas of vulnerability, the City will incorporate the Stormwater Guidance Flow Chart developed by the MDH on evaluating proposed stormwater infiltration projects in vulnerable source water protection areas and the guidance located within the Minnesota Stormwater Manual on designing infiltration BMPs while protecting groundwater. This will be of a particular concern in areas where infiltration is being considered in soils suitable for rapid infiltration adjacent to municipal and private wells.

Within the City, municipal wells serve the City's water needs. The Shakopee Public Utilities Commission (SPUC) is responsible for supplying water for the City. The location of DNR

groundwater appropriation permits are shown on **Figure 10.**

Protection of the aquifers described above is crucial in maintaining Shakopee's long-term water supply. Protecting the supply will require cooperating with the MDH when developing the City's Wellhead Protection Plan. The objectives of protecting Shakopee's water supply wells are to:

- Reduce the use of costly treatment facilities
- Avoid the drilling of new wells
- Avoid the need to clean up contaminated groundwater
- Protect public water supply wells by preventing contaminants from entering the area that contributes water to the well or well field over a period of time.

Figure 11, Appendix A also shows the surface water/groundwater interaction as analyzed by regional screening performed by the Metropolitan Council in their report, Evaluation of Groundwater and Surface-Water Interaction: Guidance for Resource Assessment. The Metropolitan Council intends on completing this process again in the future as new information becomes available. A majority of the smaller waterbodies on the eastern half of the City have been shown to recharge aquifers. Larger waterbodies such as Dean Lake Wetland, Blue Lake, Fisher Lake and areas of the Minnesota River receive and discharge groundwater.

2.3.7. Shoreland and Floodplain Ordinances

The City has developed and adopted Shoreland Management Regulations and Floodplain Management Regulations and Ordinances. A copy of these regulations is included in **Appendix C.** Per these regulations, the City has developed the following shoreland designations:

Water Body Name	Water Body Number/Location	Shoreland Classification
Blue Lake	70-0088	Natural Environment
Dean Lake Wetland	70-0074	Natural Environment
Fisher Lake	70-0087	Natural Environment
Rice Lake	70-0025	Natural Environment
Unnamed	70-0080	Natural Environment
O'Dowd	70-0095	Recreational
Minnesota River	From west section line of Section 4, T115N, R22W	Transition River
Minnesota River	From the border of Scott and Le Sueur Counties to the east section line of Section 5, T115N, R22W	Agricultural River
Eagle Creek	From Basin 245, Section 13, T115N, R22W to Section 13, T 115N, R22W	Tributary Stream
Unnamed to Minnesota River	From Section 2, T115N, R22W to Section 1, T115N, R22W	Tributary Stream
Unnamed Tributary (part of Prior Lake Outlet Channel)	From Basin 249, Section 23, T115N, R22W to Section 14, T115N, R22W	Tributary Stream

2.3.8.Existing Flood Insurance Studies

A Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) was completed

for areas within the City of Shakopee along the Minnesota River. Included in the FIS is a flood plain study of the Minnesota River completed by the United States Department of Interior. The results were outlined in a report entitled "Flood Plain Areas of the Lower Minnesota River" dated 1973. This report identified the boundaries of the floodway and floodplain. A flood insurance study for the City of Shakopee, dated March 1989, provides flood information for properties along the Minnesota River. Flood insurance information and FIS reports can be found on FEMA's Flood Map Service Center on FEMA's website. **Figure 12** shows the 100-year floodplain within the City.

2.4. Natural Resources Data

2.4.1. MLCCS and MCBS

The Minnesota Land Cover Classification System, or MLCCS, categorizes urban and built up areas in terms of land cover rather than land use. MLCCS serves as a tool for City staff to integrate natural area preservation into land planning, land use, and zoning decisions. The City is dominated primarily by developed area with planted or cultivated vegetation areas as the next majority land classification. The remaining areas are herbaceous areas and wetland throughout the center of the City. **Figure 13** provides MLCCS coverage for Shakopee.

According to the MnDNR, the Minnesota County Biological Survey (MCBS) began in 1987 as a systematic survey of rare biological features on a county-by-county basis. Shakopee has several areas identified as high biological significance. These are generally near the City's open space and park land. The DNR has jurisdiction over these areas. Based on state statute any work within these areas is required to meet DNR permit requirements. **Figure 14** provides the locations of rare and biological features in the City of Shakopee.

The conservation corridor shown in **Figure 14** represents area designated by the DNR to be protected and to provide restoration of key natural habitats. These corridors are to be used by local agencies to prioritize areas for conservation.

2.4.2. Public Area for Water Based Recreation and Access

The City has a variety of areas that are used for water based recreation. These areas include the following:

- **O'Dowd Lake:** O'Dowd Lake is 256 acres in size and is located in the southwest corner of Shakopee. The lake has public access as well as the O'Dowd Lake Community Park. The water based recreation available at O'Dowd Lake Community Park is picnicking, swimming, fishing and hiking.
- **Minnesota River:** A public boat launch is located within Huber Park.
- **Dean Lake Wetland (formally Dean Lake):** Dean Lake Wetland offers passive water-based recreation in the form of trails and parks near and around the lake.
- **Murphy's Landing:** Murphy's Landing is a historic site owned by the Three Rivers Park District. The site is on the river and offers a living history museum portraying Minnesota life on the River between 1840 and 1890.
- **Minnesota Valley National Wildlife Refuge:** This large park area along the Minnesota River throughout Shakopee and beyond offer passive water-based recreation opportunities through miles of hiking trails along the river and floodplain areas.

- **Quarry Lake Park:** This 111-acre park located in the East Shakopee Industrial area contains Quarry Lake, a designated trout lake. The lake is exclusively used by the Shakopee-Prior Lake Water Ski Association. However, trout fishing has become a popular activity as well.

The City of Shakopee also contains three parks located on the Minnesota River. These three parks are Huber Community Play Field, Memorial Community Park, and the James Wilke Regional Park Reserve. The water resource related activities available at Huber Community Play Field include picnicking, fishing, boating and hiking. This park also contains a public boat landing. The water-based recreation available at Memorial Community Park includes picnicking, fishing and hiking. The water-based recreation available at the James Wilke Regional Park Reserve includes picnicking, fishing, and hiking. The majority of water based recreation within the City centers around the Minnesota River.

More information on these Public Parks is available in the Shakopee Comprehensive Plan available on the City's website.

2.4.3. Fish and Wildlife Habitat

Figure 6 and **Figures 9-A through 9-F** shows a detailed inventory of waterbodies and wetlands within the City. Most of the areas that have been identified in this inventory provide wildlife habitat to varying degrees. Suitable fishery habitat within the City is limited. O'Dowd Lake and the Minnesota River are major water bodies located within the City that have been identified as capable of supporting a generally healthy fishery population. Quarry Lake has also been designated as a trout lake. Eagle Creek located just east of Shakopee in the City of Savage is a designated trout stream. Other small lakes or ponds within the City may have the potential to support a fish population but the threat of winter kill limits stocking of any type of game fish population within these basins.

A few areas have also been mapped by the DNR's County Biological Survey. These areas include the marsh located on the north end of Dean Lake Wetland and some oak woodlands located northeast of Dean Lake Wetland. Areas within the Minnesota Valley National Wildlife Refuge have also been mapped by in the County Biological Survey. These areas also have been noted to contain rare, endangered, or threatened plant and animal species. Some areas mapped by the County Biological Survey as well as some areas that contain rare, endangered, or threatened plant and animal species are shown in **Figure 14.** The full inventory of the County Biological Survey can be found on the MnDNR's website.

2.4.4. Unique Features and Scenic Areas

In addition to biological habitats, there are unique features and scenic areas the City plans on taking special care in management. The following areas have unique features that the City plans to take special care in managing, if and when, the parcel is proposed for development. These features and areas include:

- The Minnesota River bluffs and shoreline (**Figure 4**).
- The highlands located in the southern portion of the City (**Figure 4**).
- Eagle Creek and Boiling Springs along the eastern edge of the Shakopee and Savage border (**Figure 9F**).

The City has developed a Greenway Priority Locations Map (**Figure 15)** based on available natural resource information pertaining to slopes, lakes and streams, endangered species, woodlands, non-woody upland vegetation, wetlands, recreational opportunities, accessibility, and

wildlife. The Greenway Priority locations map is used to guide development in and around these areas to help improve, restore, and protect these resources.

2.4.5. Pollutant Sources

Figure 16 shows the approximate locations of a variety of sites that are listed with MPCA's "What's in My Neighborhood" database. The status of these sites varies from active to cleaned up and closed by MPCA. Specific details of each site can be obtained from MPCA.

Other potential pollutant sources include industrial, commercial, residential, and other highly impervious land uses. Stormwater runoff from these land uses could carry pollutants into the stormwater system (nonpoint source pollution), especially if there are direct inlets into the storm sewer system that do not drain first into a stormwater pond. Facilities within these land use types may be covered by an NPDES General Industrial Stormwater Permit, which requires preparation of stormwater pollution prevention plans to prevent nonpoint source pollution.

3. AGENCY COOPERATION

There are a number of local, State, and Federal agencies that have rules and regulations related to local water management. The City recognizes the roles of these other agencies and will cooperate, coordinate, and partner when possible with these agencies. This section describes the City's current surface water management program and practices, and identifies the agencies and organizations having roles in the City's management of these resources. **Table 3.1** summarizes the City's and other agencies' regulatory controls related to water resources management and protection.

3.1. City Ordinance, Policy, and Procedures

The Engineering Division is responsible for the planning, administration, design and inspection of infrastructure improvements which includes transportation, sewer, and storm. This division coordinates with watershed districts and other outside agencies regarding water resource management and conservation. They also manage the City's Surface Water Pollution Prevention Program and provide monitoring and maintenance of storm sewers, ponding areas, and water quality devices. The Shakopee Planning Division manages comprehensive planning and administers the zoning code within the City, which includes land use and zoning.

Current regulations and policies governing surface water management within Shakopee include the City's Design Criteria, various ordinances, and the Local Surface Water Management Plan. **Table 3.1** summarizes the City's regulatory controls regarding surface water. The Chapter 54 Ordinance is included in **Appendix C** and the City's Design Criteria are included in **Appendix D**.

Table 3.1 – Regulatory Control

Official Control	Responsibility	City Mechanism
Stormwater Management	City, WD/WMO	City Ordinance Chapter 54: Water Resources Management, Surface Water Management Plan, Design Criteria, MS4/SWPPP
Erosion and Sediment Control	City, WD/WMO, MPCA	City Ordinance Chapter 54: Water Resources Management, Surface Water Management Plan, Design Criteria, MS4/SWPPP
Shoreland	City, WD/WMO, MnDNR	City Ordinance Chapter 151: Zoning
Bluff Areas	City, WD/WMO	City Ordinance Chapter 151: Zoning
Floodplain	City, WD/WMO, MnDNR	City Ordinance Chapter 151: Zoning
Wetlands	City is the LGU, WD/WMO, MnDNR, USACE, BWSR	City Ordinance Chapter 54: Water Resources Management, Surface Water Management Plan, Design Criteria
Illicit Discharge	City, WD/WMO	City Ordinance Chapter 54: Water Resources Management, MS4/SWPPP
Grading and Drainage	City, WD/WMO	City Ordinance Chapter 54: Water Resources Management, Design Criteria

3.2. Support Agencies

This plan is in conformance with, but does not restate, all other agency rules that are applicable to water resource management. The following agencies deal with or regulate water resources throughout the City.

- Board of Water and Soil Resources (BWSR) and the Wetland Conservation Act (WCA): Responsible for coordinating and supporting the state's local water management entities. BWSR provides technical and administrative assistance, reviews local water management plans, and distributes grants to support watershed districts, WMOs, SWCDs, and counties. They also administer the Wetland Conservation Act by regulating wetlands that are not protected by other state or federal programs. Local governments perform the regulatory functions related to exemptions, noticing, and mitigation. BWSR's primary focus is soil and water conservation on private land.

- Federal Emergency Management Agency (FEMA): Administers the National Flood Insurance Management Program in coordination with the MnDNR. Floodplain Management Program.

- Lower Minnesota River Watershed District (LMRWD): Responsible for addressing water resource management along the Minnesota River. LMRWD has adopted standards that must be implemented by the City of Shakopee, including WCA administration. LMRWD does not currently have a permitting program of its own.

- Metropolitan Council : Manages sewage treatment services and regional water supply issues in the metro area. The Council (along with BWSR, DNR, MPCA, MDA, MDH, and EQB) reviews the watershed management plans and the local surface water management plans of the metro. They also provide grants to local entities to carry out their watershed management activities.

- Minnesota Department of Agriculture (MDA): Coordinates state conservation practices through the Natural Resources Conservation Service and Scott Soil and Water Conservation District.

- Minnesota Department of Health (MDH): Implements the federal Safe Drinking Water Act, which protects public water supplies and is working to develop Groundwater Restoration and Protection Strategies (GRAPS) throughout Minnesota. MDH works with communities to implement Wellhead Protection Plans and has also developed a Stormwater Guidance Flow Chart to determine the appropriateness of infiltration within Drinking Water Supply Management Areas (DWSMAs)

- Minnesota Department of Natural Resources (MnDNR): Regulates any activities that affect the course, current, or cross-section of "public waters" which are most of the state's lakes and rivers, as well as some streams and wetlands. They also regulate the use of surface and ground water by managing a water supply and permitting program. MnDNR also oversees local governments that administer shoreland and floodplain ordinances. and distributes grants to local water management entities for shoreland habitat restoration and flood hazard mitigation. MnDNR coordinates with FEMA to regulate development within the floodplain.

- Minnesota Department of Transportation (MnDOT): Designated to have a MS4 program due to their significant stormwater drainage systems. MnDOT was required to apply for a NPDES permit in 2003 to discharge stormwater and has developed its own SWPPP to limit the discharge of pollutants from applicable transportation systems within Minnesota.

MnDOT coordinates with local entities for transportation projects and can assist in providing funding.

- Minnesota Environmental Quality Board (EQB): Responsible for coordinating the state agencies involved in water resource management activities. The Board assists in developing comprehensive long range water resources planning, coordinating the development and evaluation of water information and education resources, and coordinating the development of Minnesota water policies.

- Minnesota Pollution Control Agency (MPCA): Administers the federal Clean Water Act programs in Minnesota. MPCA is responsible for assessing water quality, identifying impaired waters, and improving water quality. The agency regulates stormwater systems for municipalities and works with counties to regulate feedlots and septic systems. They also provide technical, planning, and financial assistance to local entities that are taking steps to prevent nonpoint source pollution. The MPCA regulates entities such as municipal sewage treatment facilities and industries that discharge point source pollution and issues permits for runoff from construction and industrial sites as part of the NPDES permitting program and administers the MS4 General Permit program for local municipalities.

- Natural Resources Conservation Service (NRCS): Works with private landowners and managers to conserve soil, water, and other natural resources within the USDA. They provide funding and technical assistance to landowners who implement conservation and best management practices. Locally based staff work with landowners and in partnership with the Scott Soil and Water Conservation District.

- Prior Lake Outlet Channel (PLOC) - Constructed in 1983 to provide a stormwater outlet from Prior Lake and Spring Lake. A Memorandum of Agreement was signed between the City of Prior Lake, the City of Shakopee, the Shakopee Mdewakanton Sioux Community, and the Prior Lake-Spring Lake Watershed District for regular maintenance. PLOC is managed by PLSLWD.

- Prior Lake-Spring Lake Watershed District (PLSLWD): Responsible for addressing water resource management issues that affect more than one municipality through the District. PLSLWD has adopted a Watershed Management Plan and is required to review and approve LGU's local water management plans. The District is the primary operator of a few stormwater facilities including the Prior Lake Outlet Channel and the Ferric Chloride Water Treatment Facility; both of which have NDPES permits. PLSLWD has its own permitting program and requires permits for all developments and improvements within the watershed that triggers their rules. The City will coordinate with PLSLWD when permitting is required for development.

- Scott County: Coordinates with Scott WMO to implement local water planning and conservation. Scott County has a designated MS4 Program due to their significant stormwater drainage systems.

- Scott Soil and Water Conservation District (Scott SWCD): Works with the NRCS to implement local conservation projects. SCWD also provides education and information to residents about ways to improve the quality of Minnesota's lakes and rivers.

- Scott Watershed Management Organization (Scott WMO): Implements programs related to administration, coordination, education and outreach, inventory and assessment, land and water treatment, maintenance, monitoring, planning and regulation. The WMO is required to adopt a Watershed Management Plan, prepare an annual report, and approve LGU's local water management plans. Scott WMO has prepared standards that must be implemented by the City of Shakopee, including WCA administration. Scott WMO does

not currently have a permitting program of its own.

- U.S. Geological Survey (USGS): Collects, monitors, and analyzes data about natural resources, including stream flow, water quality, and other water resource issues.

- US Army Corps of Engineers (USACE): Issues permits for projects that affect navigable waters of the US and is involved in flood control and erosion control studies and projects in Minnesota. The Corps also has the responsibility for administering Section 404 of the Clean Water Act permitting process which requires that anyone interested in depositing dredged fill material into designated waters including wetlands, must receive a permit.

- US Environmental Protection Agency (EPA): Administers the Clean Water Act which requires Minnesota to assess waters for pollutants, identify those that are impaired, and take action for clean-up. The EPA is also responsible for distributing funds to state and local governmental units to address nonpoint source pollution. Much of this work is delegated to the Minnesota Pollution Control Agency.

- US Fish and Wildlife Service (USFWS): Manages national wildlife refuges and fishery operations, enforces wildlife laws, protects endangered species, and conserves and restores wildlife habitat such as wetlands.

While these other agencies' rules, policies, and guidelines are not all restated in this Plan, they are applicable to projects, programs, and planning within the City. The MPCA Minnesota Stormwater Manual, which is a document intended to be frequently updated, is also incorporated by reference into this Plan and can be found at the MPCA website.

3.3. NPDES Permitting Process

The MPCA implemented the National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater Program in March 2003.The MPCA has designated the City of Shakopee as an NPDES Phase II MS4 community (MN Rules Chapter 7090). The permit outlines Shakopee's SWPPP to address six Minimum Control Measures (MCM):

- Public education (MCM 1)
- Public involvement (MCM 2)
- Illicit discharge detection and elimination (MCM 3)
- Construction site runoff control (MCM 4)
- Post-construction runoff control (MCM 5)
- Pollution prevention in municipal operations (MCM 6)

The City's MS4 SWPPP contains several best management practices within each of the listed control measures. These were identified using a self-evaluation and input process with City staff. Some of these best management practices include:

- Inspection of outfalls
- Street sweeping
- Inspection of post-construction BMPs
- Storm sewer system mapping
- Resident education

The most recent 5-year permit cycle required cities to reapply for coverage in the Fall of 2013. Permit coverage was extended to Shakopee in 2014 for the subsequent 5-year permit cycle. The NPDES MS4 permit is expected to be renewed by the end of 2018, at which time the City will be required to apply for permit coverage for the next 5-year cycle.

Many of the goals and policies discussed in this SWMP are directly related to requirements listed in the NPDES program. As a result, the implementation section of this plan repeatedly references items listed in the City's MS4 SWPPP.

Along with the MS4 program, the MPCA also implemented the NPDES Construction Stormwater General Permit to authorize stormwater runoff from construction sites. A Construction Permit is required for any construction activity disturbing one acre or more, or if a project is part of a common plan of development or sale that ultimately will disturb greater than one (1) acre, or poses a risk to any water resource. The Construction Permit was reissued in August 2018, with an expiration date of July 31, 2023. Additional information can be found on the MPCA's website.

3.4. Water Resource Related Agreements

The City of Shakopee has entered into a number of water resources related agreements that govern in part how the City must manage its water resources. These agreements include joint powers agreements between the City and Watershed Management Organizations having jurisdiction within its boundaries, agreements between the City and adjoining communities, or agreements it may have with other governmental units or private parties. Listed below is a description of the water resource related agreements which the City has entered into. A copy of these agreements or appropriate portions thereof, are included in **Appendix E**.

- Memorandum of Agreement for Prior Lake Outlet Channel for the City of Shakopee, Prior Lake-Spring Lake Watershed District and Shakopee Mdewakanton Sioux Community agreement for maintenance.
- Joint Powers Agreement between the City of Shakopee and the City of Savage relating to stormwater management planning within the Eagle Creek Watershed.
- Memorandum of Understanding between Scott WMO and the City of Shakopee for Local Water Planning and Regulation
- Memorandum of Understanding between Lower Minnesota River Watershed District and the City of Shakopee to enforce the District policies through permitting. An updated agreement between the District and the City is required before May 1, 2020.
- Joint Powers Agreement between the City of Shakopee and Scott WMO for Swamp Lake wetland mitigation site.

4. ASSESSMENT OF ISSUES

Previous sections of this SWMP provide background on the physical and regulatory forces shaping surface water management in Shakopee. This section describes problems and challenges of specific waters, neighborhoods or programs identified by the City, watershed districts and others. Minnesota Statutes and Metropolitan Council guidance documents require "issues and corrective actions" or "problems and corrective actions" as elements of a SWMP. The assessment includes stormwater management issues—current and future—identified by the City, the three watersheds with jurisdiction within the City, and other state and federal agencies. Shakopee emphasizes the surface water management challenges ahead and that these challenges will test the City's financial and technical resources. **Figure 17** shows locations throughout the City that have been identified as existing or future issues. Additional discussion is provided in this section.

4.1. Water Quality

Issue 4.1.1: The Minnesota River, O'Dowd Lake, Thole Lake, Schneider Lake, Picha Creek, Eagle Creek, a portion of the Prior Lake Outlet Channel (PLOC), and Pike Lake have been identified by the Minnesota Pollution Control Agency (MPCA) as impaired waters.

> **Corrective Action:** The City will be an active participant with the MPCA and the Watershed Districts to set Total Maximum Daily Loads (TMDLs) for the impaired waters in the City and to help meet the requirements outlined in the TMDL Implementation Plans once they are complete.

Issue 4.1.2: Ponds within the City have been subject to degradation as a result of erosion and sediment deposition.

> **Corrective Action:** The City has implemented the Stormwater Asset Management Program (SWAMP) for inspecting and maintaining its storm sewer outfalls, sediment basins, ponds, and other best management practices (BMPs). Maintenance will be conducted as needed.

Issue 4.1.3: Available water quality data for lakes and other waterbodies throughout the City.

> **Corrective Action:** The City will continue to implement a water quality monitoring program on O'Dowd Lake through the Citizens Assisted Monitoring Program (CAMP) program and continue to review the need for monitoring at other water bodies throughout the city.

Issue 4.1.4: Algae and other in-water aesthetic nuisances can be an issue in storm ponds and lakes and generate resident complaints.

> **Corrective Action:** The City will continue to educate residents on lawn fertilization and its contribution to nutrient and phosphorus loading resulting in algae growth in waterbodies. The City historically has not treated aesthetic or nuisance issues at ponds but has allowed residents to address the issue at their own expense. The City plans to continue this practice.

Issue 4.1.5: Trash accumulation and noxious weeds can be an issue in storm ponds and generate resident complaints.

> **Corrective Action:** The City historically has removed trash from ponds on city property but has not on private property. Removal of trash on private property has been the responsibility of the land owner. However, the City has a program to control noxious weeds within stormwater pond buffer areas within City drainage and utility easements.

The City plans to continue these practices.

Issue 4.1.6: The Shakopee Public Utilities Commission (SPUC) Wellhead Protection Plan indicates historical monitoring of groundwater from wells in the City has shown the presence of high nitrate concentrations, however, the concentrations have reduced and have not exceeded the health risk limit since 1995.

Corrective Action: SPUC manages the water distribution network, wells, and monitors the groundwater in the City of Shakopee. SPUC will continue to monitor supply wells for nitrates as part of SPUC's Well Head Protection Plan, and the City will work with SPUC and Scott County as needed to address concerns about groundwater quality.

Issue 4.1.7: Dean Lake Wetland has poor overall water quality based on recent monitoring information.

Corrective Action: Dean Lake Wetland was recently reclassified from a lake to a wetland. The City will work with the Lower Minnesota River Watershed District (LMRWD) on studies related to water quality and overall health of Dean Lake Wetland. It is anticipated that the Watershed District will be the lead, but the City should assist and provide support to the Watershed District.

Issue 4.1.8: The possibility of contamination exists when there are connections between groundwater and surface water.

Corrective Action: SPUC has developed a Wellhead Protection Plan which identifies Drinking Water Supply Management Areas (DWSMAs) and their vulnerability. The City will continue to follow the requirements of the Wellhead Protection Plan to protect groundwater. Guidance from the MPCA and Minnesota Department of Health (MDH) will be followed to determine the applicability of infiltration in the DWSMAs.

Issue 4.1.9: In 2007, the City was required by the MPCA to complete a loading assessment and a nondegradation report. The report estimates change in Total Suspended Solids (TSS) and Total Phosphorus (TP) from development since 1988 and future loading with development that could occur by 2020. The nondegradation report is included in **Appendix F**.

Corrective Action: The report concluded that there was no significant increase in TSS and TP loadings between 1988 and 2005 due to the stormwater treatment ponds that accompanied development and redevelopment in that time. Further, it predicts a reduction in TSS and TP loadings between 2005 and 2020. No changes were proposed to the City's Stormwater Pollution Prevention Plan (SWPPP).

4.2. Flooding and Stormwater Rate Control

Issue 4.2.1: Channel capacity, flooding (property flooding, no structure flooding), and erosion is an ongoing concern along the PLOC.

Corrective Action: The City will cooperate with the Cooperators of the PLOC to evaluate channel capacity and flooding concerns, and support operation and maintenance to address channel capacity, flooding, and erosion. As development occurs along the PLOC, the city will work with the PLOC cooperators to evaluate opportunities to improve and address any channel capacity, flooding, and/or erosion issues. The Memorandum of Agreement in **Appendix E** outlines this relationship. A PLOC master plan is in development to help facilitate evaluation and implementation to address issues and concerns.

Issue 4.2.2: Portions of the storm sewer throughout the City has exceeded its design life, or due to change in precipitation trends is under capacity (either inlet capacity or pipe capacity).

> **Corrective Action:** The City will continue to review and evaluate capacity and condition of storm sewer during development/redevelopment projects and street reconstruction projects. It is not the City's intent to identify and address under capacity concerns to the whole City's infrastructure. The City will evaluate capacity and implement improvements ongoing to minimize flooding issues when determined feasible.

Issue 4.2.3: The outlet of the stormwater pond north of Valley Industrial Boulevard South and east of Canterbury Road South is not well documented and may not be functioning as originally intended.

> **Corrective Action:** The City will investigate the outlet of this pond and evaluate further if there is a need to complete a study for the outlet.

Issue 4.2.4: Extended stormwater flow through a portion of the Shakopee Historic District from development along Highway 101 is impacting/degrading historical and cultural resources. The location is approximately 2,000 feet east of Memorial Park on the north side of Highway 101.

> **Corrective Action:** The City will continue to work with project stakeholders to identify short- and long-term solutions for addressing the concern at this location.

Issue 4.2.5: Localized flooding issues may occur throughout the City. Residents identify various flooding issues that impact property and drainage and bring them to the city's attention.

> **Corrective Action:** The City will meet with residents and conduct education programs on this topic. When specific issues are identified, the City will investigate the causes and address the issues as feasible. The City has created a tracking system to log the issue and track resolution of the issue. The City will consult with existing hydrologic and hydraulic models for potential flooding issues and work with the watershed districts to take appropriate corrective action for future flooding problems.

Issue 4.2.6: Sidewalk along the south side of Valley View Road approximately 800 feet east of Pheasant Run Street experiences drainage issues from runoff flowing down the hill. Runoff in this area freezes in the winter and can become a hazard to pedestrians.

> **Corrective Action:** The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.7: Debris and ice can build up on two flared end sections (FES) along the south side of Valley View Road between Mathias Road and Pheasant Run Street.

> **Corrective Action:** The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at these locations.

Issue 4.2.8: There is a flooding potential of a residential home at 815 Larkspur Court along the Upper Valley Drainage Ditch. The low opening was constructed lower than approved (constructed as a walkout versus a lookout) and does not have the required freeboard from the 100-year flood elevation. There is an FES and downstream catch basin that is part of the outlet to this area and occasionally becomes blocked with debris which adds to the flooding potential. Frequent maintenance is needed to protect adjacent homes from flooding.

> **Corrective Action:** The City will continue to provide routine maintenance, and monitor the outlet. It is expected that the property owner will convert their structure from a walkout to a lookout to mitigate the flooding potential.

Issue 4.2.9: A flooding concern at residential structures was identified where the Upper Valley Drainage Ditch crosses Alysheba Road. There is not a secondary emergency overflow path at this crossing, and if debris clogs the culverts there is a potential for flooding adjacent residential homes.

> **Corrective Action:** The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing this concern at this location.

Issue 4.2.10: There has historically been a flooding issue (property flooding, no structure flooding) approximately one mile south of County Road 16 and County Road 83. The issue was poor drainage from the west to the east side of the road. The drainage issue has been addressed by improvements to County Road 83 and adjacent land development.

> **Corrective Action**: Continue to monitor drainage in this area and work with private land owners and other stakeholders to address any future drainage issues.

Issue 4.2.11: The outlet of the stormwater pond south of Fescue Circle frequently clogs. It is possible the outlet structure is not functioning correctly.

> **Corrective Action:** The City will look into the function of the outlet structure and will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.12: Localized roadway flooding along 10th Avenue East near Spencer Street, Market Street and Main Street due to under capacity storm pipes.

> **Corrective Action:** The City will continue to review and evaluate capacity and condition of storm sewer during development/redevelopment projects and street reconstruction projects.

Issue 4.2.13: Localized roadway flooding at 4th Avenue East and Dakota Street due to under capacity storm pipes.

> **Corrective Action:** The City will continue to review and evaluate capacity and condition of storm sewer during development/redevelopment projects and street reconstruction projects.

Issue 4.2.14: The storm pipes within the Old Downtown area are undersized and have capacity issues leading to localized roadway flooding.

> **Corrective Action:** The City will continue to review and evaluate capacity and condition of storm sewer during development/redevelopment projects and street reconstruction projects. The City will evaluate the need for redevelopment requirements specific for this area to improve this issue.

Issue 4.2.15: There is no outlet for Quarry Lake. Water levels vary for prolonged durations which is causing erosion issues along the shoreline.

> **Corrective Action:** The City will work with the watershed district to complete a study to evaluate a need for an outlet to Quarry Lake and shoreline erosion.

Issue 4.2.16: The regional facility (Upper Valley Drainage Ditch) south of Highway 169 and east of Old Brick Yard Road does not have capacity for drainage from future development.

> **Corrective Action:** The City will work with the watershed to complete a feasibility study

to evaluate capacity and water quality at this regional facility. Implementation of improvements to the regional facility are dependent on development.

Issue 4.2.17: There is a need for a publicly managed outlet from O'Dowd Lake. The outlet from O'Dowd Lake consists of flow through ditches, culverts, drain tile, wetlands, and ponds primarily located on multiple different private properties. The historical issue with the privately managed outlet is land management and lack of maintenance that causes drainage issues/impacts to Lake O'Dowd and adjacent properties.

Corrective Action: The City will participate with Scott County and Louisville Township to complete a feasibility study regarding the need for a publicly managed outlet from O'Dowd Lake.

Issue 4.2.18: Culverts located at the driveway crossings across from Independence Drive south of Valley View Road have reduced culvert capacity for runoff due to additional water pumped into this drainage system from an upstream treatment plant. If the culvert capacity is exceeded, overflow is routed to a separate drainage system north towards residential developments and is a flooding concern (roadway and property flooding, no structure flooding). The culverts have been replaced with larger culverts to increase capacity, however debris can still clog the culverts resulting in overflow and flooding concerns.

Corrective Action: The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.19: There are private culverts on the PLOC to the northeast of Pike Lake Trail that frequently clog with debris.

Corrective Action: The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.20: There is a box culvert along the Upper Valley Drainage Ditch that has a trash rack on it which is prone to clogging and is a flooding concern (property flooding, no structure flooding) to adjacent homes. The culvert is located adjacent to Park Ridge Drive and Hauer Trail.

Corrective Action: The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.21: The outlet control structure to the pond southwest of Westchester Lane is prone to clogging, this is a flooding concern to adjacent homes for the series of ponds south of Westchester Avenue and north of Hawthorne Circle (property flooding and potential for structure flooding).

Corrective Action: The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.22: There is one pond east of Pheasant Run Street and south of Thrush Street, and two ponds located north and south of Mathias Road and west of Pheasant Run Street that have outlets that are prone to clogging and are a flooding concern (property flooding and potential for structure flooding) to adjacent homes.

Corrective Action: The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.23: The outlet control structure to the wetland west of Barrington Drive and north of Cortland Circle is prone to clogging and is a flooding concern (property flooding, no structure flooding) to adjacent homes.

Corrective Action: The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.24: The outlet control structure to the wetland east of Barrington Drive and north of County Road 78 is prone to clogging and is a flooding concern (property flooding and potential for structure flooding) to an adjacent home.

Corrective Action: The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.25: The wetland north of Sussex Lane and west of Sussex Court is a flooding concern during high flows in the PLOC. There is a gate valve that can be closed during high flows that reduces the impact/flooding concern in this wetland that results from the high flows from the PLOC.

Corrective Action: The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.26: Property, structures and septic systems adjacent to the low area west of Boiling Springs Lane and east of Stagecoach Road are prone to flooding. There is a culvert that drains this area; however, high-water levels and resulting high groundwater impacts septic systems and low basements.

Corrective Action: The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.27: The outlet control structure to the pond east of Whitetail Drive and north of Molina Street is prone to clogging and is a flooding concern (property flooding, no structure flooding).

Corrective Action: The City will continue to provide frequent maintenance, monitor and evaluate short- and long-term solutions for addressing the concern at this location.

Issue 4.2.28: Low water elevations in Dean Lake Wetland were identified as a historical problem.

Corrective Action: In 2006, the City constructed the Dean Lake Wetland outlet structure to maintain the water levels in the wetland and to address the issues associated with the outlet channel erosion. However, the wetland is still susceptible to low water conditions during drought conditions like many other water bodies. No additional corrective actions are needed at this time.

4.3. Flooding and Stormwater Rate Control Concerns Between the City and Adjoining Communities

Issue 4.3.1: The rate and volume of water within the PLOC within the Cities of Prior Lake, Shakopee, and the Shakopee Mdewakanton Sioux Community (SMSC) is an ongoing flooding and erosion concern.

Corrective Action: The PLSLWD, SMSC, and The Cities of Prior Lake and Shakopee have entered into a Memorandum of Agreement (MOA) which addresses allowable discharge rates and funding of repair projects along the PLOC. The MOA is included in **Appendix E.**

Issue 4.3.2: A concern has been noted regarding the protection of groundwater levels within the Eagle Creek Watershed in order to protect the Boiling Springs and Fen areas. Eagle Creek is a

high value resource identified by the Lower Minnesota River Watershed District. Eagle Creek is primarily located in the City of Savage; however, part of the creek and watershed is in Shakopee.

Corrective Action: The City of Shakopee will work with the Lower Minnesota River Watershed District and City of Savage regarding groundwater studies contributing to the Eagle Creek Boiling Springs and Fen areas.

4.4. Impacts of Water Quantity or Quality Management Practices on Recreational Opportunities

Issue 4.4.1: Maintain and improve the water quality of Lake O'Dowd to sustain recreational opportunities. Lake O'Dowd water quality has been improving for total phosphorus, transparency, and Chlorophyll-a, and has been meeting the lake water quality standards for several years.

Corrective Action: The City will continue participation in the CAMP Program to monitor and track trends of water quality in lake O'Dowd. The City will work with Scott WMO regarding water quality issues and participate in the development of TMDL studies as they arise and are identified.

Issue 4.4.2: The Minnesota River is impaired for nutrients and turbidity.

Corrective Action: The city will participate in the development of TMDL Studies. One completed TMDL study which addresses dissolved oxygen and phosphorus load allocations identified a 30% reduction in non-point source phosphorus loads from permitted Municipal Separate Storm Sewer Systems (MS4) communities. There is a TMDL study for turbidity in development but is not yet completed.

The City will continue to implement Shakopee's Comprehensive Surface Water Management Plan, meet requirements associated with the City's MS4 National Pollutant Discharge Elimination System (NPDES) Permit, and implement its SWPPP to address non-point source pollution.

4.5. Impacts of Stormwater Quality on Fish and Wildlife Resources

Issue 4.5.1: Illicit discharge into the City's storm sewer system impacts water quality of receiving water bodies and can cause environmental impacts affecting vegetation, fish and other wildlife.

Corrective Action: The City has developed an illicit discharge ordinance, trains staff on illicit discharge annually, and sends notifications if illicit discharge is observed. In addition, the City will educate the public as a part of MS4 SWPPP minimum control measures.

Issue 4.5.2: Aquatic invasive species (curly leaf pondweed, eurasian watermilfoil, purple loosestrife, carp, zebra mussels, etc) can cause displacement of, or threaten, native species in their natural environment, or threaten the use of natural resources.

Corrective Action: The City will work with the watershed districts to address concerns with aquatic invasive species in public waters.

4.6. Adequacy of Existing Regulations and Programs to Address Adverse Impacts on Local Water Resources

Issue 4.6.1: The City has adopted ordinances related to shoreland and floodplain regulation, stormwater management (including illicit discharge and wetland management), and erosion

control. These ordinances need to be kept up to date as requirements change. A copy of the ordinances can be found in **Appendix C**.

> **Corrective Action:** The City will continually evaluate these ordinances and will update them as needed. The City will continue to enforce all ordinances as necessary.

Issue 4.6.2: The City currently has limited funding sources available to complete projects related to water resources.

> **Corrective Action:** Stormwater funds and special assessment funding are not adequate to implement the studies, programs, and capital improvements outlined in this plan. The City must apply for grants to fund the implementation of capital improvements identified in this management plan. The city should evaluate and update annually the adequacy of the stormwater fund and fee, extending project forecast to 15-year capital improvements (versus the current 5-year forecast) to ensure a well-balanced, long-term, sustainable stormwater management program and fund.

Issue 4.6.3: Stormwater ponds exist throughout the City under several different scenarios of property ownership and/or within an easement. In some instances, the ponds are originally located in an outlot that is either owned by a private property owner or dedicated to the city. In an effort to minimize the City becoming property owners of these areas and outlots where a standard drainage and utility easement is adequate, the City will develop a stormwater pond easement versus outlot policy.

> **Corrective Action:** The City will develop a stormwater pond easement versus outlot policy.

4.7. Erosion and Sediment Control

Issue 4.7.1: Runoff from rainfall events can cause soil erosion, particularly from construction sites and carry sediment to waterbodies throughout the City. Sediment deposition may have resulted in reducing the water quality benefit of stormwater ponds or degraded the quality of water in wetlands, lakes, and streams.

> **Corrective Action**: The City will continue to implement and enforce erosion control measures from construction activity as required by the NPDES permit requirements. In addition, the City will continue to inspect waterbodies and evaluate the water quality benefit of stormwater ponds to identify maintenance needs.

Issue 4.7.2: Erosion and stabilization issues along the Minnesota River.

> **Corrective Action:** The City will coordinate with the Lower Minnesota River Watershed District to identify stabilization options and priority areas.

Issue 4.7.3: The catch basins/culverts located near Patterson Drive and Hawthorne Circle experience frequent clogging due to soil erosion and debris from the upstream ravine.

> **Corrective Action:** The City has implemented improvements to address and improve this issue, however debris buildup and clogging is still an issue. The City will continue to monitor and provide maintenance as needed.

Issue 4.7.4: Erosion at the FES and downstream slope/ditch south of the Shakopee High School and north of Creekside Lane West.

> **Corrective Action:** The City has implemented improvements to the ditch to address this

issue, however the City will continue to monitor and provide maintenance as needed.

Issue 4.7.5: Debris and sediment that accumulates on City streets washes into storm sewer then into ponds, wetlands and lakes. The debris and sediment can carry nutrients and other pollutants to the environment.

Corrective Action: The City will continue to street sweep debris targeting seasonal conditions (spring and fall) that tend to have increased debris buildup. In addition, the City will continue to evaluate the need to street sweep priority areas where there are no permanent water quality BMPs. More information regarding street sweeping activities can be found in the Street Sweeping Policy (**Appendix G).**

Issue 4.7.6: Sediment deposition in storm sewer pipes causes restriction in flow capacity. The city only has a reactive program to address sediment accumulation in storm sewer pipes.

Corrective Action: Develop an annual inspection program to identify needed maintenance and program annual funding for cleaning.

4.8. Impact on Water Resources from Land Use Practices and Development

Issue 4.8.1: The downtown Shakopee area is completely developed with little to no stormwater management.

Corrective Action: The City is completing a targeted BMP study to identify project opportunities throughout the downtown Shakopee area. Implement water quality BMPs during redevelopment projects based on stormwater requirements and to the maximum extent feasible.

Issue 4.8.2: Public linear transportation projects offer an opportunity to implement stormwater management practices.

Corrective Action: The City will develop and redevelop public linear transportation projects to meet applicable stormwater requirements and look for opportunities to implement stormwater management practices to the maximum extend practical.

4.9. Education Program

Issue 4.9.1: The City of Shakopee recognizes the need for local water education programs to increase public awareness of local water management and improve the quality of stormwater runoff.

Corrective Action: The City will continue to implement community education to increase residents' awareness and reduce violations concerning proper water resource management.

The City will continue to provide education content and opportunities to residents, businesses, developers, and others. These efforts may include regular notices in the City's bi-monthly newsletter, articles in the local paper, postings on the City website, and flyers in the utility bill. The City will coordinate with the watersheds to improve the efficiency of educational efforts and reduce duplication. Educational topics may include but are not limited to:

- Stormwater pond function and maintenance

- Wetland buffers
- Water quality
- Use of fertilizer
- Yard/pet waste management
- Illicit discharge to stormwater
- Controlling invasive species
- Chloride reduction BMPs (reduce deicing salts, water softeners, and water treatment plant discharge)

4.10. Identification of Potential Problems to Occur in the Next 20 Years

Issue 4.10.1: Aging infrastructure and reduced effectiveness of water quality BMPs throughout the City.

> **Corrective Action:** The City will continue to complete inspections of the stormwater infrastructure and evaluate BMP effectiveness as required by the MPCA's MS4 NPDES Permit. The City of Shakopee is responsible for maintenance of its stormwater system in conformance with the MPCA's MS4 Program. This includes maintenance of pipes, outlets, constructed ponds, lakes, wetlands, ditches, swales, and other drainage ways. Proper maintenance will ensure that the stormwater system continues to provide the necessary flood control and water quality treatment. Refer to **Appendix H** for a copy of the City's SWPPP. Other units of government are responsible for maintaining the stormwater systems under their control.

Issue 4.10.2: There are a lot of private stormwater BMPs that have been required to meet development requirements for rate and water quality purposes. These BMPs may degrade over time and not provide the protection and/or meet the requirements initially designed for.

> **Corrective Action:** An operation and maintenance agreement has been developed that private development property owners need to sign and agree to which ensures that the BMP will be maintained and provide the protection and function that they were designed to meet.

Issue 4.10.3: Presence of polycyclic aromatic hydrocarbons (PAHs) in sediment accumulated in stormwater ponds. PAHs are present primarily from historical use of coal-tar sealants for paved surfaces. The state of Minnesota banned the use of coal-tar sealants in 2014, however, PAHs are still present in accumulated sediment.

> **Corrective Action:** As accumulated sediment is identified to be dredged from stormwater ponds, the City will follow protocol for testing the sediment for PAHs and disposal of dredged material properly.

Issue 4.10.4: Elevated levels of chloride concentrations have been found in stormwater ponds, surface water bodies, and groundwater throughout the Twin Cities Metropolitan Area. At levels exceeding the water quality standards, chloride can be toxic to aquatic life and can make drinking water sources not economically feasible to treat.

> **Corrective Action:** One significant contributor to elevated chloride concentrations in surface water and groundwater is road salt application during the winter. The City will continue to implement chloride best management practices such as reducing salt use on roadways and implement prewetting and anti-icing strategies. The City will also continue to educate private business owners and residents about correct salt application, and improve policies designating salt usage and will coordinate salt applicators' training with

the watershed agencies.

The LMRWD and other public entities are currently working to create a comprehensive chloride management plan. The City will cooperate with the agencies in the creation of this plan and will consider implementing any action items that are identified.

Issue 4.10.5: Complaints from residents within the City exerting increased pressure to improve the quality of water within the City and the appearance of stormwater retention areas.

Corrective Action: The City will continue to manage the function of constructed ponds that receive public water for flood protection and water quality purposes. Property owners of the pond area are responsible for noxious weed management, litter control, and nuisance aesthetics (aquatic vegetation, algae, duckweed, etc).

Issue 4.10.6: Increased demand for public access and/or trail systems for waterbodies within the City.

Corrective Action: The City will continue to work to improve public access and/or trail systems for waterbodies within the city as part of the current Parks and Recreation Master Plan.

4.11. Availability and Adequacy of Existing Technical Information to Manage Local Water Resources

Issue 4.11.1: Change in precipitation trends used for design of stormwater infrastructure.

Corrective Action: Continue to implement stormwater requirements based on the best available precipitation information, The City has adopted Atlas 14 which is the best available precipitation information.

Issue 4.11.2: There is a lot of stormwater infrastructure throughout the city. Asset management is completed through a GIS database and the City has mapped the majority of its storm sewer system. As new and redevelopment projects are completed, the storm sewer GIS database needs to continually be updated.

Corrective Action: The City will annually update its storm sewer GIS database to incorporate recent projects, BMPs, and associated storm sewer improvements.

Issue 4.11.3: There are several governing agencies that overlay the City of Shakopee that influence how water resources are managed in the City. These agencies include two watershed districts, a watershed management organization, the county, the state, and the soil and conservation district. Input is often needed from the City at Technical Advisory Meetings that concern water resources.

Corrective Action: City Staff will attend Technical Advisory Meetings when attendance of the City of Shakopee is appropriate.

Issue 4.11.4: The city is the LGU for WCA but does not have a certified WCA manager on staff.

Corrective Action: Continue to outsource this work on an as-the-need arises basis.

5. GOALS AND POLICIES

5.1. Summary

The City of Shakopee has developed a number of goals and policies that conform to the overall purpose that is specified in Minnesota Statutes Section 103B.201. These goals and policies have been developed to compliment watershed, County or State goals and policies. They have also been developed to preserve and use natural water storage and retention systems in order to:

A. Limit public capital expenditures that are necessary to control excessive volumes and rates of runoff.

B. Improve water quality.

C. Prevent flooding and erosion from surface flows.

D. Promote ground water recharge.

E. Protect and enhance fish and wildlife habitat and water recreational facilities.

F. Secure the other benefits associated with the proper management of surface water.

Through the stormwater management planning effort, the City of Shakopee will apply the MPCA NPDES Construction Stormwater Permit requirements, the MPCA “Stormwater Best Management Practices Manual” and the MN Stormwater Manual for the design of new stormwater management systems. All new developments in Shakopee are required to reduce non-point source pollution associated with stormwater run-off. The City of Shakopee has incorporated standards and requirements with the adoption of the Design Criteria. This SWMP also represents the City's primary action for obtaining the 30% reduction of non-point pollution in the Minnesota River.

The goals and policies that the City has developed address issues related to water quantity, water quality, recreation, fish and wildlife, enhancement of public participation, information and education, erosion and sediment control, groundwater management, wetland management, maintenance and inspections, and financial management. Outlined below are the goals and policies that have been developed for each of the above areas of concern.

5.2. Water Quantity

Goal

Limit public capital expenditures that are necessary to control excessive volumes and rates of runoff.

Policies

1. As is part of any new development activity, adequate runoff rate and volume control measures must be incorporated into the design to ensure that stormwater runoff rates and volumes will be in conformance with the rates outlined in the City’s Design Criteria and in this Plan.

2. Stormwater infrastructure shall be designed using Atlas 14 rainfall data, or most current and best available information.

3. The City will require new development and redevelopment to meet discharge rate requirements as outlined in the City's Design Criteria.

4. In Jackson Township annexation area, development is required to limit the 2-year, 10-year, and 100-year critical storm events to the pre-settlement rates. This can be accomplished with local or regional detention facilities.

5. The design of all major stormwater storage facilities shall attempt to accommodate the runoff from the 100-year critical event. These facilities include lakes, ponds, and their outlets. The critical event shall be the 100-year 24-hour storm event or the 10-day snowmelt event, whichever requires the largest pond volume and has the highest flood elevation.

6. New storm lateral sewer systems shall be designed to accommodate discharge rates associated with the 10-year storm event.

7. Any new development or redevelopment will maintain a minimum building opening and basement floor elevations consistent with requirements outlined in the City Ordinance Chapter 54: Water Resources Management (**Appendix C**).

8. The City requires pretreatment of runoff prior to infiltration wherever it is practical and reasonable to do so, provided that past and existing land use practices do not have a significant potential to contaminate the stormwater runoff. Infiltration will be required in all areas with A and B hydrologic soils as feasible. In addition, in areas where enhanced infiltration practices are employed, a minimum of three feet of soil must be present between the pond bottom and bedrock to treat infiltrating storm water.

9. The City encourages the use of Low Impact Development (LID) techniques for new development and redevelopment to reduce water quality and quantity impacts and will investigate allowed/approved methods to be used in the City consistent with the City's Design Criteria.

10. The City will develop an infiltration monitoring program to monitoring the existing infiltration areas for effectiveness and maintenance needs.

11. Landlocked depressions which presently do not have a defined outlet and do not typically overflow may be allowed a positive outlet provided it is in conformance with this SWMP and the City's Design Criteria and does not cause downstream flooding, sufficient dead storage is provided to retain back-to-back 100-year, 24-hour rainfalls, will not affect the stability of downstream water resources, and it has been demonstrated that volume control practices alone will not address the problem.

12. Floodplain alterations or filling shall meet the requirements of the City's floodplain ordinance and the City's Design Criteria.

13. The City's Design Criteria, Ordinances, and Minnesota Stormwater Manual will be the guide for design and implementation of stormwater best management practices.

5.3. Water Quality

Goal

Maintain or improve the quality of water in lakes, streams, or rivers within or immediately downstream of the City of Shakopee.

Policies

1. For new development or redevelopment, the City encourages water quality requirements to be met through infiltration to the maximum extent practical.

2. For new development or redevelopment, storm water quality treatment is required to meet the MPCA NPDES Construction Stormwater Permit and the City's Design Criteria.

3. The City will accept other storm water quality treatment methods on a case-by-case basis if they meet or exceed the removal efficiencies provided by a BMP meeting the requirements of the MPCA NPDES Construction Stormwater Permit and the City's Design Criteria.

4. The City will actively participate in the development of Total Maximum Daily Load (TMDL) studies for O'Dowd Lake, the Minnesota River, Eagle Creek, the Prior Lake Outlet Channel and Pike Lake, which the City drains to.

5. The City will reduce its non-point source phosphorus loading to the Minnesota River by a minimum of 30% through the implementation of this Plan as required by the Minnesota River Dissolved Oxygen TMDL Study.

6. The City will annually review and update its Storm Water Pollution Prevention Plan (SWPPP). The City incorporates its SWPPP into this Water Resource Management Plan by reference. The SWPPP can be viewed on the City of Shakopee's website.

7. The City developed an NPDES Nondegradation Plan in 2007. The Nondegradation Plan will be used as a reference for approved TMDLs regarding any loading assessments. The Nondegradation Plan is included as **Appendix F**.

8. The City has adopted the following water resource classifications for water quality as follows:

Water Body	Water Quality Classification*	Goals
Eagle Creek	Level I	Preserve existing human use of the water body such as fishing or swimming
Dean Lake Wetland	Level III	Preserve existing human use of the water body such as fishing and to not degrade from current conditions.
Minnesota River	Level II/III	Achieve 30% reduction in non-source pollution
Blue Lake	Level IV	Enhance natural plant and animal communities as well as passive water recreation such as hiking, wildlife observation, and fishing
Fisher Lake	Level IV	Enhance natural plant and animal communities as well as passive water recreation such as hiking, wildlife observation, and fishing
O'Dowd	Level I	Preserve existing human use of the water body such as fishing to not degrade from current conditions.

Water resource level classifications source: 2012 EPA Recreational Classifications
Level I: Level I water bodies fully support all water-based recreational activities including swimming, scuba diving, and

snorkeling.

Level II: Level II water bodies are appropriate for all recreational uses except full body contact activities. Recreational activities for these water bodies include boating, water skiing, etc.

Level III: Level III water bodies will support fishing (in lakes capable of supporting a fishery), aesthetic viewing activities, and observing wildlife.

Level IV: Level IV water resources are wetlands and may be suitable for aesthetic viewing activities, observing wildlife, and other appropriate public uses.

Level V: Level V water bodies are generally intended for runoff management (i.e. storm water detention) and have no significant recreational use values.

9. The City will investigate opportunities to retrofit the downtown area to provide additional water quality treatment in this fully developed area. The City will partner with the LMRWD and the state through the watershed-based funding grant program.

10. The City of Shakopee will sweep the streets at least two times annually. Refer to **Appendix G** for a detailed description of the Shakopee Street Sweeping Program.

11. The City will work with Scott County to develop a program to ensure that solid or liquid waste is disposed of properly. This program will include providing information to homeowners on proper disposal and/or use of yard waste in an environmentally responsible manner. It will also educate its residents on the proper disposal of household hazardous waste including waste oil, paints, and solvents. The City will work with Scott County toward securing locations within the City limits where household hazardous waste may be dropped off.

12. The City will discourage use of fertilizers and pesticides in shoreland protection zones to minimize pollutant runoff to public waters.

13. The City will work with the County to develop a sanitary sewer plan to address the issues concerning individual sewage treatment systems consistent with State standards.

14. The City will continue to implement its retention/treatment basin clean out and maintenance plan that will address maintenance to the extent feasible and practical. The City will utilize the Stormwater Asset Management Program (SWAMP) to prioritize clean out schedules. The goal of this program will be to assure that the City's retention and treatment basins will have the capability to retain and treat stormwater in future years.

15. The City prefers the use of regional treatment facilities and will facilitate these methods where feasible and appropriate.

16. The City does not use sand to improve vehicle traction in the winter. The City uses salt between 10 and 32 degrees Fahrenheit and uses treated salt when the temperature is below 10 degrees Fahrenheit. The City only treats intersections, hills, and curves. The application rate typically averages 267 pounds of salt per lane mile. The City does not currently have the technology that records road and air temperature to automatically adjust the spreading ratio so they use as little as they can while still being effective.

5.4. Recreation, Fish, and Wildlife

Goal

Protect and enhance recreational facilities and fish and wildlife habitat.

Policies

1. The City of Shakopee will work with and support to the maximum extent practical the efforts of Minnesota Department of Natural Resources, the Corps of Engineers, the United States Environmental Protection Agency, the U.S. Fish and Wildlife Service, and other appropriate agencies in promoting public enjoyment and protecting fish, wildlife, and recreational resource values in the watershed.

2. The City will partner with the Scott WMO to undertake aquatic plant surveys on O'Dowd Lake.

3. The City will encourage land owners to maintain wetlands and open space areas for the benefit of wildlife.

4. The City will encourage the expansion of DNR fish stocking programs in appropriate lakes and streams of the City.

5. The City will preserve unique features and aesthetics such as those identified in **Section III** to the greatest extent feasible.

6. The City's Greenway Location Map **(Figure 15)** shall be taken into account if areas within the corridor are proposed to be developed.

7. Development shall be required to adhere to the City's Shoreland and Tree Preservation Ordinances.

8. The City will remove impediments to the storm water management system as needed. These impediments could include beaver lodges, downed trees, and/or unauthorized man-made structures.

5.5. Enhancement of Public Participation Information and Education

Goal

Educate and inform the public on pertinent water resource management issues and increase public participation in water management activities.

Policies

1. Through the City's MS4 NPDES permit, the City has implemented a public education plan that provides information on pertinent water management issues. This includes annual meetings, information in newsletters, and information on the City's website. The City's SWPPP and NPDES permit are incorporated by reference and can be viewed on the City of Shakopee's website.

2. The City will work with the Watershed Districts in public education efforts. This will include utilizing educational resources developed by the WMOs and WDs to assist in the City's public education program.

3. Through the City's public education effort, information about maintaining wetland buffers will be targeted at homeowners.

4. Promote increased public involvement through volunteering with groups such as CAMP (Citizen Assisted Monitoring Program) and CSMP (Citizen Stream Monitoring Program).

5.6. Erosion and Sediment Control

Goal

Prevent erosion and sedimentation to the maximum reasonable extent.

Policies

1. Erosion and sedimentation control plans and SWPPP's for projects that disturb one acre or more of land shall be reviewed and enforced by the City for all new developments. These plans shall conform to the requirements of the Scott WMO, PLSLWD or LMRWD (depending on location) and the NPDES Construction Stormwater Permit.

2. The City will conduct erosion inspections for areas in the City not currently under construction but are susceptible to erosion (i.e. bluff areas).

3. The City will sweep the streets at least two times annually. Refer to **Appendix G** for a detailed description of the Shakopee Street Sweeping Program.

4. The City will prohibit work in areas having steep slopes (>12%) and high erosion potential where the impacts of significant erosion cannot be protected against or mitigated in accordance with the City's ordinances.

5. The City requires a 30-foot structure setback and a 50-foot storm water pond/infiltration area setback from the top of a bluff.

6. The City will actively administer a program for controlling sediment erosion from single family home construction sites.

7. The City will adhere to the requirements of its NPDES SWPPP. The City's SWPPP is available upon request from the City's Engineering Department.

8. The City will identify, rank, and map disturbed shoreland areas.

5.7. Groundwater

Goal

Protect the quality and supply of groundwater resources

Policies

1. Promote and coordinate with other agencies the continuation of existing groundwater monitoring, inventorying or permitting programs.

2. Encourage the development of spill prevention, control, and counter measure plans that are consistent with State and/or Federal regulations.

3. The City will work with the Shakopee Public Utilities Commission (SPUC) to implement a Wellhead Protection Plan to the extent necessary.

4. Encourage preservation of wetlands, ponds, and parks areas to encourage infiltration of precipitation in areas where land use is not anticipated to adversely affect groundwater or surface water runoff.

5. Support efforts to gather further information on the hydrogeology of the region. When such information becomes available, including information on the location of groundwater recharge areas and surface water and groundwater interactions, the City will take into consideration these areas for the purpose of maintaining their recharge capabilities in protecting groundwater quality. Actionable activities will be developed at that time.

6. Cooperate with Scott County Environmental Health Department to ensure that all unsealed or improperly abandoned wells within the watershed are properly sealed. Technical requirements for the abandonment of these wells will be in conformance with the Minnesota Department of Health Water Well Code.

7. The City will work with the watershed agencies and other state and local entities to promote the protection of groundwater resources.

5.8. Wetlands

Goal

Protect wetlands in conformance with the requirements of the Wetland Conservation Act of 1991.

Policies

1. The City of Shakopee will accept the Local Governmental Unit (LGU) responsibility for wetland management and manage these wetlands in conformance with the Wetland Conservation Act (Minnesota Rules Chapter 8420). The City will maintain any wetland information obtained as the LGU. Information regarding the City's permitting process is included in **Appendix I.**

2. Prior to any site development activities, the City will require a site inspection from trained wetland delineation professional to identify the location and extent of any wetlands present.

3. Any review of a proposed wetland encroachment will initially address the issue of avoidance. It will be the city's policy that prior to allowing any wetland encroachment; all reasonable attempts to avoid such alteration must be demonstrated. This avoidance review must also consider the reasonableness of the no build alternative.

4. As part of new development or redevelopment of a site that contains wetlands, a MnRAM 3.0 functional assessment, or more recent version, will be required to be submitted by the project proposer and reviewed by the City.

5. Based on the results of the MnRAM 3.0 assessment (or more recent version of MnRAM) wetlands will be classified as outlined in this policy. The average buffer width and minimum buffer width requirements shall be based on the wetland classification as outlined in the City Ordinance Chapter 54: Water Resources Management (**Appendix C**).

6. Wetland buffers shall be dedicated in outlots or conservation easement. Monumentation will be required as outlined in the City Ordinance Chapter 54: Water Resources

Management.

7. Setbacks from the wetland buffers will be required for all new development and redevelopment to provide useable yard space and reduce the chances of buffer encroachment. Setbacks will be required as outlined in the City Ordinance Chapter 54: Water Resources Management.

8. The City's ordinances will be updated to incorporate the policies outlined in this Plan.

5.9. Maintenance and Inspection

Goal

Continue an active storm sewer system maintenance and inspection program.

Policies

1. Continue to implement an annual inspection and maintenance program as required by the city's NPDES MS4 permit. The City will utilize SWAMP for prioritization of inspection and maintenance of BMPs.

2. Require and enforce adequate access to ponding facilities including outlots and easements. A copy of the City's Utility Facilities Easement Agreement is included in **Appendix J**.

5.10. Financial Management

Goal

Use available funding mechanisms to construct and maintain a sustainable stormwater management system.

Policies

1. The City will utilize various funding sources including, but not limited to area charges, stormwater utility and grants to accomplish improvements listed in this surface water management plan and other surface water documents including required TMDLs.

2. The City will pursue grants, donations, and in-kind contributions to help fund stormwater projects.

3. The City will encourage the watershed districts to finance intercommunity and regional issues and projects.

6. IMPLEMENTATION PROGRAM

6.1. Overview

Shakopee has developed its implementation program to address issues identified earlier in this LSWMP. This program reflects the needs and concerns of many stakeholders including the City Council, City staff, citizens, and watershed districts. The program also considers Shakopee's ability to fund these items through its stormwater utility fund. The implementation program consists of the following components:

- Capital Improvement Projects (CIP)
- Operation and Maintenance
- Official Controls
- Monitor and Study

Capital Improvements consist of "on-the-ground" projects intended to remedy issues identified as current problems. The capital projects focus on phosphorus, TSS, and E. coli reduction within the TMDL subwatersheds and areas identified in the City's Nondegradation Report. Projects within the TMDL subwatersheds are the highest priority for the City. Flood protection is also a high priority for CIPs.

Operation and Maintenance items consist primarily of the general maintenance of Shakopee's drainage system including ponds, storm sewer, and culverts. Operation and maintenance also includes activities related to NPDES MS4 Permit compliance such as annual meetings, SWPPP updates, and SWPPP implementation.

Official Controls include ordinance and policy revisions intended to achieve water quality benefits. Each proposed implementation item has a specific driver, which are identified in **Table 6.1**. The overarching goal of Shakopee's implementation program is to improve the quality of its surface waters, improve its surface water discharge, and achieve sustainable site development practices. Over time, codes must be updated to remain consistent with goals, policies, and practices. City ordinances are revised as needed to stay current with the MS4 permit requirements and revisions to the two watershed district rules.

Monitor and Study items consist primarily of projects designed to collect water resource data such as water quality monitoring projects, and projects to evaluate cost benefits for various stormwater treatments or planning opportunities. These types of projects also include relevant partnerships and collaborations with the City, specifically in terms of groundwater/surface water protection and recharge.

6.2. 15-Year Implementation Plan Priorities

Table 6.1 presents Shakopee's Implementation Program. More importantly, the Implementation Program aligns with the City's goals and policies presented in this LSWMP. **Table 6.1** presents implementation items in each of the four functional areas of CIP, Operation and Maintenance, Official Controls and Monitor and Study. The implementation program incorporates Shakopee's SWPPP through direct reference of items that have a financial impact. The City will review and update the Implementation Program on a regular basis. The City's CIP is reevaluated yearly and the table will be updated to reflect CIP changes, which does not require an amendment to this LSWMP.

6.3. Financial Considerations

The City of Shakopee updates their Fee Schedule annually for all city services. As part of this Fee Schedule, the City has fees related to stormwater management and a summary of each is listed below. A full copy of the Fee Schedule can be found on the City's website.

The City of Shakopee maintains a Stormwater Utility Fund to fund its stormwater management program. The City determines a parcel's stormwater utility charge by multiplying the Residential Equivalence Factor (REF) for the parcel's land use by the size of the property. This REF is based on the amount of impervious surface and whether flood control ponds and water quality practices are located onsite. This fee is applied to all properties within the City.

In 2014, the City completed a study to analyze the existing stormwater utility fee to determine if the current revenue generated was adequate to address stormwater management activities within the City, specifically to meet water quality requirements and permit compliance. The City revised the existing fee at that time to the current REF value of $7.80 per acre to be paid monthly.

Additional stormwater management fees are listed below. Stormwater management fees are reviewed and updated annually. The current summary of fees can be found on the City's website.

- Street and Utility Fee – Lump sum of 7.5% of construction costs; includes storm sewer.
- Stormwater Management Plan Review Fee – Cost for developer submitted stormwater reviews.
- Trunk Stormwater Charge – Calculated for new development at $0.139 per developable square footage.
- Trunk Stormwater Storage and Treatment Charge – Charged to all developments utilizing regional storm ponding systems. Calculated based on the following density of development:
    - Three or less lots per acre: $0.069 per developable square footage
    - More than three lots per acre: $0.138 per developable square footage
    - Commercial or industrial developments: $0.231 per developable square footage
- Regional Infiltration Pond Charge – Charged to all developments utilizing regional infiltration pond systems at $1,383 per new impervious acre.

The City will use funds generated from its Stormwater Utility Fund as the primary funding mechanism for its implementation program including maintenance, repairs, capital projects, and studies. If funds from this fee do not cover necessary costs, the City will consider adjusting the Stormwater Utility Fee to cover the costs associated with the implementation program. The City will continue to review the fee annually and adjust based on the stormwater related needs of the City and other available funding mechanisms. The City will also take advantage of grant or loan programs to offset project costs where appropriate and cost-effective. Below is a list of various sources of revenue that the City will attempt to use:

- Grant monies possibly secured from various agencies. This could include the LMRWD, PLSLWD, Scott WMO, Scott County, MnDOT, MPCA, DNR, Legislative-Citizen Commission on Minnesota Resources, Met Council, BWSR, and others.
- Special assessments for local improvements performed under authority of Minnesota Statutes Chapter 429.
- Revenue generated by Watershed Management Special Tax Districts provided for under Minnesota Statutes Chapter 473.882.
- Project funds could be obtained from watershed district levies as provided for in Minnesota Statutes Chapter 103D.905 for those projects being completed by or in

cooperation with LMRWD and PLSLWD.

- Cost share and/or incentive funds from Scott WMO, PLSLWD, or LMRWD.
- Other sources potentially including tax increment financing, tax abatement, state aid, and others.

TABLE 6.1

SURFACE WATER MANAGEMENT IMPLEMENTATION PLAN

No.	Project Description	15 Year Total Cost Estimate [1,3]	Possible Funding Sources [2]	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029-2033	Comments
Capital Improvement Projects (CIP)															
1	Annual Erosion Control and Pond Cleaning - Erosion control and pond cleanout projects are to prevent water quality impacts, and to restore water quality benefits of ponds.	$2,250,000	Surface Water Fund	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$750,000	Addresses Issue 4.1.2 and Issue 4.10.2
2	Reroute Stormwater to Protect Historic Sites - Stormwater flow through a historical and archaeological sensitive area is causing degradation. This project is to reroute stormwater to an area that will not result in further degradation of the historical and archeological sensitive area.	$900,000	Surface Water Fund, Grants, SMSC, LMRWD	$900,000											Addresses Issue 4.2.4
3	West End Regional Pond and Trunk Oversizing - It is important to control rates to manage the stormwater system and protect/reduce the potential for flooding in the downstream stormwater system. It may also provide water quality benefit by reducing sediment and phosphorus to help meet water quality goals and NPDES MS4 requirements.	$750,000	Surface Water Fund, Grants		$750,000										Addresses Issue 4.1.1, Issue 4.2.5
4	Valley View Drainage - There is a large drainage area that is concentrated to a drainage path that flows over a sidewalk and onto the adjacent street. There is a safety concern during the winter when ice builds up in this area and on the sidewalk.	$58,000	Surface Water Fund		$58,000										Addresses Issue 4.2.6 and Issue 4.2.7
5	Blue Lake Channel (East) Regional Storm Pond - It is important to control rates to manage the stormwater system and protect/reduce the potential for flooding in the downstream Prior Lake Outlet Channel. If there is infiltration, the project may reduce share outlined in the Prior Lake Outlet Channel Agreement. This project can provide water quality benefits by reducing sediment and phosphorus to help meet water quality goals and NPDES MS4 requirements.	$750,000	Surface Water Fund, Grants, SMSC			$750,000									Addresses Issue 4.1.1, Issue 4.2.5
6	NE Shakopee Storm Water BMP Retrofit - This project will provide water quality benefits by reducing sediment and phosphorus to help meet water quality goals and NPDES MS4 requirements.	$2,000,000	Surface Water Fund, Grants, LMRWD				$2,000,000								Addresses Issue 4.1.1, Issue 4.2.5
7	Stormwater Quality Retrofit BMPs - Future stormwater quality improvement projects.	$2,500,000	Surface Water Fund, Grants						$250,000	$250,000	$250,000	$250,000	$250,000	$1,250,000	Addresses Issue 4.1.1, Issue 4.1.7

No.	Project Description	15 Year Total Cost Estimate [1,3]	Possible Funding Sources [2]	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029-2033	Comments
8	Stormwater Flood Mitigation Projects - Future projects to address/mitigate flood concern/related projects.	$2,500,000	Surface Water Fund, Grants						$250,000	$250,000	$250,000	$250,000	$250,000	$1,250,000	Addresses Issue 4.2.1, Issue 4.2.3, 4.2.5
9	Blue Lake Channel (West) Regional Storm Pond - It is important to control rates to manage the stormwater system and protect/reduce the potential for flooding in the downstream stormwater system. It may also provide water quality benefit by reducing sediment and phosphorus to help meet water quality goals and NPDES MS4 requirements.	$750,000	Surface Water Fund, Grants, SMSC					$750,000							Addresses Issue 4.1.1, Issue 4.2.5, Issue 4.2.18
10	Ridge Creek Park and Prior Lake Outlet Channel Improvements - The channel improvements include realignment of the Prior Lake Outlet Channel to better handle increased run-off due to development, incorporating water quality BMPs to reduce sediment and phosphorus, and wetland enhancement.	$1,200,000	Surface Water Fund, Grants, PLOC	$1,200,000											Addresses Issue 4.1.1, Issue 4.2.2, Issue 4.2.1
	Subtotal Capital Improvement Projects (CIP)	$13,658,000		$2,250,000	$958,000	$900,000	$2,150,000	$900,000	$650,000	$650,000	$650,000	$650,000	$650,000	$3,250,000	
Operation and Maintenance															
11	Miscellaneous annual repairs to storm sewer infrastructure	$750,000	Surface Water Fund	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$250,000	Addresses Issue 4.2.2, Issue 4.2.12, Issue 4.2.13, Issue 4.2.14,
12	Easement acquisitions to create access to stormwater BMPs and address flooding/storage issues that are not CIP Related	$50,000	Surface Water Fund			$10,000			$10,000			$10,000		$20,000	Addresses Issue 4.6.3
13	Street Sweeping - Sweep City maintained streets and Parking Lots	$982,500	Surface Water Fund	$65,500	$65,500	$65,500	$65,500	$65,500	$65,500	$65,500	$65,500	$65,500	$65,500	$327,500	Addresses Issue 4.7.5
14	Storm Sewer Inspection Program - Conduct one inspection of all City-owned ponds and outfalls prior to expiration date of the MS4 NPDES Permit. Annually inspect 100% of structural BMPs.	$75,000	Surface Water Fund	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$25,000	Addresses Issue 4.10.1
15	Road Salt (Chloride) Application Review - The City will record the annual activities of the salt distribution program and adjust current practices as necessary.	$150,000	Surface Water Fund	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$50,000	Addresses Issue 4.10.4
16	Stormwater Training Program - Staff trainings to discuss the following topics: parking lot and street cleaning, storm drain systems cleaning, road salt materials management, fleet and building maintenance, park and open spaces and other stormwater-related topics. Includes MN Fall Maintenance Expo, MPWA Fall Conference, Water Resources Conference, and miscellaneous safety trainings.	$37,500	Surface Water Fund	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$12,500	MS4 Permit Requirement
17	Education Program: The City will collaborate with other agencies to raise awareness by providing information on stormwater pollution prevention, effects of illicit discharges, best management practices, stormwater pond maintenance, pet waste management and outside entity resources available to City residents and business owners.	$22,500	Surface Water Fund	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$7,500	Addresses Issue 4.1.4. Issue 4.1.5, Issue 4.9.1
18	Storm Sewer System Mapping - Annually update storm sewer map for new development including new outfalls, storm sewer, and BMPs.	$75,000	Surface Water Fund	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$25,000	Addresses Issue 4.11.2

No.	Project Description	15 Year Total Cost Estimate [1,3]	Possible Funding Sources [2]	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029-2033	Comments
19	Illicit Discharge Inspections - Using the areas that the City identified as high-priority outfalls and areas around high-risk establishments, the City will integrate those sites into its annual MS4 inspection activities. As needed, City staff will televise a section of the sewer system, collect grab samples or perform other effective testing procedures to find illicit connection identified in the system.	$37,500	Surface Water Fund	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$12,500	Addresses Issue 4.6.1
20	Regular Flood Monitoring - The City will continually monitor known issue areas related to flooding and evaluate need for improvements.	$37,500	Surface Water Fund	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$12,500	Addresses Issue 4.2.8, Issue 4.2.9, Issue 4.2.10, Issue 4.2.11, Issue 4.2.18, Issue 4.2.19, Issue 4.2.20, Issue 4.2.21, Issue 4.2.22, Issue 4.2.23, Issue 4.2.24, Issue 4.2.25, Issue 4.2.26, Issue 4.2.27,
21	Routine Ditch Maintenance - The City will continually perform ditch maintenance to prevent blockage through the main flow areas.	$45,000	Surface Water Fund	$5,000		$5,000		$5,000		$5,000		$5,000	$5,000	$15,000	Addresses Issue 4.2.17, Issue 4.7.4, Issue 4.10.1
22	Storm Sewer Pipe Inspection and Cleaning	$300,000	Surface Water Fund		$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$75,000	Addresses Issue 4.7.6
23	Stormwater Management Asset Program (SWAMP) - The City will implement this program to monitor BMP performance and water quality, prioritize inspection and maintenance activities, track TSS and TP load reductions, and schedule and record MS4 inspections.	$112,500	Surface Water Fund	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$37,500	Addresses Issue 4.10.3
24	Pond Surveys - The City will annually complete pond surveys to schedule and prioritize the necessary maintenance projects. This effort will be assisted by the SWAMP application.	$150,000	Surface Water Fund	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$50,000	Addresses Issue 4.10.3
25	Prior Lake Outlet Channel (PLOC) Improvements - Maintenance and improvements to the PLOC. There is a Memorandum of Agreement between the City of Shakopee, City of Prior Lake, Shakopee Mdewakanton Sioux Community, and Prior Lake-Spring Lake Watershed District that requires the Cooperators to maintain the channel and crossings.	$400,000	Surface Water Fund		$60,000	$30,000	$45,000	$65,000		$50,000		$50,000		$100,000	Addresses Issue 4.2.1, Issue 4.3.1
26	Administration fees associated with the Prior Lake Outlet Channel and Shakopee Public Utilities Commission	$1,200,000	Surface Water Fund	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$400,000	Addresses Issue 4.2.1
	Subtotal Operation and Maintenance	$4,425,000		$247,000	$327,000	$312,000	$312,000	$337,000	$277,000	$322,000	$267,000	$332,000	$272,000	$1,420,000	
Official Controls															
27	Ordinance updates - The City will continually evaluate their adopted ordinances related to floodplain regulation, illicit discharge, surface water management, wetland management, and erosion control. Any necessary revisions will be made as regulations change.	$21,000	Surface Water Fund	$5,000	$3,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$5,000	Addresses Issue 4.6.1
28	Private BMP Operation and Maintenance Agreement - The City will continue to enforce private BMP operation and maintenance agreements.	$15,000	Surface Water Fund	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$5,000	Addresses Issue 4.1.5
29	Wellhead Protection Standards - The City will work with Shakopee Public Utility Commission regarding wellhead protection standards and plan to remain consistent with local and regional updates.	$15,000	Surface Water Fund	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$5,000	Addresses Issue 4.1.6, Issue 4.1.8
	Subtotal Official Controls	$51,000		$7,000	$5,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$15,000	

No.	Project Description	15 Year Total Cost Estimate [1,3]	Possible Funding Sources [2]	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029-2033	Comments
Monitor and Study															
30	Regional BMP Study (West End Pond, Blue Lake Channel (east) and Blue Lake Channel (West))	$33,000	Surface Water Fund, Scott WMO, Grants	$33,000											Addresses Issue 4.8.1
31	Downtown Shakopee BMP Study	$27,500	Surface Water Fund, LMRWD, Grants	$27,500											Addresses Issue 4.4.2, Issue 4.8.1
32	Water Quality Monitoring - CAMP Program and possibly expanding as water quality information is needed.	$75,000	Surface Water Fund	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$25,000	Addresses Issue 4.1.3
33	Water Resources Studies - Future studies to review BMPs opportunities or to evaluate and understand surface water or groundwater systems.	$210,000	Surface Water Fund, LMRWD, PLSLWD, Scott WMO			$30,000		$30,000		$30,000		$30,000		$90,000	Addresses Issue 4.3.2
34	Dean Wetland Water Quality Studies -Assist the LMRWD on studies related to water quality and overall health of Dean Wetland.	$16,000	Surface Water Fund, LMRWD, Grants				$8,000				$8,000				Addresses Issue 4.1.7
35	Quarry Lake Study - work with the watershed district to complete a study to evaluate the need for an outlet to Quarry Lake and shoreline erosion.	$20,000	Surface Water Fund, LMRWD, Grants		$20,000										Addresses Issue 4.2.15
36	Upper Valley Drainage Ditch Study - work with the watershed district to complete a study to evaluate capacity and water quality at this regional facility.	$25,000	Surface Water Fund, LMRWD, Grants									$25,000			Addresses Issue 4.2.16
37	O'Dowd Lake Outlet Study - partner with Scott County and Louisville Township to complete a study regarding the need for a publicly managed outlet from the lake.	$20,000	Surface Water Fund, Scott County, Louisville Township, Grants					$20,000							Addresses Issue 4.2.17
	Subtotal Monitor and Study	$361,500		$65,500	$25,000	$35,000	$13,000	$55,000	$5,000	$35,000	$13,000	$60,000	$5,000	$115,000	
Totals															
	Total Capital Improvement Projects (CIP)	$13,658,000		$2,250,000	$958,000	$900,000	$2,150,000	$900,000	$650,000	$650,000	$650,000	$650,000	$650,000	$3,250,000	
	Total Operating Budget	$4,837,500		$319,500	$357,000	$350,000	$328,000	$395,000	$285,000	$360,000	$283,000	$395,000	$280,000	$1,550,000	
	TOTAL	$18,495,500		$2,569,500	$1,315,000	$1,250,000	$2,478,000	$1,295,000	$935,000	$1,010,000	$933,000	$1,045,000	$930,000	$4,800,000	

[1] Cost estimates are preliminary and subject to review and revision as engineer's reports are completed and more information becomes available. Table reflects 2018 costs and does not account for inflation. Costs generally include labor, equipment, materials, and all other costs necessary to complete each activity. Some of the costs outlined above may be included in other operational costs budgeted by the City.

[2] Funding for stormwater program activities projected to come from following sources - Surface Water Management Fund, Developers Agreements, Grant Funds, General Operating Fund, or Special Assessments.

[3] Staff time is not included in the cost shown.

7. ADMINISTRATION

7.1. Review and Adoption Process

Review and adoption of this Surface Water Management Plan will follow the procedure outlined in Minnesota Statutes 103B.235:

> After consideration, but before adoption by the governing body, each local government unit shall submit its water management plan to the watershed management organization[s] for review for consistency with the watershed plan. The organization[s] shall have 60 days to complete its review.
>
> Concurrently with its submission of its local water management plan to the watershed management organization, each local government unit shall submit its water management plan to the Metropolitan Council for review and comment. The council shall have 45 days to review and comment upon the local plan. The council's 45-day review period shall run concurrently with the 60-day review period by the watershed management organization. The Metropolitan Council shall submit its comments to the watershed management organization and shall send a copy of its comments to the local government unit.
>
> 'After approval of the local plan by the watershed management organization[s], the local government unit shall adopt and implement its plan within 120 days, and shall amend its official controls accordingly within 180 days.

7.2. Plan Amendments and Future Updates

This Local Surface Water Management Plan will be incorporated into the City's 2040 Comprehensive Plan currently being updated and planned for approval in 2019. The Plan is intended to be in effect for 10 years, at which time an updated plan will be required. Following review by the watershed organizations and the formal adoption process outlined above, the Shakopee LSWMP will be current.

The City of Shakopee may revise/amend the plan in response to City-identified needs. 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 stormwater runoff is discharged from the City boundaries. Updating the Implementation Table in Section 6 will also be considered a minor change as the City consistently identifies and completes scheduled projects. The City will send a revised list of projects to the watersheds as completed. Minor changes to this plan can be made by the staff at the City of Shakopee without outside review. It is the intention of the City of Shakopee that this plan be updated by the year 2027 unless significant changes to the plan are deemed necessary prior to that date.

Appendix A – Figures

Figure 1: Watershed Districts and Management Organizations
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Figure 7: Water Quality & Quantity Monitoring Locations
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Figure 12: FEMA Floodplain
Figure 13: MLCCS
Figure 14: Natural Resources
Figure 15: Greenway Locations
Figure 16: Pollutant Sources
Figure 17: Problem Areas

SHAKOPEE

Figure 1 - Watershed Management Boundaries

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- City Boundary
- Annexation Boundary
- PLOC
- Lower Minnesota River WD
- Prior Lake Spring Lake WD
- Scott WMO

Sources: BWSR Watershed Boundaries (2015);

N

0 4,300 Feet

wsb

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SHAKOPEE

Figure 2 - Location

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary
- Municipal Boundaries

N

0 3 Miles

1 inch = 3 miles

wsb

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Date: 1/23/2019

SHAKOPEE

Figure 3 - Major Watersheds

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- City Boundary
- Annexation Boundary

Subwatersheds

- Blue Lake
- Downtown
- Eagle Creek
- Louisville
- Mill Pond
- Minnesota River
- Rice Lake
- Sand Creek
- Drainage Direction

N

0 4,300 Feet

wsb

Document Path: K:\011510-000\GIS\Maps\ArcMap Maps\Figure 3 Major Watersheds.mxd Date Saved: 1/23/2019 4:43:13 PM

SHAKOPEE

Figure 4 - Steep Slopes

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- City Boundary
- Annexation Boundary
- LMRWD Boundary
- Slopes Greater than 18%
- Slopes >12%

Note: This figure indicates areas that steep slopes are likely. Steep slopes may be identified in areas not shown on this figure.

Slopes greater than 18% outside of the Lower Minnesota River Watershed District were calculated using the DNR Bluff Mapping Tool. Slopes greater than 18% within the Lower Minnesota River Watershed District were provided by the WD.

N

0 4,500 Feet

wsb

Document Path: Z:\011510-000\GIS\Maps\ArcMap Maps\Figure 4 Steep Slopes.mxd Date Saved: 11/27/2019 12:32:58 PM

SHAKOPEE

Figure 5 - Soils

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary

Hydrologic Group

- Unclassified/Urban
- A
- A/D
- B
- B/D
- C
- C/D
- D

Sources: NRCS Web Soil Survey (2018)

N

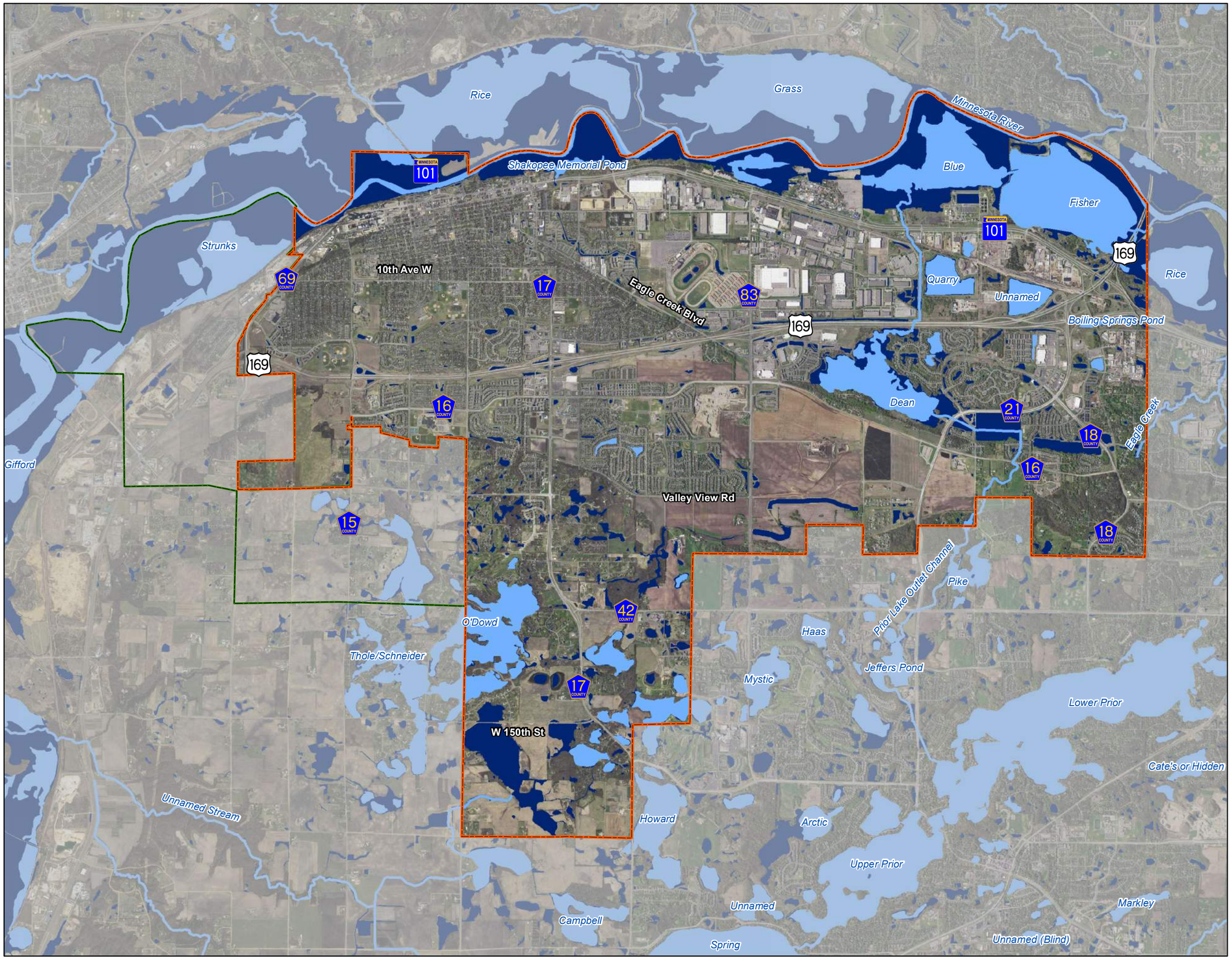
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Figure 6 - National Wetland Inventory (NWI)

Shakopee Surface Water Management Plan
Shakopee, MN



Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary
- National Wetland Inventory

Sources: MnDNR (2017)

N

0 4,500 Feet

wsb

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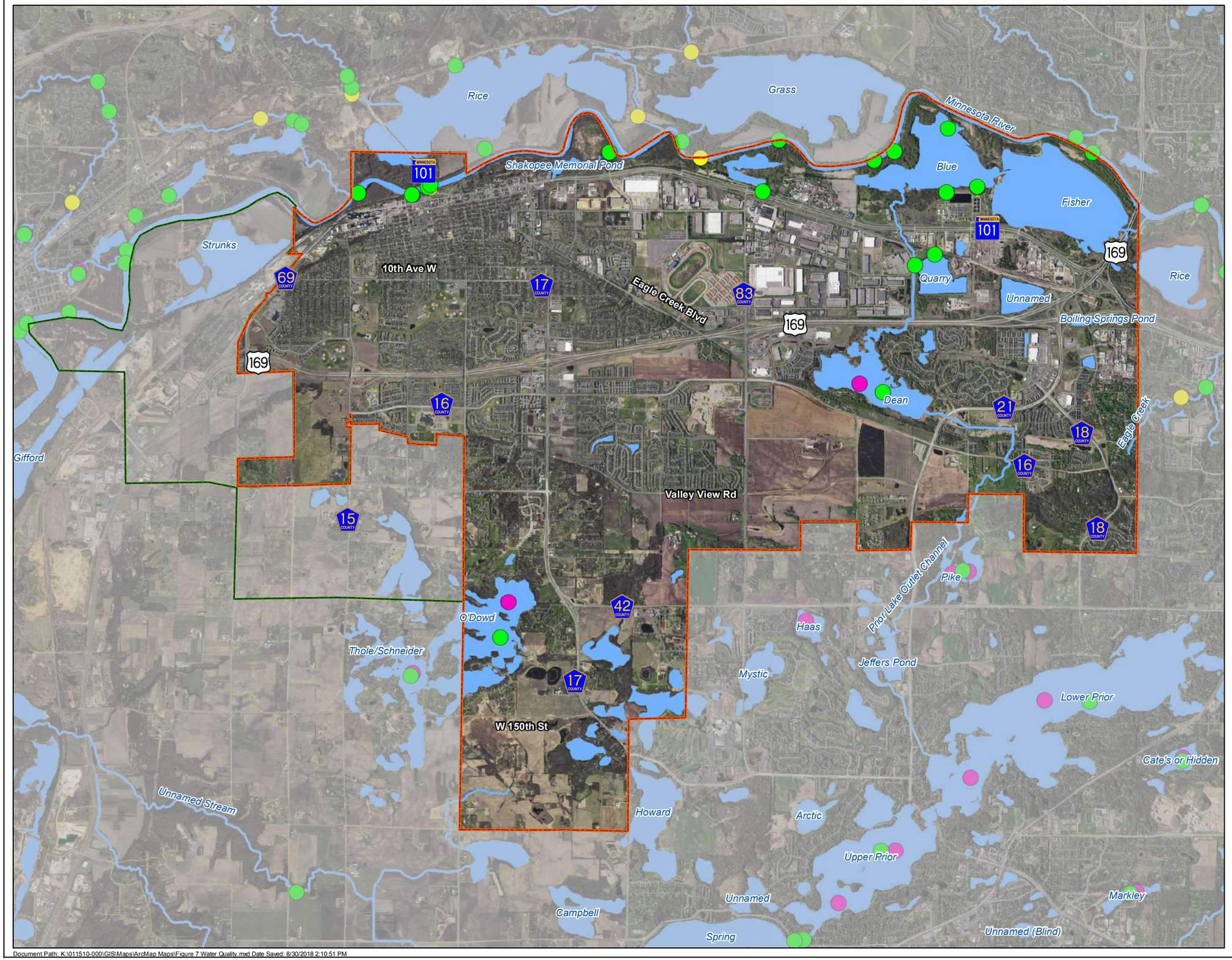


Figure 7 - Water Quality & Quantity Monitoring Locations

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary
- MPCA Monitoring Sites
- Met Council Stream Monitoring
- Met Council Lake Monitoring

Sources: MPCA Water Quality Data (2018)
Met Council Monitoring Data (2018)

N

0 4,500 Feet

wsb

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SHAKOPEE

Figure 8 - 2018 Impaired Waters

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary
- Impaired Stream
- Impaired Lake

Sources: MPCA (2018)

N

0 4,500 Feet

wsb

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SHAKOPEE

Figure 9 - Hydrologic System

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- City Boundary
- Annexation Boundary
- Stormwater Facilities
- StormLines
- Flow Direction
- Subwatersheds

N

0 4,300 Feet

wsb

Document Path: K:\011510-000\GIS\Maps\ArcMap Maps\Figure 9 Hydrologic System new.mxd Date Saved: 1/24/2019 4:11:34 PM

SHAKOPEE

Figure 9-A Mill Pond Subwatershed

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Annexation Boundary
- City Boundary
- Stormwater Facilities
- Storm Sewer
- Flow Direction
- Subwatersheds

N

0 2,000 4,000 Feet

wsb

Document Path: K:\011510-000\GIS\Maps\ArcMap Maps\Figure 9a Hyd Mill Pond.mxd Date Saved: 1/24/2019 2:39:35 PM

SHAKOPEE

Figure 9-B Blue Lake Subwatershed

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- City Boundary
- Annexation Boundary
- Stormwater Facilities
- Storm Sewer
- Flow Direction
- Subwatersheds

N

0 2,000 4,000 Feet

wsb

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SHAKOPEE

Figure 9-C Sand Creek Subwatershed

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- City Boundary
- Annexation Boundary
- Stormwater Facilities
- Storm Sewer
- Flow Direction
- Subwatersheds

N

0 1,500 3,000 Feet

wsb

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SHAKOPEE

Figure 9-D Minnesota River Subwatershed

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- City Boundary
- Annexation Boundary
- Stormwater Facilities
- Storm Sewer
- Flow Direction
- Subwatersheds

N

0 1,500 3,000 Feet

wsb

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SHAKOPEE

Figure 9-E Rice Lake Subwatershed

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- City Boundary
- Annexation Boundary
- Stormwater Facilities
- Storm Sewer
- Flow Direction
- Subwatersheds

N

0 1,000 2,000 Feet

wsb

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SHAKOPEE

Figure 9-F Eagle Creek Subwatershed

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- City Boundary
- Annexation Boundary
- Stormwater Facilities
- Storm Sewer
- Flow Direction
- Subwatersheds

N

0 1,500 3,000 Feet

wsb

Document Path: K:\011510-000\GIS\Maps\ArcMap Maps\Figure 9f Eagle Creek.mxd Date Saved: 1/29/2019 3:43:28 PM

SHAKOPEE

Figure 9-G Downtown Subwatershed

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- City Boundary
- Annexation Boundary
- Stormwater Facilities
- Storm Sewer
- Flow Direction
- Subwatersheds

N

0 1,000 2,000 Feet

wsb

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SHAKOPEE

Figure 10 - Groundwater Protection Areas

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary
- Wellhead Protection Areas

DWSMA Well Vulnerability

- Very High
- High
- Moderate

Water Appropriations

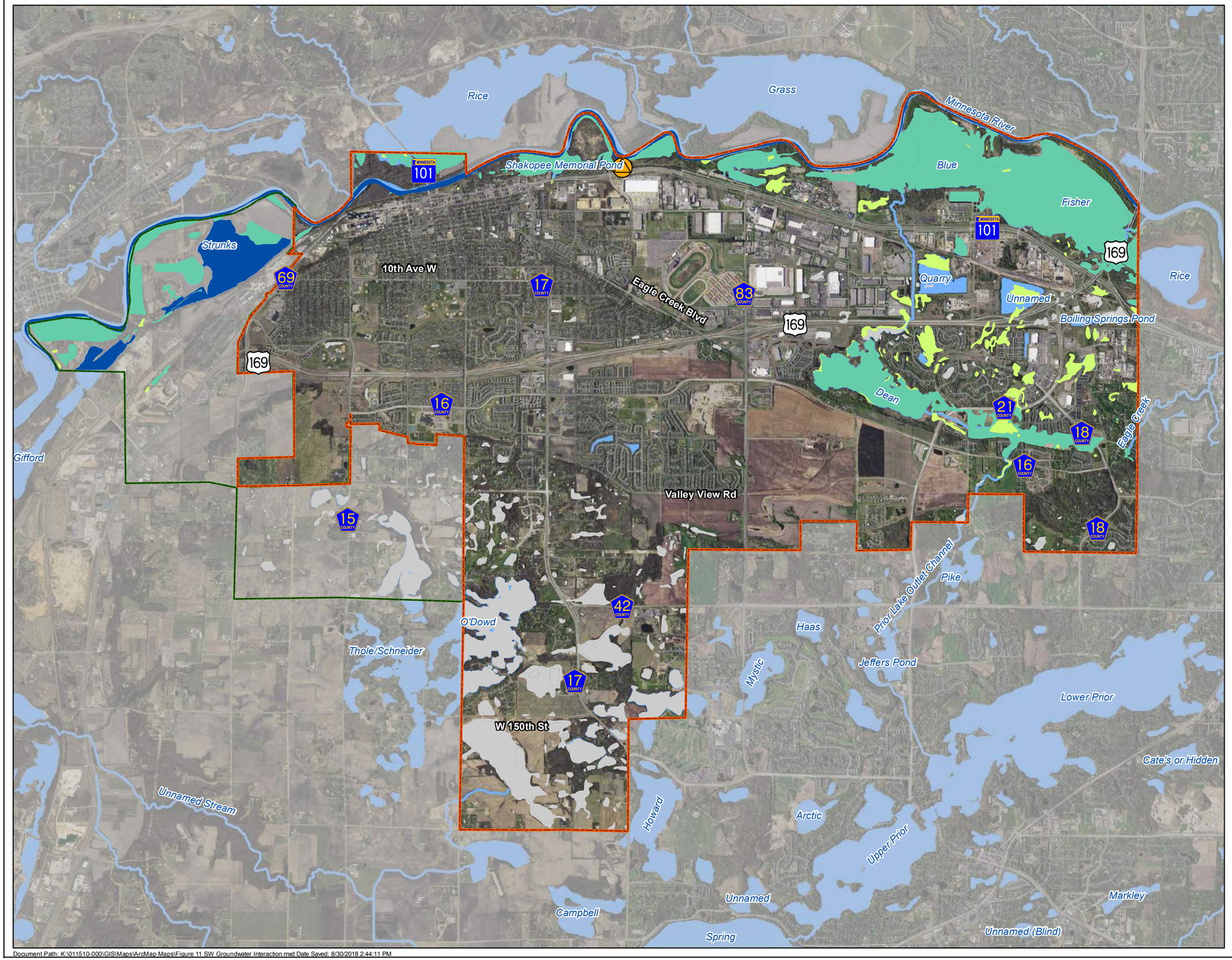
- Industrial Processing
- Major Crop Irrigation
- Non-Crop Irrigation
- Water Level Maintenance
- Waterworks

Sources: MN Department of Health (2017)
Shakopee Wellhead Protection Plan

N
0 4,500 Feet

wsb

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SHAKOPEE

Figure 11 - Surface Water & Groundwater Interaction

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary
- Groundwater Observation Well

Interaction Type

- Supported by upwelling groundwater
- Receives and discharges groundwater
- Recharges aquifers
- Disconnected from regional groundwater system

Sources: Met Council Groundwater Assessment (2010)

N

0 4,500 Feet

wsb

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SHAKOPEE

Figure 12 - FEMA Floodplain

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary
- Parcels
- Floodway
- 100 Floodplain
- 500 Floodplain

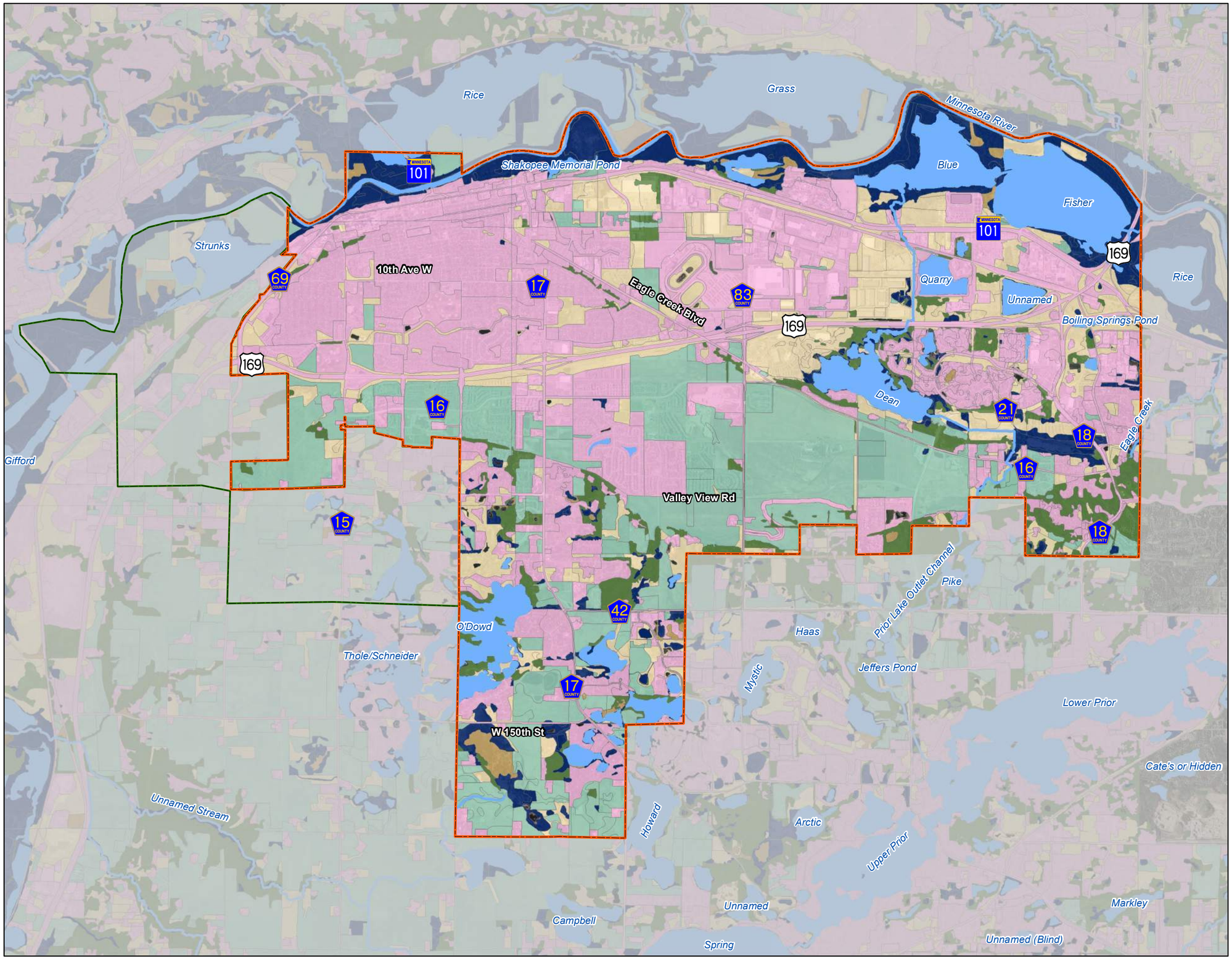
Sources: National Flood Layer, FEMA (2015)

N

0 4,500 Feet

wsb

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SHAKOPEE

Figure 13 - Minnesota Land Cover Classification System (MLCCS)

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary

MLCCS Type

- Developed Area
- Herbaceous
- Planted/Cultivated
- Forest
- Wetlands
- Shrubland
- Rock Outcrop
- Sand and Mud Flats

Source: 2018 MnDNR Land Cover Data based on the Minnesota Land Cover Classification System

N

0 4,500 Feet

wsb

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SHAKOPEE

Figure 14 - Natural Resources

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary
- Parks/Open Space
- Metro Conservation Corridors

Biodiverstiy Significance

- Outstanding
- High
- Moderate
- Below

Sources: Minnesota Biological Survey, MnDNR (2018)
MnDNR Metro Conservation Corridor (2015)

N
0 4,500 Feet

wsb

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SHAKOPEE

Figure 15 - Greenway Priority Locations

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary
- Parks and Open Space

Greenway Corridor Priority

- Good
- Better
- Best

Sources: City of Shakopee (2012)

N

0 3,500 Feet

1 inch = 4,333 feet

wsb

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SHAKOPEE

Figure 16 - Pollutant Sources

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary

Pollutant Sources

- Aboveground Tanks
- Air Quality
- Brownfields
- Emergency Management
- Feedlots
- Industrial Stormwater
- Multiple Activities
- SSTS
- Site Assessment
- Solid Waste
- Underground Tanks
- Wastewater

Sources: MPCA What's in My Neighborhood (2018)

N

0 3,500 Feet

1 inch = 4,333 feet

wsb

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SHAKOPEE

Figure 17 - Problem Areas

Shakopee Surface Water Management Plan
Shakopee, MN

Legend

- Waterbodies
- Shakopee City Boundary
- Annexation Boundary
- Issues from Section 4
- Prior Lake Outlet Channel

N

0 3,500 Feet

wsb

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