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Surface Water Management Plan

Water Resources | City of St. Louis Park

Executive Summary

City of St. Louis Park Surface Water Management Plan

Executive Summary

Located in Hennepin County just west of Minneapolis, the 10.7-square-mile City of St. Louis Park is a fully developed suburban community. The population of St. Louis Park is approximately 48,000 residents, making it the 20th largest city in Minnesota. St. Louis Park contains a variety of physical and water resources including several wetlands and small lakes, wooded areas, parks, and recreational lands, as well as the Minnehaha Creek corridor.

Two watershed management organizations (WMOs) cover St. Louis Park, each with its own governing body: the Bassett Creek Watershed Management Commission (BCWMC) and the Minnehaha Creek Watershed District (MCWD).

This local Surface Water Management Plan (SWMP) was prepared in accordance with Minnesota Statute 103B.235 and Minnesota Rules 8410 and is intended to replace the 2009 plan. The purpose of this SWMP includes objectives outlined in Minnesota Statute 103B.201 for metropolitan water management programs. According to the statute, the purposes of these water management programs are to:

- protect, preserve, and properly 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 the erosion of soil into surface water systems;
- promote effective groundwater recharge;
- protect and enhance fish and wildlife habitats and water recreational facilities; and
- secure the other benefits associated with the proper management of surface and groundwater.

This plan meets the policies and requirements of each of the WMOs within the city as well as other local, state, and federal agencies.

During the update of the SWMP, the city implemented a robust outreach and engagement plan that complemented the City of St. Louis Park's 2040 comprehensive plan and municipal separate storm sewer system (MS4) stormwater pollution prevention plan program (SWPPP) updates. Table E-1 below summarizes the outreach and engagement efforts undertaken to ensure that the SWMP-drafting team incorporated information and ideas from a diverse group of stakeholders.

Table E-1: SWMP Development Outreach and Engagement Plan

Shareholder Group	Purpose	Engagement Approaches/Timeline
Resident/public	Inform and educate	☐ Website updates (December 2017 and February, April, May, or June 2018, as appropriate) ☐ Open house (Jan 9, 2018, 6–8 p.m.) ☐ Tabling with fact sheets (e.g., at the West Metro Home Remodeling Fair: February 11, 2018, 10:30 a.m.–3 p.m.; Earth Day: April 22, 2018; Arbor Day: April 27, 2018; and Spring Cleanup Day: June 9, 2018, 8 a.m.–1 p.m.)
	Gather input	☐ Neighborhood planning workshops: "Your Voice Matters!" (November 2017 and April 2018—comprehensive plan item) ☐ Web survey (January 2018) ☐ Open house (Jan 9, 2018, 6–8 p.m.) ☐ Tabling with fact sheets (e.g., at the West Metro Home Remodeling Fair: February 11, 2018, 10:30 a.m.–3 p.m.; Earth Day: April 22, 2018; Arbor Day: April 27, 2018; and Spring Cleanup Day: June 9, 2018, 8 a.m.–1 p.m.) ☐ "Water and Coffee" discussion sessions (June 26, 2018)
Advisory partners	Inform and educate	☐ Website updates (December 2017 and February, April, May, or June 2018, as appropriate) ☐ Open house (Jan 9, 2018, 6–8 p.m.) ☐ Web survey (January 2018)
	Gather input	
	Involve	☐ Collaborative meetings to evaluate and assess SLP goals, policies, and strategies (September 2017, December/January 2018, February/March 2018)
	Consult	☐ Collaborative meetings on watershed commission and district's standards (January 2018) ☐ Implementation activities (June/July 2018)
Interdepartmental partners	Inform and educate, gather input, involve, and consult	☐ Monthly interdepartmental meetings; project team will provide agenda topics approximately one week before every meeting to allow departments to prepare for and participate in them (meetings held on the second Wednesday of each month).
Regulatory partners	Inform and educate, gather input, and consult	☐ Topic-specific meetings/conference calls with regulatory agencies to ensure the project team is interpreting its requirements correctly ☐ Regulatory plans review (August/September 2018)
Leadership partners	Inform and educate	☐ Leadership briefings

Shareholder Group	Purpose	Engagement Approaches/Timeline
	Involve	☐ Council study session (September 24, 2018, 6:30 p.m.) ☐ Council approval session (October 15, 2018, 7:30 p.m.)

The St. Louis Park SWMP sets the course for the city's management of surface water and stormwater within the city. It sets goals and policies for the city and its resources, provides data and other background information, assesses both city-wide and specific issues, and lists implementation tasks to achieve these goals. Additionally, the SWMP provides information regarding how the city might fund the implementation program. The SWMP is organized into six major chapters, as follows:

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Chapter 3	**Existing and Potential Water Resources-Related Problems**
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Chapter 2 provides technical information describing the surface and subsurface conditions of the city. Most of **Chapter 2** is devoted to presenting a city-wide inventory, including land use, climate and precipitation, topography, soils, geology, groundwater, MnDNR public waters, wetlands, surface water resource monitoring information, floodplain information, unique features and scenic areas, pollutant sources, major drainage basins, and overall drainage patterns. **Chapter 2** also includes several maps, such as city-wide maps of land use, MnDNR public waters, wetlands, drainage basins, and maps showing the drainage patterns for each major drainage basin. **Chapter 2** also includes several tables containing information such as precipitation data and water quality information.

Chapter 3 presents a summary of the general and specific water resource-related issues, problems, and challenges facing the City of St. Louis Park. These issues include water quality, stormwater runoff rate and volume, wetlands, Minnehaha Creek and erosion and sedimentation issues.

By way of its National Pollution Discharge Elimination System (NPDES) Phase-II MS4 permit, the City of St. Louis Park actively and progressively manages stormwater to protect life, property, and waterbodies within the city as well as receiving waters outside the city. **Chapter 4** of the plan presents the city's goals and policies toward meeting these goals. The following paragraphs summarize the key goals from **Chapter 4**.

Surface Water Quality Goals:

1. Manage surface water resources within St. Louis Park, with input from the public, so that the beneficial uses of wetlands, lakes, and streams remain available to the community, including aesthetic appreciation, wildlife observation, and boating.
2. Maintain or improve the quality of water in lakes, wetlands, Minnehaha Creek, and rivers within or immediately downstream of St. Louis Park, such as the Minneapolis chain of lakes, Bassett Creek and ultimately the Mississippi River.
3. Manage surface water on a regional basis to protect designated waterbodies and meet regional water quality standards in concert with the watershed organizations and the Metropolitan Council.
4. Reduce illicit discharge to the city's storm sewers and receiving waters.
5. Work to meet the phosphorous load reductions required by the city's NPDES permit, the BCWMC, and the MCWD for the City of St. Louis Park.

Chapter 4 also addresses local, state, and federal water regulations, nondegradation and total maximum daily load (TMDL) issues, and WMO requirements. The city's policies require the implementation of best management practices (BMPs) and include public education programs to better preserve surface water resources within the city (discussed in Chapter 5).

Stream Goals:

1. Maintain or enhance the natural beauty, public access, and wildlife habitats value of streams running through St. Louis Park.
2. Implement stream restoration measures wherever feasible to maintain health, safety, and ecological integrity.
3. Minimize the volume of stormwater runoff entering streams.

With these goals in mind, the policies include evaluating opportunities to increase recreation opportunities, reducing runoff from impervious surfaces, and cooperating with WMOs to implement stream restoration projects.

Wetlands Goal:

1. Protect and restore wetlands to improve or maintain their functions and values in accordance with the Minnesota Wetland Conservation Act (WCA) and the city's Wetland Management Plan.

This goal reflects the continuing role of the MCWD and BCWMC as the local government units (LGUs) responsible for administering the Wetland Conservation Act. The policies of the city conform to and support the rules and regulations of the WMOs.

Surface Water Quantity and Flooding-related Goals:

1. Manage the rate and volume of runoff entering the lakes, Minnehaha Creek and wetlands within the City of St. Louis Park.
2. Manage floodplain areas to minimize flooding and protect the functions of the floodplain.
3. Protect the public from flooding through measures that ensure public safety and prevent inundation of occupied structures.
4. Minimize flooding potential in a cost-effective manner.

Under these goals, city policies require compliance with the stormwater standards and criteria of the WMOs and this SWMP. These policies also address issues such as stormwater system maintenance and floodplain management.

Groundwater Goals:

1. Protect groundwater quality and quantity to preserve it for sustainable and beneficial purposes.
2. Manage surface water runoff to meet requirements for groundwater protection from Hennepin County, the Minnesota Pollution Control Agency (MPCA), and/or the Minnesota Department of Health (MDH).
3. Promote proper well abandonment.

The city's policies regarding groundwater include the continued implementation of the city's Wellhead Protection Plan, the promotion of infiltration BMPs where feasible, and cooperation with other agencies to promote the protection and monitoring of groundwater resources.

Erosion and Sedimentation Goal:

1. Prevent sediment from entering the city's surface water resources and minimize and control the erosion and sedimentation in drainageways within the city.

Under this goal, the SWMP includes policies regarding the submission of erosion and sediment control plans, compliance with WMO policies, MPCA NPDES construction stormwater permit, inspection of construction sites, and ensuring proper construction site debris storage and waste disposal.

Recreation, Habitat, and Shoreland Management Goals:

1. Protect and enhance wildlife habitats within St. Louis Park.
2. Maintain and enhance recreational facilities within St. Louis Park.
3. Preserve or enhance the ecological functions of shoreland areas within St. Louis Park.

Policies for these goals include encouraging the maintenance of natural, open spaces and riparian buffers and cooperating with other agencies to promote the use and protection of watershed resources.

Education and Public Involvement Goals:

1. Involve and educate residents of the city in water resource-related issues.
2. Offer programs, educational opportunities, and information that facilitate an understanding of water resource issues in St. Louis Park and downstream.

With respect to these goals, the SWMP's policies call for the city to implement education and public involvement-related BMPs identified in the city's SWPPP for its NPDES Phase-II MS4 permit.

Funding Goal:

1. Provide sufficient funding to implement measures and policies contained in this plan.

Adequate funding is essential for the city to implement its SWMP policies. Under this goal, the city's policies call for the continued use of the city's stormwater utility fee as well as the exploration of additional funding methods and opportunities.

Chapter 5 of the SWMP describes the city's implementation program to address the issues that have been identified in the SWMP, including a discussion of the following aspects:

- Water quality/NPDES Phase-II MS4 permit
- Operation and maintenance of the stormwater system
- Specific BCWMC and MCWD-related tasks
- Education and public involvement
- Costs of implementation program
- Funding sources for implementation program
- Design standards
- Local controls and regulatory responsibilities
- Specific implementation program items

Chapter 6 of the SWMP includes the references (e.g., plans, reports, studies, websites) that the team used for the development of this SWMP.

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List of Acronyms

ac	Acre
AIS	Aquatic Invasive Species
ATP	Aquifer Test Plan
BCWMC	Bassett Creek Watershed Management Commission
BMPs	Best management practices
BWSR	Minnesota Board of Water and Soil Resources
CAMP	Citizen-Assisted Monitoring Program
CD	County ditch
CFS	Cubic feet per second
CFR	Code of Federal Regulations
Chla	Chlorophyll-a
CIP	Capital Improvement Program
CJDN	Jordan Sandstone
CAMP	Citizen Assisted Monitoring Program
CLMP	Citizen Lake Monitoring Program
CLP	Clean Lakes Program
CMTS	Mt. Simon Sandstone
COE	United States Army Corps of Engineers
CSW	Construction stormwater general
CUP	Conditional use permits
CWA	Clean Water Act
CWI	County Well Index
CWL	Clean Water Legacy
CWRMP	Comprehensive Water Resources Management Plan
DCIA	Directly connected impervious area
DNR or MnDNR	Minnesota Department of Natural Resources

DS	Downstream
DWSMA	Drinking water supply management area
EAW	Environmental assessment worksheet
EIMS	Environmental Information Management System
EIS	Environmental impact statement
EMC	Event Mean Concentration
EPA	U.S. Environmental Protection Agency
EQB	Minnesota Environmental Quality Board
EQIP	Environmental Quality Incentives Program
ERA	Emergency response area
ERPs	Enforcement response procedures
ESC	Erosion and sediment control
FEMA	Federal Emergency Management Agency
FF	Flood fringe district
FIRM	Flood insurance rate map
FIS	Flood insurance studies
FP	General floodplain district
ft.	Feet
FW	Floodway district
IDDE	Illicit discharge detection and elimination
in	Inch
gal/yr	Gallons/year
GIS	Geographic information system
GP	General permit
H&H	Hydrology and hydraulic
HHPLS	Hydrologic/Hydraulic and Pollutant Loading Study
IWMZ	Inner wellhead protection management zone
ISTS	Individual sewage treatment system

JD	Judicial ditch
k	Hydraulic conductivity
LA	Load allocation
lbs.	Pounds
LCA	Local cooperation agreement
LCCMR	Legislative-Citizen Commission on Minnesota Resources
LIDAR	Light detection and ranging
LGU	Local government unit
LOP	Letter of permission
LULC	Land use and land cover
LWMP	Local water management plan
m	Meter
MAISRC	Minnesota Aquatic Invasive Species Research Center
MCMs	Minimum control measures
MCWD	Minnehaha Creek Watershed District
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MEP	Maximum extent practicable
Mg/L	Milligram per liter
MGS	Minnesota Geological Survey
MGY	Million gallons per year
MIDS	Minimal impact design standards
MnDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MnRAM	Minnesota Routine Assessment Method
MPCA	Minnesota Pollution Control Agency
MS4	Municipal separate storm sewer system
MSL	Mean sea level

MSP	Minneapolis/St. Paul
NAWCA	North American Wetlands Conservation Act
NCHF	North Central Hardwood Forest
NOAA	National Oceanic and Atmospheric Administration
NPDES	National pollutant discharge elimination system
NRCS	Natural Resources Conservation Service
NURP	Nationwide Urban Runoff Program
NWI	National wetlands inventory
NWPs	Nationwide permits
OHWL	Ordinary high water level
OPDC	Prairie du Chien Group
PCA	Project cooperation agreement
PE	Professional engineer
PLS	Public Land Survey
PPB	Parts per billion
PWI	Public waters inventory
PWS	Public water supply
RFP	Request for proposal
RFPE	Regulatory flood protection elevation
ROC	Recreation outdoor center
SD	Secchi depth
SDS	State disposal system
sf	Square feet
SLP	Saint Louis Park
SOP	Standard operating procedures
SSTS	Subsurface septic treatment system
SWB	Soil water balance
SWCD	Soil and Water Conservation District

SWCS	Soil and Water Conservation Society
SWMM	Storm Water Management Model
SWMP	Surface Water Management Plan
SWPPP	Storm Water Pollution Prevention Program
SWUDS	State water use data system
SWUF	Stormwater utility Fund/Fee Program
T	Transmissivity
TAC	Technical advisory committee
TMDL	Total maximum daily load
TP	Total phosphorus
TP-40	Technical Report 40
TSS	Total suspended solids
UMN	University of Minnesota
US	Upstream
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VIC	Voluntary investigation and cleanup
VOCs	Volatile organic compounds
VSMP	Volunteer Stream Monitoring Program
WCA	Wetland Conservation Act
WHEP	Wetland Health Evaluation Project
WHNC	Westwood Hills Nature Center
WHP	Wellhead protection
WHPA	Wellhead protection area
WHPP	Wellhead protection plan
WLA	Waste load allocation
WMO	Watershed management organization

WMP	Wetland management plan
WOMP	Watershed Outlet Monitoring Program
WRMP	Water resources management plan
yr	Year
°F	Degrees Fahrenheit

Glossary

100-year Flood: The flood event that has a 1 percent annual probability of being equaled or exceeded in any given year. This flood is a result of the critical duration 1-percent chance storm falling on the watershed. This is also commonly called the "1-percent chance flood."

Algae: Simple, rootless plants that grow in bodies of water in relative proportion to the amount of nutrients available. Algal blooms, or sudden growth spurts, can adversely affect water quality.

Aquifer: A saturated permeable geologic unit that can transmit significant quantities of water under ordinary hydraulic gradients.

Authorized Enforcement Agency: Employees or designees of the City or other governing authorities designated to enforce an ordinance

Base Flood Elevation: The elevation of the "regional flood", which is used in the flood insurance survey.

Basement: Any area of structure, included crawl spaces, having its floor or base subgrade (below ground level) on all four sides, regardless of the depth of excavation below ground level.

Best Management Practices (BMPs):

1. Practices that can be used to control urban nonpoint source pollution.
2. Schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

City: The City of St. Louis Park, including any employees, agents, contractors or designees.

Clean Water Act: The Federal Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

CWRMP: The Comprehensive Water Resources Management Plan or Surface Water Management Plan on record in the City offices.

Data Element: A specific type of information required by the Minnesota Department of Health to prepare a wellhead protection plan.

Design Storm: A rainfall event of specific return frequency and duration (e.g., a storm with a two-year frequency of occurrence and 24-hour duration) that is used to calculate runoff volumes and peak discharge rates.

Detention: The temporary storage of storm runoff that settles pollutants via gravity and is used to control peak discharge rates.

Detention Pond: An impoundment that is normally dry but is used to store water runoff until it is released from the structure and reduce peak discharge from stormwater runoff.

Discharge: Any substance entering the stormwater system by any means.

Drinking Water Supply Management Area (DWSMA): The area delineated using identifiable landmarks that reflects the scientifically calculated wellhead protection area boundaries as closely as possible (Minnesota Rules, part 4720.5100, subpart 13).

Drinking Water Supply Management Area Vulnerability: An assessment of the likelihood that the aquifer within the DWSMA is subject to impact from land and water uses within the wellhead protection area. It is based upon criteria that are specified under Minnesota Rules, part 4720.5210, subpart 3.

Emergency Response Area (ERA): The part of the wellhead protection area that is defined by one-year time of travel within the aquifer that is used by the public water supply well (Minnesota Rules, part 4720.5250, subpart 3). It is used to set priorities for managing potential contamination sources within the DWSMA.

Equal degree of encroachment: A method of determining the location of floodway boundaries so that floodplain lands on both sides of a stream are capable of conveying a proportionate share of flood flows.

Erosion:

1. The wearing away of the lands or structures by running water, glaciers, wind, and/or waves.
2. Any process that wears away the surface of the land by the action of water, wind, ice or gravity. Erosion can be accelerated by the activities of people and nature.

Erosion Control: Methods employed to prevent erosion. Examples include soil stabilization practices, horizontal slope grading, temporary or permanent cover, and construction phasing.

Erosion Control Plan: A plan detailing erosion control during construction activity as defined in the SWMP, Appendix M.

Eutrophication: The natural or artificial process of nutrient enrichment whereby a waterbody's oxygen content lessens as it becomes filled with aquatic plants.

Evapotranspiration: Water that has evaporated and transpired from soil and plant surfaces.

Flood: A temporary increase in the flow or stage of a stream or in the stage of a wetland or lake that results in the inundation of normally dry areas.

Flood frequency: The frequency for which it is expected that a specific flood state or discharge may be equaled or exceeded.

Flood fringe: The portion of the Special Flood Hazard Area (one percent annual chance flood) located outside of the floodway. Flood fringe is synonymous with the term "floodway fringe" used in the Flood Insurance Study for Hennepin County, Minnesota.

Flood Insurance Rate Map (FIRM): An official map of a community, on which the Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community.

Flood Prone Area: Any land susceptible to being inundated by water from any source.

Floodplain: Lowland area adjoining waterbodies that are susceptible to an inundation of water during a flood.

Flood proofing: A combination of structural provisions, changes or adjustments to properties and structures subject to flooding, primarily for the reduction or elimination of flood damages.

Floodway: The bed of a wetland or lake and the channel of a watercourse and those portions of the adjoining floodplain which are reasonably required to carry or store the regional flood discharge.

Geology: The science that examines the origin, history, and structure of the Earth as it is recorded in rocks, along with the forces and processes now operating to modify rocks.

Groundwater: Water underneath the ground surface that is under positive pressure.

Hazardous Materials: Any material, including any substance, waste or combination thereof, which because of its quantity, concentration; or, physical, chemical, or infectious characteristics, may cause or significantly contribute to a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Hydrology: The applied science concerned with the waters and waterbodies of the Earth in all their states—their occurrences, distribution, and circulation through the unending hydrologic cycle of precipitation, runoff, stream flow, infiltration, storage, evaporation, and reprecipitation.

Illicit Connections:

1. This is either 1) any drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the stormwater system or 2) any drain or conveyance connected from a commercial or industrial and use to the stormwater system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.
2. Any direct or indirect non-stormwater discharge to the stormwater system, except as exempted in Section 12-157 of this ordinance.

Illicit Discharge:

1. Any discharge to the municipal separate storm sewer system that is not composed entirely of stormwater, except for discharges allowed under a NPDES permit or waters used for firefighting operations.
2. Any direct or indirect non-stormwater discharge to the stormwater system, except as exempted in Section 12-157 of this ordinance

Impervious Area: Impermeable surfaces such as pavement or rooftops that prevent the infiltration of water into the soil.

Industrial Activity: Activities that are subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).

Infested Waters: waterbodies that host invasive species.

Infiltration: The entrance of water into the soil or other porous materials through interstices.

Inner Wellhead Management Zone (IWMZ): The land that is within 200 feet of a public water supply well (Minnesota Rules, part 4720.5100, subpart 19). The public water supplier must manage the IWMZ to help protect it from sources of pathogen or chemical contamination that may cause an acute health effect.

Inundation Period: Time during which flood water is temporarily stored in the wetland, exceeding the wetland's natural elevation level.

Judicial Ditch: A public drainage system established under Chapter 106 of the Minnesota Statutes and under the jurisdiction of the district court or a watershed management organization.

Land Disturbing Activity: Any activity which changes the volume or peak flow discharge rate of rainfall runoff from the land surface.

Landlocked Lake or Basin: An area with an outlet that is significantly higher than the normal water level of the lake, pond, or wetland.

Lowest Floor: The lowest floor of the lowest enclosed area (including basement).

Nationwide Urban Runoff Program (NURP): A study initiated by the EPA in 1978 to develop a consistent database and set of recommendations to be used for planning decisions about nonpoint pollution issues. This study included 28 projects across the United States that were completed independently under the direction of the EPA. This study has been used extensively in both the characterization of stormwater quality and as a guide for the implementation of management alternatives for stormwater treatment. The most-often cited management option derived from this study is a detention basin referred to as a NURP pond. The NURP study provided recommendations for the size and shape of detention ponds to provide pollutant removal efficiency.

New Construction: Structures, including additions and improvements, and placement of manufactured homes, for which the start of construction commenced on or after the effective date of an ordinance.

No Net Loss: Zero reduction in the area and value of a wetland from existing conditions.

Nonpoint Source Pollution:

1. Pollution originating at a variety of nonlocalized sources, such as street runoff, septic systems, atmospheric deposition, or groundwater.
2. Pollution from any source other than any discernable, confined and discreet conveyances, and shall include but not be limited to pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

Non-Stormwater Discharge: Any discharge to the stormwater system that is not composed entirely of stormwater.

NPDES Permit: A National Pollutant Discharge Elimination System Stormwater discharge permit issues by the MPCA that regulates discharges of pollutants to waters of the United State, whether the permit is applicable on an individual, group, or general area-wide basis.

Nutrients: Fertilizer, particularly phosphorus and nitrogen (the two most common components that run off in sediment).

Obstruction: Any dam, wall, wharf, embankment, levee, dike, pile, abutment, projection, excavation, channel modification, culvert, building, wire, fence, stockpile, refuse, fill, structure or matter in, along, across or projecting into any channel, watercourse or regulatory floodplain which may impeded, retard or change the direction of the flow of water, either in itself or by catching or collecting debris carried by such water.

One Hundred Year Floodplain: Lands inundated by the "regional flood".

Ordinary High Water Level: The boundaries of public waters and wetlands, this refers to the elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape. This is commonly the point at which natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the ordinary high water level comprises the elevation of the top of the channel's bank. For reservoirs and flowages, the ordinary high water level is the operating elevation of the normal summer pool.

Peak Discharge or Flow: The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

Permanent Stabilization Plan: A written plan to establish permanent vegetation to prevent erosion of soil.

Person: Any individual, association, organization, partnership, firm, corporation or other private or public entity recognized by law and acting as either the owner or as the owner's agent.

Pollutant: Anything which causes or contributes to pollution.

Precipitation: The total, measurable supply of all forms of falling moisture including dew, rain, mist, snow, hail, and sleet; usually expressed as depth of liquid water on a horizontal surface per day, month, or year, and often designated in terms of daily, monthly, or annual precipitation.

Premises: Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Public Waters: Any waters as defined in Minnesota Statutes, Section 103G.

Reach: Longitudinal segments of a stream defined by natural or manmade restrictions. In an urban area, the segments of the stream between two consecutive road crossings typically constitute a reach.

Recharge: Replenishment of a groundwater system by natural or artificial means.

Recurrence Interval: The average interval of time, based on a statistical analysis of actual or representative stream flow records, that can be expected to elapse between floods equal to or greater than a specified stage or discharge. The recurrence interval is generally expressed in years.

Regional flood: A flood which is representative of large floods known to have occurred generally in Minnesota and reasonably characteristic of what can be expected to occur on an average frequency in the magnitude of the 1% chance or 100-year recurrence interval. Synonymous with the term "base flood" used in the flood insurance survey.

Regulatory Flood Protection Elevation (RFPE): An elevation not less than two feet above the elevation of the regional flood plus any increases in flood elevation caused by encroachments on the floodplain that result from designation of a floodway.

Repetitive Loss: Flood related damages sustained by a structure on two separate occasions during a ten year period for which the cost of repairs at the time of each such flood event on the average equals or exceeds 25% of the market value of the structure before the flood occurred.

Retention: The holding of runoff in a basin without release except by means of evaporation, infiltration, or emergency bypass.

Riparian: A relatively narrow strip of land that borders a stream or river and often coincides with the maximum water surface elevation of the 100-year storm.

Runoff: That portion of the precipitation that is not absorbed by deep strata but finds its way into the surface water system after meeting the demands of evapotranspiration.

Secchi Disc: A circular plate used to measure the transparency or clarity of water by noting the greatest depth at which it can be visually detected. Its primary use is in the study of lakes.

Sediment: Solid matter carried by water, sewage, or other liquids.

Shoreland: Land located within the following distances from public water: 1,000 feet from the ordinary high water level of a lake, pond, or flowage; and 300 feet from a river or stream, or the landward extent of a floodplain designated by an ordinance on a river or stream, whichever is greater.

Special Flood Hazard Area: A term used for flood insurance purposes synonymous with "One Hundred Year Floodplain".

Start of Construction: The actual start of construction, repair, reconstruction, rehabilitation, addition, placement or other improvement that occurred before the permit's expiration date.

Stormwater: Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation.

Stormwater Facility: Anything within the stormwater system that collects, conveys or stores stormwater.

Stormwater Management: The use of structural or non-structural practices that are designed to reduce stormwater runoff pollutant loads, discharge volumes, peak flow discharge rates and detrimental changes that affect water quality and habitat.

Stormwater Management Plan: A plan which describes how runoff and associated water quality impacts resulting from the development will be controlled or managed.

Stormwater Pollution Prevention Plan (SWPPP): A document which describes BMPs and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to stormwater, stormwater systems and/or receiving waters to the maximum extent practicable.

Stormwater System: Facilities by which stormwater is collected and/or conveyed.

Structure:

1. Anything constructed or erected on the ground or attached to the ground or on-site utilities, including, but not limited to, buildings, factories, sheds, detached garages, cabins, manufactured homes and other similar items.
2. Anything manufactured, constructed, or erected, which is normal attached to or positioned on land, including portable structures, earthen structures, roads, parking lots or paved storage areas.

Substantial Damage: Damage of any origin sustained by a structure where the cost of restoring the structure to its before damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred.

Substantial Improvement: Within any consecutive 365-day period, any reconstruction, rehabilitation (including normal maintenance and repair), repair after damage, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the "start of construction" of the improvement.

Swale: A natural depression or A wide, shallow ditch used to temporarily store, route, or filter runoff.

Wastewater: Any water or other liquid, other than uncontaminated stormwater, discharged from a facility.

Waterbodies: Natural and manmade depressions, stormwater conveyances, and storage facilities, including wetlands, lakes, ponds, streams, and rivers.

Watercourse: A stream or body of water, or a natural or artificial channel for the passage of stormwater.

Watershed: A geographical area that collects precipitation and provides runoff to a particular collector, such as a stream, lake, or marsh.

Waters of the U.S.: Any water in the United Sates per definition as specified 33 CFR 328.a.

Wellhead Protection (WHP): A method of preventing well contamination by effectively managing potential contamination sources in all or a portion of the well's recharge area.

Wellhead Protection Area (WHPA): The surface and subsurface area surrounding a well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field (Minnesota Statutes, section 102I.005, subdivision 24).

Well Vulnerability: An assessment of the likelihood that a well is at risk to human caused contamination, either due to its construction or indicated by criteria that are specified under Minnesota Rules, part 4270.5550, subpart 2.

Wetland: A translational area between terrestrial and aquatic systems where the water table is usually at or near the surface or where the land is covered by shallow water. A more specific definition of wetland can be found in Minnesota Statute 103G.005.

CHAPTER 1.0 Introduction

City of St. Louis Park Surface Water Management Plan

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Chapter 1.0 Introduction

1.1 Location and History

Located in Hennepin County just west of Minneapolis, the 10.7-square-mile city of St. Louis Park is a fully developed suburban community. The population of St. Louis Park is approximately 48,800 residents, making it the 20th-largest city in Minnesota. St. Louis Park contains a variety of natural resources including several wetlands and small lakes, wooded areas, parks, and recreational lands, as well as the Minnehaha Creek corridor.

Two watershed management organizations cover St. Louis Park, each with its own governing body: the Bassett Creek Watershed Management Commission (BCWMC) and the Minnehaha Creek Watershed District (MCWD).

St. Louis Park's population has been relatively stable since 1980. Currently, nearly all of the city is developed. St. Louis Park's land use comprises predominantly low-density residential areas with interspersed park and open areas. Commercial, office, industrial, and other high-density land use generally occur along the major transportation corridors nearby such as Interstate 394, Highway 7, Excelsior Boulevard, Highway 100, and Highway 169.

St. Louis Park has a long and interesting history, from when the land was settled by Dakotah and Ojibway Indians to its inclusion in the 1803 Louisiana Purchase, its settlement by European and American-born farmers in the 1850s, its progression from a township to a village in 1886, and finally to becoming an incorporated city in 1954.

In 1851, Indian tribes signed an agreement allowing settlement of lands west of Fort Snelling, and by the 1850s, farmers began settling in the area that is now St. Louis Park. By 1873, two railroads passed through St. Louis Park, connecting the flour mills in Minneapolis with the grain fields in the west. Community leaders believed that the railroad would help transform the village into a center of trade and industry. In 1886, the area known as Elmwood was incorporated into the village of St. Louis Park. Originally, the village center was located at the intersection of the Minneapolis and St. Louis railroad (now the Canadian Pacific railroad) and Wooddale Avenue. However, the original concentric pattern was eventually outgrown by the rising population of Minneapolis.

In the 1890s, St. Louis Park's commercial development was concentrated in the village center. However, this development was limited by the financial panic of 1893 and the depression of the late 1890s. By the end of World War I, only seven scattered retail stores operated within St. Louis Park. Street cars limited local enterprise, too, in that they provided easy access to more reliable commercial opportunities in Minneapolis. The lumber baron Thomas Barlow Walker and other wealthy industrialists incorporated the Minneapolis Land and Investment Company, which started to develop St. Louis Park for industrial, commercial, and residential use. They sought to maintain Minneapolis' economic advantage over St. Paul. In 1892, Walker's company platted about 1,000 acres using a layout influenced by George Pullman's "model city." This subdivision plan, called the "rearrangement of St. Louis Park," was organized around a grid of

streets, street car lines, railroads, and railroad spurs that served the needs of a growing industrial suburb.

Development occurred rapidly in the early 1890s but slowed with the downward turn of the economy. However, despite the financial panic of 1893, marked by the collapse of railroad companies and bank failures, land speculation continued, and subdivision of land occurred in sporadic and erratic patterns. In 1933, Carol W. Hurd headed a committee to rectify the inconsistent street naming that these erratic subdivisions caused. The city's current street naming conventions are the result of Hurd's effort.

Vigorous home-building occurred in the later 1930s but came to a halt with World War II. Following the war, in the late 1940s and the 1950s, 60 percent of the city's residential housing stock was constructed. However, the later subdivisions no longer used the grid pattern typical of the older sections of St. Louis Park. Rather, these new developers utilized the new suburban ideals of cul-de-sacs and curvilinear streets. Most of the recent residential developments in St. Louis Park are not single-family homes but multiunit apartment and condominium buildings.

As transportation shifted to the automobile in the 1940s, the retail and service sectors followed suit. In the 1940s, Lilac Way, the first shopping center in the state, was constructed on the northeast corner of Highway 100 and Excelsior Boulevard. It was demolished in the late 1980s for a redevelopment project. Just south of this area, the Miracle Mile Mall was constructed in 1950 and still prospers today.

In 1956, Knollwood Mall was constructed. It was one of the largest shopping centers in the western suburbs until the construction of the Southdale and Ridgedale Malls in Edina and Minnetonka, respectively. Another significant commercial development to occur in St. Louis Park is the Excelsior and Grand redevelopment project located on Excelsior Avenue between France Avenue and Highway 100. Completed in 2007, Excelsior and Grand is a mixed-use development with first-floor commercial areas and multifamily residential living spaces on the floors above. Conveniently located just west of downtown Minneapolis, The West End is an up-tempo mixed-use development approximately 40 acres located at the southwest corner of I-394 and Highway 100. The West End development include The Shops at West End: 350,000-square-foot lifestyle center, 30,000-square-foot office (completed 2009), Flats at West End: 119-unit apartment building (completed 2013), Millennium at West End Apartments: 158 units (completed 2015), Central Park West: 5 buildings of apartments, a hotel, office spaces and multi-family residential properties to be completed between 2017 – 2022. In general, the city plans to manage land use in the future by increasing the number of multifamily and mixed-use developments.

Some of the city's first parks were dedicated by the original subdividers of the city. Other lands became parks and open spaces through tax forfeiture. These lands were essentially low, wet areas with soil that was unstable for building purposes. Overall, park land was not acquired according to any overall plan or system. In the 1950s, city officials recognized that the city's population growth was occurring at a faster rate than the community could manage. In 1959,

the city had its first park bond sale to acquire land and improve its parks and open spaces. Today, the city has 72 parks and open space areas that span over 820 cumulative acres.

Because much of the city developed before many major standards and regulations related to wetlands, water quantity, and water quality were implemented, the city has had to retroactively update its surface water management and treatment infrastructures. As this redevelopment occurs, stormwater management practices can be incorporated into the system.

In 2001, the city developed its first "City of St. Louis Park Comprehensive Water Resource Management Plan." The document established a stormwater management plan for the city, integrating flood control with wetland and water quality needs.

1.1.1 City of St. Louis Park: Vision

In 1994, St. Louis Park undertook its first visioning process, "Vision 1.0: A Community of Choice for a Lifetime," to capture ideas from citizens on the overall direction of the city. At the time, citizens were concerned about a lack of a downtown and wanted more sidewalks and bike paths, among other things. It made a decisive move toward determining its own destiny. Over the next ten years, the city worked to build the rec center and aquatic center, Wolfe Park, the amphitheater, Excelsior and Grand, the St. Louis Park parks and trails plan, housing opportunities, and stronger neighborhoods. Since the success of Vision 1.0, the city continues to reevaluate and update its vision every decade with greater community involvement.

In 2005 and 2006, teams consisting of participants from throughout the community worked for six months to develop a community-wide strategic action plan called "Vision 2.0: Discover, Dream, Design." This effort was aimed at creating a unique community that people would want to call home. The groups involved in developing the plan included representatives from the government, schools, businesses, community organizations, religious institutions, and neighborhoods. The purpose of Vision 2.0 was to develop goals for the future of St. Louis Park as well as the action steps, timelines, and potential partnerships. The focus of Vision 2.0 was to consider eight major community components: arts and culture, the environment, transportation, gathering places, sidewalks and trails, housing, community events, and diversity.

Because the environment is one of these eight major components, St. Louis Park vows to remain committed to being a leader in environmental stewardship. One goal is to increase environmental consciousness and responsibility in all areas of city business. This includes encouraging green building designs, the creation of open spaces, and environmental innovations.

"Vision 3.0: A Place for All People" was launched and completed in 2017, with a major focus on engaging as many citizens as possible. In Vision 3.0, residents reported that they valued "care [for] and enjoyment of the natural environment," and they identified "climate change" as a top issue facing the city. They recommended that the city "continue to lead in environmental stewardship and ensure access to green space for [the] future." For more

information about Vision 3.0, see the following website: https://www.stlouispark.org/our-city/about-us/vision-st-louis-park.

1.2 Purpose and Scope

The Surface Water Management Plan (SWMP) is a local water management plan prepared in accordance with Minnesota Statute 103B.235 and Minnesota Rules 8410. The purpose of the SWMP includes those purposes listed in Minnesota Statute 103B.201 for metropolitan water management programs:

- to protect, preserve, and responsibly use natural surfaces, groundwater storage, and retention systems;
- to minimize the public capital expenditures needed to correct flooding and water quality problems;
- to identify and plan for a means to effectively protect and improve surface and groundwater quality;
- to establish more uniform local policies and official controls for surface and groundwater management;
- to prevent erosion of the soil into surface water systems;
- to promote effective groundwater recharge;
- to protect and enhance fish and wildlife habitats and water recreational facilities; and
- to secure other benefits associated with proper management of surface and ground water.

The SWMP meets the policies and requirements of the Minnehaha Creek Watershed District and Bassett Creek Watershed Management Commission, as well as other local, state, and federal agencies. This SWMP was designed to further the city's vision statements, guiding goals and policies toward surface water management, preservation, and capital improvement program and plans. Those vision statements are as follows:

- Ensure every person understands the stormwater and natural systems and where their water goes and encourage people to change their actions to positively influence those systems.
- Incorporate a city-wide, integrated, and collaborative approach to maximizing stormwater and natural system opportunities through landuse changes.
- Collaborate beyond expectations to further define and utilize our resources and better manage stormwater and our natural systems to revitalize and connect our community and guarantee our future resilience.
- Position natural systems in balance with the built environment to place the community as a vibrant, resilient regional land use and water resource management leader.

- .

1.3 Plan Organization

The SWMP sets the course for the city's management of surface water and stormwater. It provides data and other background information, outlines the applicable regulations, assesses city-wide and specific issues, sets city-wide surface water goals and policies, and lists implementation tasks to achieve the goals. It also provides information regarding the funding of the implementation program. The SWMP is organized into six major chapters, summarized as follows:

Executive Summary: The executive summary provides the highlights of the SWMP, including the SWMP purpose and scope, goals, policies, and implementation tasks.
Chapter 1.0 Introduction: Chapter 1 provides general background information on the city's history of surface water management, including a summary of water management agreements and Minnesota regulatory framework.
Chapter 2.0 Physical Environment and Land Use: Chapter 2 provides technical information describing the surface and subsurface conditions of the city. Most of this chapter presents a city-wide inventory of climate and precipitation, topography, soils, geology, groundwater, public waters, wetlands, surface water monitoring information, floodplain information, unique features and scenic areas, pollutant sources, major basins, and overall drainage patterns. Chapter 2 also includes a number of maps, such as city-wide maps of land use, Minnesota Department of Natural Resources (MnDNR) public waters, wetlands, and drainage basins, as well as maps showing the drainage patterns for each major drainage basin. It also includes a number of tables such as precipitation information and water quality information.
Chapter 3.0 Existing and Potential Water Resource-Related Problems: Chapter 3 assesses challenges the city faces in managing stormwater in a fully built environment on behalf of the public. This section discusses the overall adequacy of the city's ordinances and official controls, jurisdictional issues, education and public involvement program, maintenance, and funding.
Chapter 4.0 Goals and Policies: Chapter 4 presents the goals and policies of the city. It describes the components of the city's SWMP implementation program, including its National Pollutant Discharge Elimination System (NPDES), its Phase-II municipal separate storm sewer system (MS4) permit, information on the operation and maintenance of stormwater systems, and information about education and public involvement.
Chapter 5.0 Implementation Program: Chapter 5 presents funding, ordinance implementation and official controls, implementation priorities, detailed implementation plan, and budget.
Chapter 6.0 References: Chapter 6 lists the documents and other references used in the preparation of the SWMP.

1.4 Plan Update and Amendment Procedures

This SWMP guides the City of St. Louis Park's activities through 2027 or until it is superseded by the adoption and approval of a subsequent SWMP. The city will begin the process of updating this plan one to two years before its expiration date. The updated plan will meet the requirements of applicable Minnesota laws and rules, the BCWMC, and the MCWD.

The city must revise this SWMP through an amendment prior to the next update of the plan if minor changes are required, BCWMC or MCWD updates their respective watershed management plans or if problems arise that are not addressed in the SWMP. However, this SWMP remains in full effect until an updated SWMP can be approved by the BCWMC and the MCWD.

Any significant changes to this SWMP must be approved by the BCWMC, the MCWD and Metropolitan Council. Minor changes to this SWMP will not require WMO approval and can be made by city staff, but WMOs must be promptly informed. The city considers minor changes to be those that do not modify the goals, policies, or commitments identified in the SWMP. Examples of minor changes include the following:

- the inclusion of new or corrected hydrologic modeling results and mapping, as long as the changes do not significantly affect the rate or quality of intercommunity stormwater runoff;
- adjustments to subwatershed boundaries, provided that the changes will have no significant impact on the rate or quality in which stormwater runoff is discharged from the city boundaries;
- the inclusion of new/updated water quality monitoring data;
- minor changes to the city's implementation program, such as added or removed projects, schedule changes, and revised cost estimates, as long as there are no intercommunity impacts of such changes and so long as the changes stem from the goals and policies listed in the SWMP; and
- revisions to the city's design guidelines and standards to reflect the new BCWMC and MCWD rules, and other applicable regulations if the changes do not result in less stringent requirements.

If it is unclear whether a proposed SWMP change is minor or not, the city will bring the issue to the BCWMC and the MCWD for determination. The city's amendment procedure for significant changes to the SWMP is as follows:

1. **Preparation**: City staff prepare and review the SWMP amendment.
    - Significant changes shall be made known to the following parties:
        1. The city manager, director of inspections, engineering director, community development director, and operations and recreation director

2. The City of St. Louis Park engineering department, community development department, and operation and recreation department.
3. All affected watershed management organizations in Hennepin County, and the Metropolitan Council

2. **Consideration**: The city council will consider the SWMP amendment as prepared by staff. The council can either approve or deny submitting the amendment for WMO review and approval. If the city council votes to submit the amendment for WMO approval, the council also needs to determine when/if a public hearing or other public process should be undertaken.
3. **Submission, Review, and Approval**: The proposed SWMP amendment is submitted to the BCWMC and the MCWD for review and approval. The review process for a SWMP amendment is the same as it was for the original SWMP. The WMOs have 60 days to review and comment on the proposed SWMP amendment.
4. **Adoption**: If both WMOs approve the SWMP amendment, the city council will adopt the SWMP amendment.

1.5 Water Resources-Related Agreements

The City of St. Louis Park has entered into several surface water-related agreements over the years that have affected how the city manages its surface water. These agreements include:

1. A Joint and Cooperative Agreement for the Establishment of a Bassett Creek Watershed Management Organization to Plan, Control and Provide for the Development of Bassett Creek, August 29, 2014.
2. Cooperative Agreement, City of St. Louis Park and Minnehaha Creek Watershed District, Powell Road Stormwater Diversion Project, January 29, 2015
3. Memorandum of Understanding between the Minnehaha Creek Watershed District and the City of St. Louis Park for Local Water Planning Regulations, March 24, 2016
4. 2017 Water Education Activities Letter of Understanding between Bassett Creek Watershed Management Commission and the City of St. Louis Park, February 21, 2018.

The agreement is included in **Appendix A**.

1.6 Regulatory Framework/Agency Responsibilities

Various units of government are involved in water-resource related activities, including the City of St. Louis Park, watershed management organizations, the Metropolitan Council, Hennepin County, the MnDNR, the Minnesota Board of Water and Soil Resources (BWSR), the Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Health (MDH),

the Minnesota Environmental Quality Board (EQB), the Minnesota Department of Transportation (MnDOT), and the US Army Corps of Engineers (COE).

1.6.1 City of St. Louis Park

St. Louis Park actively and progressively manages stormwater to protect life, property, and waterbodies within the city as well as receiving waters outside the city. To this end, St. Louis Park creates and implements regulatory programs that accomplish these aims. This SWMP serves as the city's guide for operating and maintaining the city's stormwater system. It also maps out the general direction the city will take in planning for the future.

The city intends to continue its implementation of the following water resource-related elements of the St. Louis Park code of ordinances as well as the city's stormwater pollution prevention program, its wetland management plan, and its floodplain district ordinance.

The city requires permits and/or approvals for land use modifications that result in land disturbance (including redevelopment), depending on the type of project. See **Chapter 5** for a complete list of permits and approvals potentially required by the City of St. Louis Park.

The BCWMC and MCWD act as the local government unit (LGU) responsible for administering the wetland conservation act (WCA) in St. Louis Park.

The city is responsible for informing developers and other project applicants regarding the city's requirements. It is their responsibility to comply with BCWMC, MCWD, and other regulatory agencies.

The city is required to meet the conditions of its NPDES MS4 permit and to implement the St. Louis Park Stormwater Pollution Prevention Program (SWPPP). The city continues to actively engage the MPCA and others to keep its permit and implementations up to date regarding technology and regulations.

More information is available at the city's website: www.stlouispark.org.

1.6.2 Watershed Management Organizations

The Metropolitan Surface Water Management Act (Chapter 509, as per the laws of 1982, Minnesota Statute Section 103B.201 to 103B.255, as amended) establishes requirements for watershed management organizations to prepare watershed management plans within the Twin Cities Metropolitan Area. The law requires these plans to focus on the purpose of these organizations, which is to:

- protect, preserve, and responsibly use natural surfaces, 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 effective groundwater recharge;
- protect and enhance fish and wildlife habitats and water-based recreational facilities; and
- secure other benefits associated with the proper management of surface and ground water.

The city lies within two watershed management organizations, each with its own governing body: the BCWMC and the MCWD, as described below.

1.6.2.1. Bassett Creek Watershed Management Commission (BCWMC)

The BCWMC encompasses land within nine communities: St. Louis Park, Crystal, Golden Valley, Medicine Lake, Minneapolis, Minnetonka, New Hope, Plymouth, and Robbinsdale. The BCWMC's current Watershed Management Plan was adopted by the commission in September 2015. The BCWMC's plan sets the vision and guidelines for managing surface water within its boundaries.

The BCWMC does not issue formal permits. Instead, the member cities must implement the BCWMC's development policies. The BCWMC or its staff sends a letter of approval to each member city, stating that each proposed project meets the requirements of the BCWMC plan. This occurs prior to the city issuing its construction permit or other approval permit. The BCWMC also reviews applications to the MnDNR for public waters work and appropriations permits.

The BCWMC provides leadership and assists member communities with certain water management issues. It also coordinates intercommunity stormwater runoff planning and design. The BCWMC reviews local water management plans for conformance with its goals, policies, and rules and for the sake of intercommunity consistency.

More information is available at the BCWMC website: www.bassettcreekwmo.org.

1.6.2.2. Minnehaha Creek Watershed District (MCWD)

The MCWD consists of 27 cities and 2 townships on the western edge of the Twin Cities area. The MCWD adopted its most recent watershed management plan, the Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan, on January 11, 2018.

The MCWD is a political subdivision created under state law and exists to pursue water resource management purposes set forth in Minnesota Statutes 103B.201 and 103D.201. The mission of MCWD is to collaborate with public and private partners to protect and improve land and water for future generations. As established through the Water

Management Plan, MCWD's organizational philosophy recognizes that the natural environment is an integral component of vibrant communities and creates a sense of place, provides vital connections, and enhances social and economic value. This philosophy stems from the MCWD's Balanced Urban Ecology policy. The Balanced Urban Ecology Policy is grounded in the principles of focusing on high priority projects, partnership to pursue watershed management goals, and exercising flexible when considering the needs of its partners. MCWD is especially interested in the partnership with St. Louis Park due to significant, ongoing land use planning and development in the City. Through this Plan cycle, coordination and holistic planning between St. Louis Park and MCWD will continue, to pursue Greenway expansion, regional stormwater management, flood management while leveraging the asset value of St. Louis Park's natural resources to enhance community connections and the built environment.

More information is available at the MCWD website: www.minnehahacreek.org.

1.6.3 Metropolitan Council

The Metropolitan Council (Council) provides regional planning and wastewater services (i.e., collection and treatment) for the seven-county metropolitan area. It also reviews and comments on watershed management plans, local water management plans, and local comprehensive land use plans. It also maintains the following programs:

- The Watershed Outlet Monitoring Program (WOMP)with BCWMC
- The Citizen-Assisted Monitoring Program (CAMP)
- The Environmental Information Management System (EIMS)
- The Regional Master Water Supply Plan for the Metropolitan Area

In 2015, the Council adopted the 2040 Water Resources Policy Plan (WRPP) which presents policies and strategies focused on supporting prosperity, livability, equity, sustainability, and stewardship, outcomes identified in Thrive MSP 2040. The WRPP highlights the importance water resources management plays in achieving economic growth, competitiveness, and high quality of life. The WRPP provides regional strategy for balancing demands of growth with the protection and management of our lakes, rivers, streams, wetlands, and groundwater through integrated planning for wastewater, water supply, and surface water management.

More information is available at the Metropolitan Council's website: www.metrocouncil.org.

1.6.4 Hennepin County

Hennepin County plays a role in surface and groundwater protection and management through implementation of its Natural Resources Strategic Plan (2015 through 2020). Since 2014, the county has taken the lead role in delivering soil and water conservation services throughout the county with all duties and authorities of the Soil and Water Conservation District. The county's goals, objectives, and strategies include working to protect and restore

lakes, rivers, streams, and wetlands; to preserve the health of aquatic ecosystems; to meet applicable standards for fishing and recreation; and to ensure that water supplies are sustainable.

The county offers a variety of programs that provide funding and technical assistance to projects for surface and groundwater protection plans. The county monitors and enforces rules regarding subsurface septic treatment systems (SSTS) and administers a well-sealing, cost-share program.

More information is available at the Hennepin County website: https://www.hennepin.us.

1.6.5 Minnesota Department of Natural Resources (MnDNR)

The MnDNR Ecological and Water Resources Division manages water resources through a variety of programs in its water resources, groundwater, floodplain management, and climatology sectors. The MnDNR administers the public waters work permit program, the water appropriation permit program, the dam safety permit program, the aquatic plant management control permit program, and other fishery-related permits.

More information is available at the MnDNR website: www.dnr.state.mn.us.

1.6.6 Minnesota Board of Water and Soil Resources (BWSR)

The BWSR oversees the state's watershed management organizations (joint powers, county, and watershed district organizations) and the state's soil and water conservation districts, and it administers rules for WCA and metropolitan-area watershed management.

The BWSR also provides funding to LGUs to deliver soil and water conservation services. Grant funds from the BWSR support and increase the local capacity to implement programs and leverage ongoing partnerships with cities and WMOs.

More information is available at the BWSR website: www.bwsr.state.mn.us.

1.6.7 Minnesota Pollution Control Agency (MPCA)

The MPCA administers the State Discharge System/NPDES Permit Program (e.g., point source discharges of wastewater), the NPDES General Stormwater Permit Program for Construction Activity, the NPDES General Industrial Stormwater Permit Program, the NPDES Phase-I and Phase-II Stormwater MS4 Permit Programs, and the individual sewage treatment system regulations (per Minnesota Rules 7080). The MPCA also reports the state's "impaired waters" to the U.S. Environmental Protection Agency (EPA) and facilitates the development of total maximum daily load reports and implementation plans.

The MPCA administers and enforces laws relating to pollution of the state's waters, including groundwater, as well as Section 401 of the Clean Water Act—the Water Quality Certification program, which is primarily administered by the COE. Section 401 certification is required to obtain a federal permit for any activity that will result in a discharge to navigable waters in the United States. Formal applications for 401 certifications

must be sent to the MPCA. The MPCA also monitors ambient groundwater quality and administers septic system design and maintenance standards.

More information is available at the MPCA website: www.pca.state.mn.us.

1.6.8 Minnesota Department of Health (MDH)

The MDH is the official state agency responsible for addressing environmental health matters, including groundwater protection. The MDH administers the Well Management Program, the Wellhead Protection Program, and the Safe Drinking Water Act. The MDH also issues fish-consumption advisories. The MDH is responsible for preventing pollution of water supplies to ensure safe drinking water sources and to limit public exposure to contaminants. Through implementation of the federal Safe Drinking Water Act, the MDH conducts the Public Water Supply Program, which allows it to monitor groundwater quality and train water supply system operators. As part of its role in wellhead protection, the MDH developed a guidance document called "Evaluating Proposed Stormwater Infiltration Projects in Drinking Water Supply Management Areas" (MDH, 2016).

More information is available at the MDH website: http://www.health.state.mn.us/divs/eh/water/index.html.

1.6.9 Minnesota Environmental Quality Board (EQB)

The EQB is made up of nine agency heads from the departments of administration, agriculture, commerce, employment and economic development, health, natural resources, transportation, the BWSR, and the MPCA, and as well as citizen members. The agency provides leadership and coordination across agencies on priority environmental issues that are multijurisdictional and multidimensional as well as opportunities for public access and engagement through the state's environmental review program including environmental assessment worksheets (EAWs) and environmental impact statements (EISs).

More information is available at the EQB website: www.eqb.state.mn.us.

1.6.10 Minnesota Department of Transportation (MnDOT)

As part of the 2003 and subsequent NPDES permits, the MnDOT metro district was required to develop and implement a SWPPP to reduce the discharge of pollutants from the storm sewer system to the maximum extent practicable.

The primary goal of MnDOT is to develop and implement its SWPPP program so that it is consistent with other permitted entities and to ensure uniform regulatory environments for the public. Any work done on or affecting MnDOT property must be approved by MnDOT.

More information is available at the MnDOT website: http://www.dot.state.mn.us.

1.6.11 U.S. Army Corps of Engineers (COE)

The COE administers the Section 10 of the Rivers and Harbors Act and Sections 401 and 404 of the Federal Clean Water Act Permit Program and the Section 404 Permit Program.

Section 404: Authorizations. The Federal Clean Water Act requires that anyone who wants to discharge dredged or fill material into U.S. waters, including wetlands, must first obtain a Section 404 permit from the COE. Examples of activities that require a Section 404 permit include construction of boat ramps, placement of riprap for erosion protection, placing fill in a wetland, building a wetland, construction of dams or dikes, stream channelization, and stream diversion.

When Section 404 permit applications are submitted to the COE, the applications are typically posted to the U.S. Fish and Wildlife Service, the U.S. Forest Service, the EPA, and other federal agencies to review and provide comments on the application. The COE evaluates permit requests for the potential impact to various functions and values of the wetland.

Section 401: Water Quality Certifications. A Section 401 water quality certification may be granted if an applicant demonstrates that a proposed activity "will not violate Minnesota's water quality standards or result in adverse long-term or short-term impacts on water quality." Greater protection is given to a category of waters designated as "outstanding resource value waters." The waters in this category have received this designation because of their exceptional value. These include scientific and natural areas; wild, scenic, and recreational river segments; and calcareous fens.

More information is available at the COE website: www.usace.army.mil.

Chapter 2.0 Physical Environment and Land Use

City of St. Louis Park Surface Water Management Plan

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Chapter 2.0 Physical Environment and Land Use

This chapter of the SWMP provides a technical description of the City of St. Louis Park and its water resources. General concepts and data related to climate and precipitation, topography, soils, geology, and land use are discussed. In addition, the following water resources data are discussed: surface water resources, stormwater systems, wildlife habitat, pollutant sources, water quality and quantity and groundwater resources

Having a complete understanding of the physical environment helps identify management issues, resolve problems, and provides the basis for the city's goals, policies, and implementation strategies.

2.1 Climate and Precipitation

Because of its location near the center of the North American continent, St. Louis Park (and Minnesota at large) has a continental climate, meaning that it experiences a wide variation in climate conditions (e.g., droughts, floods, heat, and cold).

The mean annual temperature for St. Louis Park is 46.8°F, as measured at the Minneapolis-St. Paul (MSP) airport (1987–2017). Mean monthly temperatures vary from 16.3°F in January to 74.1°F in July (1987–2017). Extreme temperatures on record include a high of 105°F on July 31, 1988, and a low of -32°F on February 2, 1996. For the period of 1987–2017, the average date for the latest occurrence of freezing temperatures is April 25, whereas the average date for the first autumn frost is October 12. The average frost-free period (growing season) is 170 days. **Table 2-1** summarizes precipitation data measured at the MSP airport. Average total annual precipitation (1987–2017) is 32.0 inches and has ranged from a low of 19.9 inches in 1988 to a high of 40.3 inches in 2016. The mean monthly precipitation (1987–2017) varies from 0.83 inches in February to 4.69 inches in July. From May to September, the growing season months, the average rainfall (1987–2017) is 20.15 inches, or about 63 percent of the average annual precipitation. Average annual evapotranspiration is 34.6 inches (1987–2017). Table 2-1 and Figure 2-2 show the average monthly precipitation measured at the MSP airport. Figure 2-1 shows the average monthly maximum and minimum temperatures measured at the MSP airport.

Table 2-1: Precipitation Summary—Minneapolis-St. Paul Airport

	Total Precipitation (Inches)				Snow (Inches)	
Month	**Mean**	**Max. Year**	**Min. Year**	**One-day Max**	**Mean**	**Max Year**
Jan.	0.84	2.39 1996	0.12 1990	0.90 1/17/1990	10.2	33.3 1999
Feb.	0.83	2.11 2012	0.03 1987	0.85 2/20/2011	8.6	19.7 2004
Mar.	1.77	3.88 1990	0.41 1994	1.52 3/27/1998	8.8	22.7 1989

	Total Precipitation (Inches)				Snow (Inches)	
Month	**Mean**	**Max. Year**	**Min. Year**	**One-day Max**	**Mean**	**Max Year**
Apr.	2.86	6.99 2001	0.15 1987	2.59 4/6/2006	3.1	20.2 2002
May	3.57	9.17 2012	0.15 1987	2.58 5/24/2012	0.0	0.5 2013
Jun.	4.65	11.02 2014	0.13 1988	4.13 6/19/2014	0.0	N/A
Jul.	4.69	13.98 1987	1.07 1988	9.15 7/23/1987	0.0	N/A
Aug.	4.17	10.11 2016	0.35 2003	3.19 8/19/1997	0.0	N/A
Sep.	3.07	8.43 1991	0.95 2011	2.59 9/15/1992	0.0	N/A
Oct.	2.5	5.95 2009	0.55 1999	4.61 10/4/2005	0.9	8.2 1991
Nov.	1.77	5.45 1996	0.08 2002	1.85 11/1/1991	7.3	46.9 1991
Dec.	1.24	3.28 2010	0.28 1997	1.16 12/11/2010	11.5	33.6 2011
Annual	31.98	41.65 2016	19.93 1988	9.15 7/23/1987	49.0	86.6 2010–11
May–Sep.	20.15	28.02 2002	10.09 1996	9.15 7/23/1987	0.0	N/A

Source: Minnesota DNR Climate Data, https://www.dnr.state.mn.us/climate/historical/acis_stn_meta.html

Figure 2-1: Average Monthly High and Low Temperatures at Minneapolis-St. Paul International Airport (1987–2017)

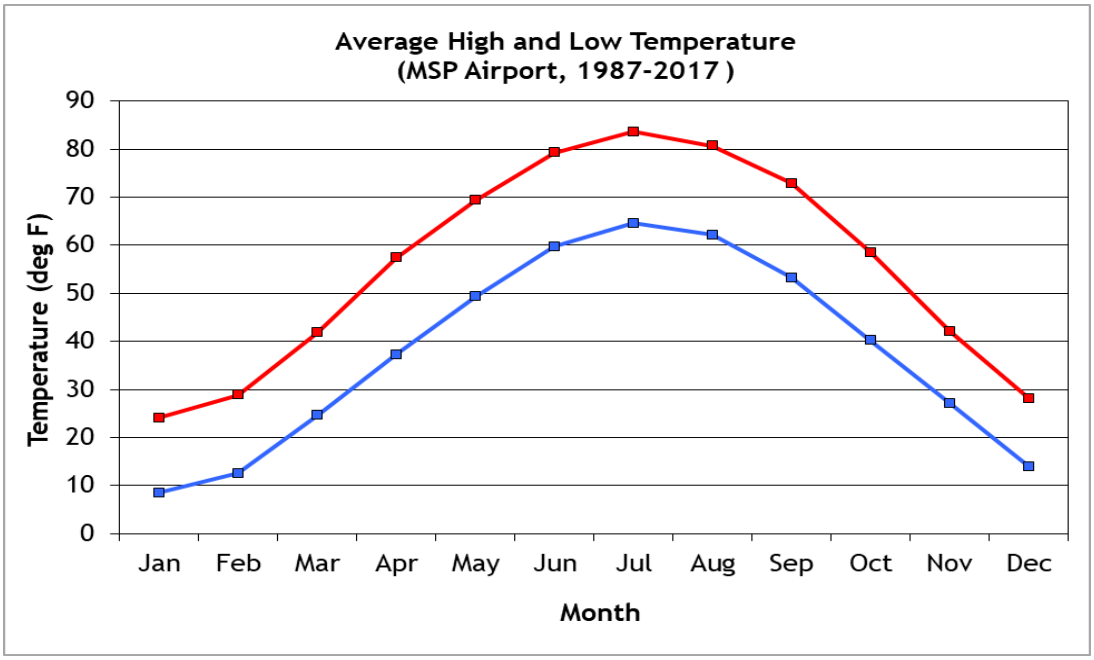
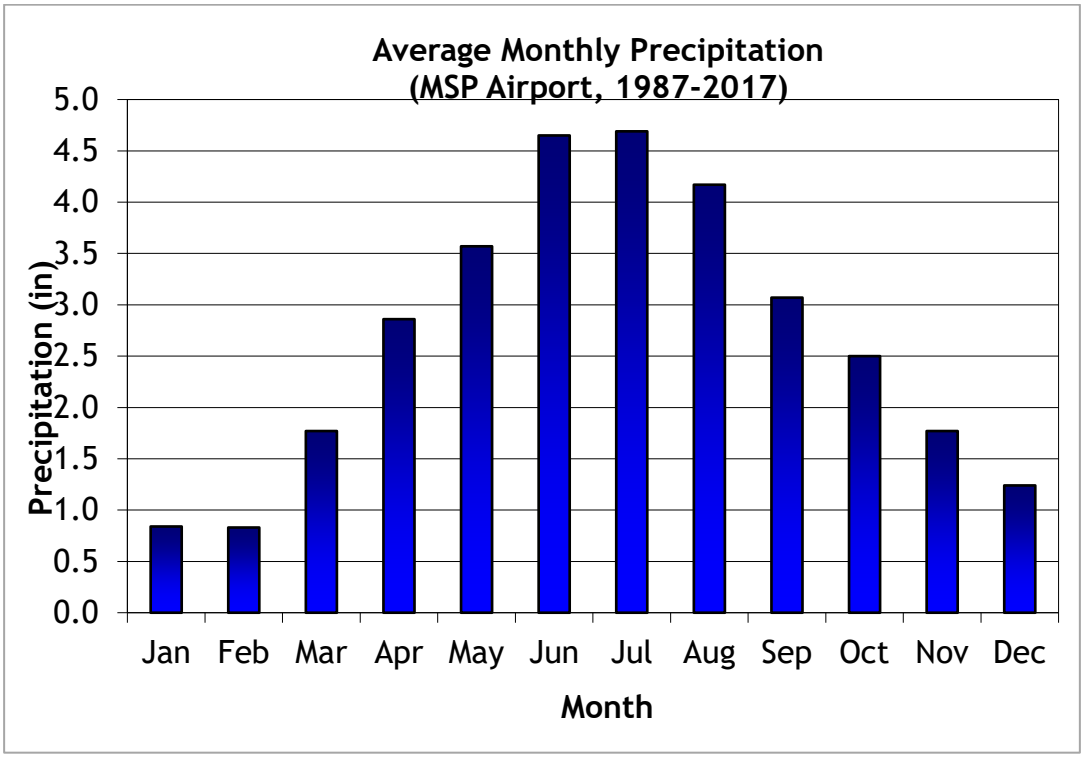


Figure 2-2: Average Monthly Precipitation for Minneapolis-St. Paul International Airport (1987–2017)



Average annual snowfall (1987–2017) is 49.0 inches at the MSP airport. Extreme snowfall records range from 86.6 inches during the 2010–2011 season to 17.4 inches at MSP during the 1986–1987 season.

The amount, rate, and type of precipitation are important in determining flood levels and stormwater runoff rates, all of which impact water resources. In urbanized watersheds, shorter-duration events tend to play larger roles in predicting high water levels in basins. Shorter-duration events are generally used by hydrologists to study local issues (e.g., sizing catch basins, storm sewer pipes.). Longer-duration events are generally used by hydrologists to study regional issues such as predicting high water levels for regional basins and basins that have no outlets (i.e., landlocked basins) or those that have small outlets relative to their watershed size.

Extremes of precipitation and snowmelt are important for design of flood control systems. The National Weather Service has data on extreme precipitation events that can be used to aid in the design of flood control systems. Extremes of snowmelt and rainstorms that occur with snowmelt in early spring most often affect major rivers, the design of large stormwater storage areas, and landlocked basins. Extremes of precipitation most often affect the design of conveyance facilities.

In contrast with stormwater drainage facilities, stormwater quality treatment systems are designed based on the smaller, more frequent storms. These more frequent storms account for most of the annual pollutant loadings from urban watersheds. Analysis of National Weather Service rainfall data (1987–2017) from the MSP station found that almost 95 percent of storms produced one inch or less of rainfall.

Technical Paper 40 (TP-40), which was developed by the National Oceanic and Atmospheric Administration (NOAA)and initially published in 1961, was the key document used by hydrologists and designers of hydraulic structures (e.g., storm sewer infrastructure, detention ponds, etc.). TP-40 was developed using less recorded precipitation data, with a smaller time range and fewer precipitation stations. A recent increase in large storm events had scientists questioning if the document was underprojecting rainfall depths, so an updated document was developed. NOAA Atlas 14 Volume 8 (commonly known as Atlas 14) was developed by the Hydrometeorological Design Studies Center within the Office of Hydrologic Development of the NOAA's National Weather Service (Perica et al. 2013). Atlas 14 used denser precipitation data networks than the previous document had as well as a greater period of record, new statistical approaches, and new spatial interpolation and mapping techniques to develop new precipitation frequency estimates. Atlas 14 is now the primary source of precipitation information in the Midwest. See Table XX for the Atlas 14 rainfall depths used in St. Louis Park.

Table 2-2: Atlas 14 Rainfall Depths for City of St. Louis Park, MN

Storm Event	Depth, inches
50% annual probability (2-year) 24-hour	2.9
10% annual probability (10-year) 24-hour	4.3
1% annual probability (100-year) 24-hour	7.4

Climate information can be obtained from a number of sources, including the following sites:

- For climate information about the Twin Cities metropolitan area: https://www.dnr.state.mn.us/climate/twin_cities/index.html
- For a wide range of Minnesota climate information: http://climateapps.dnr.state.mn.us
- For additional Minnesota climate information: https://www.dnr.state.mn.us/climate/index.html

2.2 Topography

The area of St. Louis Park that is north of Minnetonka Boulevard is characterized by rolling uplands with intermittent ponds and wetlands. Areas in the southern portion of the city have nearly level and gently rolling topography. Some relatively large, flat areas are present along Minnehaha Creek. Figure 2-3 shows the areas of the city with slopes greater than 12 percent.

The elevations generally vary from 880 to 990 feet throughout the city. The highest point in the city is located at the Westwood Hills Nature Center, whereas the lowest area is located at the Bass Lake basin. The City of St. Louis Park has two-foot contour data coverage for the entire city. The contours were created based on LiDAR data of Twin Cities Metropolitan area, which was collected in 2011.

2.3 Soils

Soils information for the City of St. Louis Park is available in the Hennepin County Soil Survey (USDA-NRCS, 2004), which includes information concerning the classification of soils within St. Louis Park.

The infiltration capacities of soils affect the amount of direct runoff resulting from rainfall. The higher the infiltration rate for a given area of soil, the lower the potential for runoff from the land. Conversely, soils with low infiltration rates produce high runoff volumes and high peak discharge rates. Hydrologic grouping symbols A through D established by the Soil Conservation Service (now called the Natural Resources Conservation Service or NRCS) represent soils with high to low infiltration rates, respectively. The combination of these hydrologic groupings and land use are used to estimate the amount of runoff that will occur over a given area for a

particular rainfall amount. As land is developed for urban use, much of the soil is covered with impervious surfaces, and soils in the remaining areas are significantly disturbed and altered. Development often results in the consolidation of the soil and tends to reduce the infiltration capacities of otherwise permeable soils, resulting in significantly greater amounts of runoff.

Figure 2-4 shows the soils in St. Louis Park by hydrologic soil group. However, because of significant urban development, much of the city is categorized as having "undefined/urban soil." The map intends to provide general guidance about the infiltration capacities of the soils throughout St. Louis Park. Soils and their respective infiltration capacity should be confirmed on a site-by-site and project-by-project basis.

2.4 Geology

St. Louis Park is in the east central portion of Hennepin County. The general geology of Hennepin County, including St. Louis Park, has been studied, and the results are outlined in the *Geologic Atlas of Hennepin County, Minnesota* (Minnesota Geological Survey [MGS] Atlas C-4, 1992).

St. Louis Park is located in the Twin Cities structural basin. The bedrock beneath the city consists of Paleozoic sedimentary rocks that dip gently to the southeast. The uppermost bedrock unit for most of the city is Platteville Limestone and St. Peter Sandstone for the rest of the city. There are also a few buried valleys where the Prairie du Chien group comprises the top layer. The Plattville Formation is dominantly limestone and dolostone. The Glenwood Formation is dominantly shale. Together, they are as much as 34 feet thick, but generally the thickness is less than that because the upper part of the Platteville Formation is usually eroded at the uppermost bedrock unit. The St. Peter Sandstone is generally 145 to 155 feet thick in the Twin Cities where it is overlain by the Glenwood and Platteville Formations. The Prairie du Chien group is generally between 125 to 140 feet thick in the middle of the Twin Cities basin, where it is covered by St. Peter Sandstone. An MGS map entitled "Bedrock Geology of the Twin Cities Ten-County Metropolitan Area, Minnesota" further describes these bedrock layers.

The bedrock elevations in the area can vary, depending on the type, from 750 to 800 feet. The surficial geology of the city is comprised of a sand, loamy sand, and gravel outwash, which ranges in depth from 50 to 200 feet.

St. Louis Park
MINNESOTA

FIGURE 2-3: SLOPES GREATER THAN TWELVE PERCENT

LEGEND

- City Boundary
- Slope Less than 12%
- Slope Between 12% and 18%
- Slope Greater than 18%
- Lakes

0 0.25 0.5 1 MILES

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St. Louis Park
MINNESOTA

FIGURE 2-4:
HYDROLOGIC SOIL GROUPS

LEGEND

- A - High Infiltration Rate
- A/D - High Infiltration Rate (if drainage system in place)
- B - Moderate Infiltration Rate
- C - Slow Infiltration Rate
- C/D - Slow/Very Slow Infiltration Rate
- Undefined/Urban Soils
- City Boundary
- Lakes

N

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2.5 Groundwater

This section summarizes the finding of the city's 2015 Part-1 Wellhead Protection Plan Update.

The growing population in the Twin Cities metropolitan area has put increased pressure on groundwater supplies. Increased impervious surfaces also reduce the amount of groundwater recharge. The City of St. Louis Park obtains its entire water supply from nine primary groundwater wells and one emergency backup well. The wells draw water from the Prairie du Chien, Mount Simon, and Jordan aquifer formations. Municipal Wells 4, 8, and 10 are multiaquifer wells, open to both the Prairie du Chien and Jordan aquifers. Wells 14, 15, and 16 are completed in the Jordan sandstone, and Wells 11, 12, and 13 are open to the Mount Simon aquifer. Well 6, the emergency well, is open to both the Prairie du Chien and Jordan aquifers. The city has no immediate plans to replace or add municipal wells or utilize any other sources of water supply because existing groundwater wells appear to adequately meet the city's current and projected water demands.

The MDH is responsible for the protection of groundwater supplies and aims to prevent contaminants from entering the recharge zones of public water supply wells. This can result in the restriction of certain stormwater best management practices (BMPs) for areas with high potential vulnerability to protect groundwater supplies.

The MDH Source Water Protection Vulnerability rating for St. Louis Park's municipal wells determine that Wells 8, 11, 12, and 13 are not vulnerable to contaminants from land and water use. Wells 4, 6, 10, 14, 15, and 16 were found to be vulnerable because the well water either had a detection of tritium, or a nearby well within the same aquifer had a detection of tritium. The overall quality of groundwater in St. Louis Park is good. No contaminants were detected at levels that violated federal drinking water standards. Some contaminants were detected in trace amounts, but these were below legal limits.

Figure 2-5 shows groundwater sensitivity areas within St. Louis Park. More information about the wellhead protection area delineation and the well and drinking water supply management area (DWSMA) vulnerability assessments can be found in the City of St. Louis Park Part I Wellhead Protection Plan Update (Source Water Solutions, LLC, February 2015) and in **Appendix C**.

St. Louis Park
MINNESOTA

FIGURE 2-5: GROUNDWATER SENSITIVITY TO POLLUTION

LEGEND

- Municipal Wells
- Private Wells

DWSMA Vulnerability

- High
- Moderate
- Low
- City Boundary
- Lakes

N

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2.6 Surface Water System

St. Louis Park's surface water system consists of a combination of natural lakes, ponds, wetlands, and a creek, along with stormwater infrastructure, open channels, and constructed ponds.

2.6.1 Public Waters

The MnDNR designates certain water resources as public waters to indicate those lakes, wetlands, and watercourses over which the MnDNR has regulatory authority. By statute, the definition of public waters includes "public waters" and "public wetlands." Public wetlands include all type-3, -4, and -5 wetlands (as defined by the U.S. Fish and Wildlife Service) that are 2.5 acres or more in size in incorporated areas.

The MnDNR uses county-scale maps to show the general location of public waters and wetlands under its regulatory authority. These maps are commonly known as public waters inventory (PWI) maps. The regulatory boundaries of these waters and wetlands are called ordinary high-water level (OHWL). PWI maps are available on a county-by-county basis. Additionally, county-by-county lists of these waters are available in tabular form.

The PWI maps and lists are available on the MnDNR Public Waters Inventory webpage: www.dnr.state.mn.us/waters/watermgmt_section/pwi/maps.html.

Public waters are identified with a number and the letter P. Public wetlands are identified with a number and the letter W. Table 2-2 summarizes the MnDNR public waters in St. Louis Park along with the associated OHWL, in cases where they are known. Figure 2-6 shows the location of PWI waterbodies and watercourses within the City of St. Louis Park.

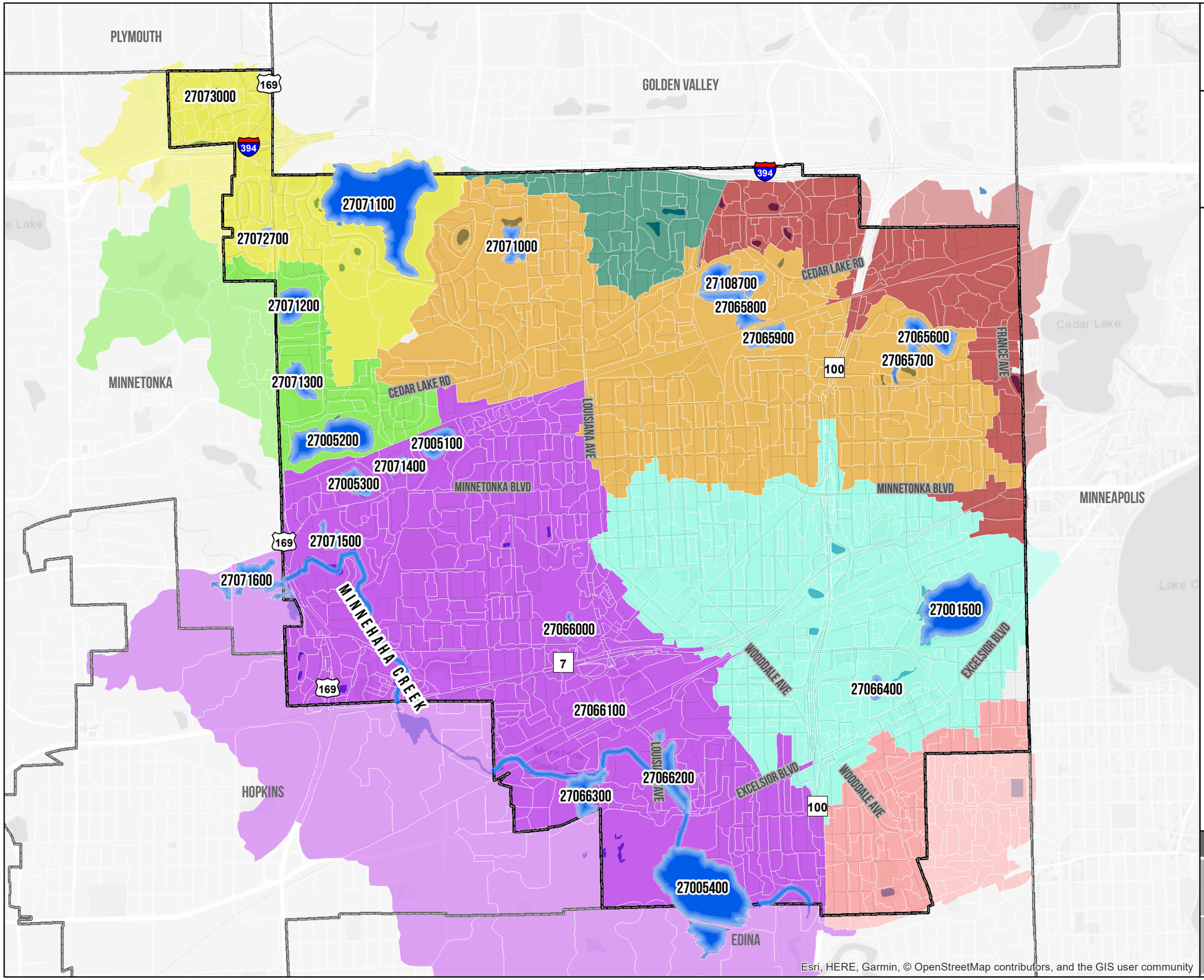
Table 2-3: MnDNR Public Waters in St. Louis Park

Waterbody Name	MnDNR Public Waters Number	OHWL (feet)[1]
Public Waters		
Westwood	27071100	887.8
Unnamed (Kilmer)	27072700	NA
Hannan	27005200	NA
Unnamed (Cobblecrest)	27005300	NA
Victoria	27005100	NA
Lamplighter Park	27071000	NA
Unnamed (Oak Pond)	27066000	NA
Twin	27065600	871.3
Unnamed (Quentin Pond)	27065700	871.3
Bass	27001500	NA

[1] National Geodetic Vertical Datum or NGVD, 1929

Waterbody Name	MnDNR Public Waters Number	OHWL (feet)[1]
Wolfe Park	27066400	872.9
Meadowbrook	27005400	NA
Public Wetlands		
Unnamed (Shelard Pond)	27073000	NA
Unnamed (Crestview Wetland)	27071200	NA
Unnamed (Cedar Manor)	27071300	899.1
Unnamed (Westling Pong)	27071400	NA
Unnamed (Minnehaha Creek Wetland)	27071500	NA
Unnamed (Cedar Lake Road Wetland	270108700	NA
Unnamed (Cedar Lake Road Wetland)	27065800	NA
Unnamed (Triangle Wetland)	27065900	NA
Unnamed (South Oak)	27066100	NA
Unnamed (Methodist Wetland)	27066200	NA
Unnamed (Excelsior Wetland)	27066300	NA
Public Watercourses		
Minnehaha Creek	27003600	NA

Source: DNR Lake Finder Website



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St. Louis Park
MINNESOTA

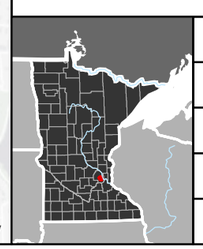
FIGURE 2-6: PUBLIC WATERS INVENTORY (PWI)

LEGEND

- Minnesota Public Waters
- 01-Westwood Lake District (740 acres)
- 02-Golden Valley District (219 acres)
- 03-Hannan Lake District (605 acres)
- 04-Minnehaha Creek District (3,783 acres)
- 05-Twin Lake District (1,636 acres)
- 06-Minneapolis District (649 acres)
- 07-Bass Lake District (1,362 acres)
- 08-Edina District (497 acres)
- City Boundary

N

0 0.25 0.5 1 MILES



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2.6.2 Public Ditches

Judicial ditches and county ditches are public drainage systems established under Chapter 103E of Minnesota Statutes and are under the jurisdiction of the county or a WMO. Judicial ditches and county ditches within St. Louis Park include cddcounty ditches 14, 17, and 29, which are located in the MCWD, and judicial ditch 6, which is located in the BCWMC watershed. The authority for the ditches within the MCWD was transferred from Hennepin County to the MCWD, which is now responsible for the maintenance of these ditches, while ditcheswithin the BCWMC remain under the authority of Hennepin County.

County Ditch #14: This ditch was established prior to 1908 and originally connected a wetland northwest of Bass Lake to Bass Lake. It then traveled out of Bass Lake to the east and flowed to the southwest corner of Bde Maka Ska. The portion of the ditch that exists within St. Louis Park has been converted into a storm sewer.

County Ditch #17: This ditch was established in 1908 and was intended to drain a large wetland complex in St. Louis Park, Minneapolis, and Edina. The alignment extends from what is now the intersection of Morningside and Browndale to the outlet of Bde Maka Ska around 37th Street. It has been entirely converted into a storm sewer that does not follow the exact path of the ditch but receives drainage from the same area.

County Ditch #29: This ditch begins around Minnetonka Boulevard and Highway 100 and runs east to its end near the railroad tracks. The ditch has been completely converted into a storm sewer that generally follows the alignment of the former ditch.

Judicial Ditch #6: This ditch began in the City of St. Louis Park and drained areas on the east side of Westwood Lake and the area between Lamplighter Pond and the railroad. This system drained to the north into Golden Valley and Bassett Creek. This ditch has been completely converted into a storm sewer that no long follows the alignment of the original ditch system. Much of this system now drains to the south and eventually discharges to Minnehaha Creek.

Figure 2-7 shows the location of public (judicial and county) ditches within the City of St. Louis Park.

St. Louis Park
MINNESOTA

FIGURE 2-7:
PUBLIC DITCHES

LEGEND

- Public Ditches
- Minnesota Public Waters
- 01-Westwood Lake District (740 acres)
- 02-Golden Valley District (219 acres)
- 03-Hannan Lake District (605 acres)
- 04-Minnehaha Creek District (3,783 acres)
- 05-Twin Lake District (1,636 acres)
- 06-Minneapolis District (649 acres)
- 07-Bass Lake District (1,362 acres)
- 08-Edina District (497 acres)
- City Boundary

N

0 0.25 0.5 1 MILES

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PLYMOUTH
GOLDEN VALLEY
MINNETONKA
MINNEAPOLIS
HOPKINS
EDINA
JUDICIAL DITCH 6
COUNTY DITCH 29
COUNTY DITCH 14
COUNTY DITCH 17
MINNEHAHA CREEK
CEDAR LAKE RD
MINNETONKA BLVD
WOODDALE AVE
EXCELSIOR BLVD
LOUISIANA AVE
FRANCE AVE
Cedar Lake
169
394
100
7

2.6.3 Streams

Minnehaha Creek is the primary stream within the city. The mainstem of the creek enters St. Louis Park from the west, just south of the intersection of Highway 169 and Minnetonka Boulevard. It flows through the southwest portion of the city before passing through Meadowbrook Lake and entering the City of Edina. Approximately 3.3 stream miles of Minnehaha Creek flow through St. Louis Park. Minnehaha Creek ultimately drains into the Mississippi River.

2.6.4 Wetlands

In 2001, WSB & Associates, Inc. developed a Wetland Management Plan (WMP) for St. Louis Park. The WMP provides a way for the city to manage its wetlands and ensure that wetlands are considered during development review and city-wide planning to balance protection of wetlands with the development and growth of the city.

Wetlands in the city are inventoried and classified into two management categories according to the function and value of the wetlands: Manage I and Manage II. Typically, Manage I wetlands are higher-quality wetlands, wetlands that serve a specific purpose, or wetlands located primarily on public lands. All other wetlands are classified as Manage II. Management standards based on the wetland classifications were also developed. Most of the wetlands in St. Louis Park are subject to the WCA. MCWD, BCWMC, and MnDOT are LGUs under the WCA, which means they are the permitting authority for any draining or filling of wetlands.

More information about wetland policies and issues can be found in the City of St. Louis Park Wetland Management Plan (City of St. Louis Park (WSB), 2001) and is also in **Appendix D**.

2.7 Stormwater System

The St. Louis Park stormwater system consists of approximately 110 miles of underground pipe that range in size from 12 in. to 102 in., 11 stormwater lift stations, 22 lakes and ponds, and over 3,000 catch basins. Ninety percent of the city streets are serviced by curbs and gutters. The City has developed and maintains a GIS geodatabase of storm sewer coverage for the entire city. The city obtained manhole, catch basin, and pipe information for the entire city. Figure 2-8 shows the city's surface and stormwater systems.

St. Louis Park
MINNESOTA

FIGURE 2-8:
SURFACE WATER SYSTEM

LEGEND

- Intercommunity Flow Locations
- Stormwater Lift Stations
- Stormwater Discharge Points
- Storm Mains (Gravity)
- Storm Mains (Pressure)
- 01-Westwood Lake District (740 acres)
- 02-Golden Valley District (219 acres)
- 03-Hannan Lake District (605 acres)
- 04-Minnehaha Creek District (3,783 acres)
- 05-Twin Lake District (1,636 acres)
- 06-Minneapolis District (649 acres)
- 07-Bass Lake District (1,362 acres)
- 08-Edina District (497 acres)
- City Boundary

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2.8 Watersheds and Drainage Patterns

The nautral drainage pattern for the City of St. Louis Park is fairly well-defined. There are two major watersheds within the city, Minnehaha Creek and Bassett Creek. These two watersheds are shown on Figure 2-9. Each of these watersheds are an active watershed management organization, as previously discussed.

These two major watersheds are subdivided into eleven drainage districts, based on the city's regional lakes, which are then further subdivided into smaller catchments (Figure 2-9). Figure 2-10 shows the major watersheds, drainage districts, developed during the most previous 2009 update to the surface water management plan, and based on surface drainage patterns, and major waterbodies in the city.

In addition to these internal drainage districts, the city receives and discharges runoff from neighboring communities (Minnetonka, Plymouth, Edina, Minneapolis), including MnDOT right-of-way (I-394, TH 5, TH 7, TH 100, and TH 169).

As part of this SWMP update, the drainage district boundaries have been updated based on newly available data, including the MnDNR LiDAR data for Hennepin County and recent topographic surveys by city staff.

2.8.1 Bass Lake Drainage District

The Bass Lake drainage district is a 1,362-acre watershed on the east side of the City, bounded by the Twin Lake district to the north and the Minnehaha Creek district to the west. It receives stormwater runoff from TH 100 and CP Railway corridors that bisect the watershed. Major water features include Bass Lake, Wolfe Pond, Cattail Pond, remnants of County Ditch 14, and several MnDOT stormwater ponds. The drainage district ultimately discharges to the City of Minneapolis via the Bass Lake outlet and storm sewer systems (County Ditch 14). The Bass Lake drainage district is connected to the Minnehaha Creek district by the stormwater lift station on Oregon Avenue. It also receives flow from the Twin Lake district via a 30-in RCP at Colorado Ave and Minnetonka Blvd.

Known flood-prone areas include: Problem Area 15 (SW corner of Brunswick Ave and 33rd St), Beltline Blvd & 35th St, 4725 Hwy 7, Bass Lake, City Hall, Cattail Pond.

2.8.2 Edina Drainage District

The Edina drainage district is a 497-acre watershed located in the southeast cornder of the City, with roughly have the watershed located in the City of Edina. It is bounded to the north by the Bass Lake drainage district and the west by the Minnehaha Creek drainage district. It is primarily residential with several parks. Major water features include Browndale Pond and Weber Pond in the City of Edina and remnants of County Ditch 17. Stormwater enters the storm sewer system and the City of Edina at Yale Gardens Park, flows through the City of Edina's storm sewer (County Ditch 17) to Weber Pond and is outlet back into the City of St. Louis Park at Minikada Vista Park.

Known flood-prone areas include: Browndale Park and Morningside Road.

2.8.3 Golden Valley Drainage District

The Golden Valley watershed discharges to MnDOT right-of -way, storm sewer and to the City of Golden Valley. It is a 219-acre watershed comprising of primarily residential and commercial land uses, bounded by I-394 to the north and the Canadian Pacific (CP) Railway corridor to the east. Major water features in this drainage district include Otten Pond and Hampshire Pond and remnants of Judicial Ditch 6.

Known flood-prone areas include: Otten Pond

2.8.4 Hannan Lake Drainage District

The Hannan Lake drainage district is a 605-acre watershed which includes direct runoff from the City of Minnetonka and MnDOT right-of-way. This watershed is bounded by the Burlington Northern Santa Fe (BNSF) railroad to the south and the Westwood Lake Drainage District to the north and bisected by Trunk Highway 169. Major water features include Cedar Manor Lake and Hannan Lake. Uniquely this watershed has two land-locked features, the landlocked wetland to the east of TH 169 connected to a large wetland in the City of Minnetonka by a MnDOT culvert, and Hannan Lake itself.

The City provided the MCWD regional XPSWMM model as a basis for the development of this SWMP modeling in this watershed. The MCWD model has been refined within the City of St. Louis Park to reflect the city's stormwater infrastructure and updated topography (2013 MnDNR LiDAR), as well as to include any MnDOT drainage entering the city from TH 169 and stormwater from the City of Minnetonka. The City of Minnetonka was also contacted and provided input on the infrastructure entering the City of St. Louis Park.

Known flood-prone areas include: Land-Locked Wetland, Cedar Manor Lake, Hannan Lake

2.8.5 Minneapolis Drainage Districts

The Minneapolis drainage district is comprised of three subwatersheds in the City of St. Louis Park with a total area of 649 acres that discharge to the City of Minneapolis at several locations. The Minneapolis watersheds receive stormwater from TH 5, TH 7, TH 100, and TH 394, as well as outlet flows from Bass Lake and Twin Lakes. The Minneapolis watersheds ultimately discharge to Brownie Lake, Cedar Lake, Bde Maka Ska, and Weber Pond. In most cases, the Minneapolis drainage district discharges directly to the City of Minneapolis' storm sewer. The City of Minneapolis was contacted however is in the process of developing new hydraulic models at this time and does not have any information to provide to assist with the development of this SWMP modeling and identification of tailwater conditions in the storm sewer. It is assumed that the storm sewer is at capacity.

Major water features in this drainage district include Candlestick Pond, Cedar Meadows Pond, and several private stormwater ponds. There is one stormwater lift station in the Minneapolis

drainage district at Candlestick Pond to provide an artificial outlet for the pond and reduce flooding to neighboring homes.

Known flood-prone areas include: Candlestick Pond

2.8.6 Minnehaha Creek Drainage District

The Minnehaha Creek Drainage District is the largest watershed in the city with 3,783 acres that covers the southwest corner of the City and receives flows Minnehaha Creek, upstream municipalities, and stormwater runoff from MnDOT right-of-way. The watershed is bounded by Trunk Highway 100 to the east, BNSF railroad to the north, and bisected by MnDOT TH 169 and TH 7. The Minnehaha watershed ultimately discharges to the City of Edina via Minnehaha Creek at TH 100. Major water features include Minnehaha Creek, Cobble Crest Lake, Westling Pond, Victoria Lake, Oregon Pond, Sumter Sediment Basin, Oak Pond, and South Oak Pond. There are seven stormwater lift stations in the Minnehaha Creek drainage district to move pump stormwater runoff from low-lying areas to the creek.

The city provided the MCWD regional XPSWMM model as a basis for the development of the current SWMP modeling in this watershed. The MCWD model has been refined within the City of St. Louis Park to reflect the city's stormwater infrastructure and updated topography (2013 MnDNR LiDAR), as well as to include any MnDOT right-of-way drainage entering the City and stormwater from the City of Minnetonka. The City of Minnetonka was also contacted to provide input on the infrastructure entering the City of St. Louis Park.

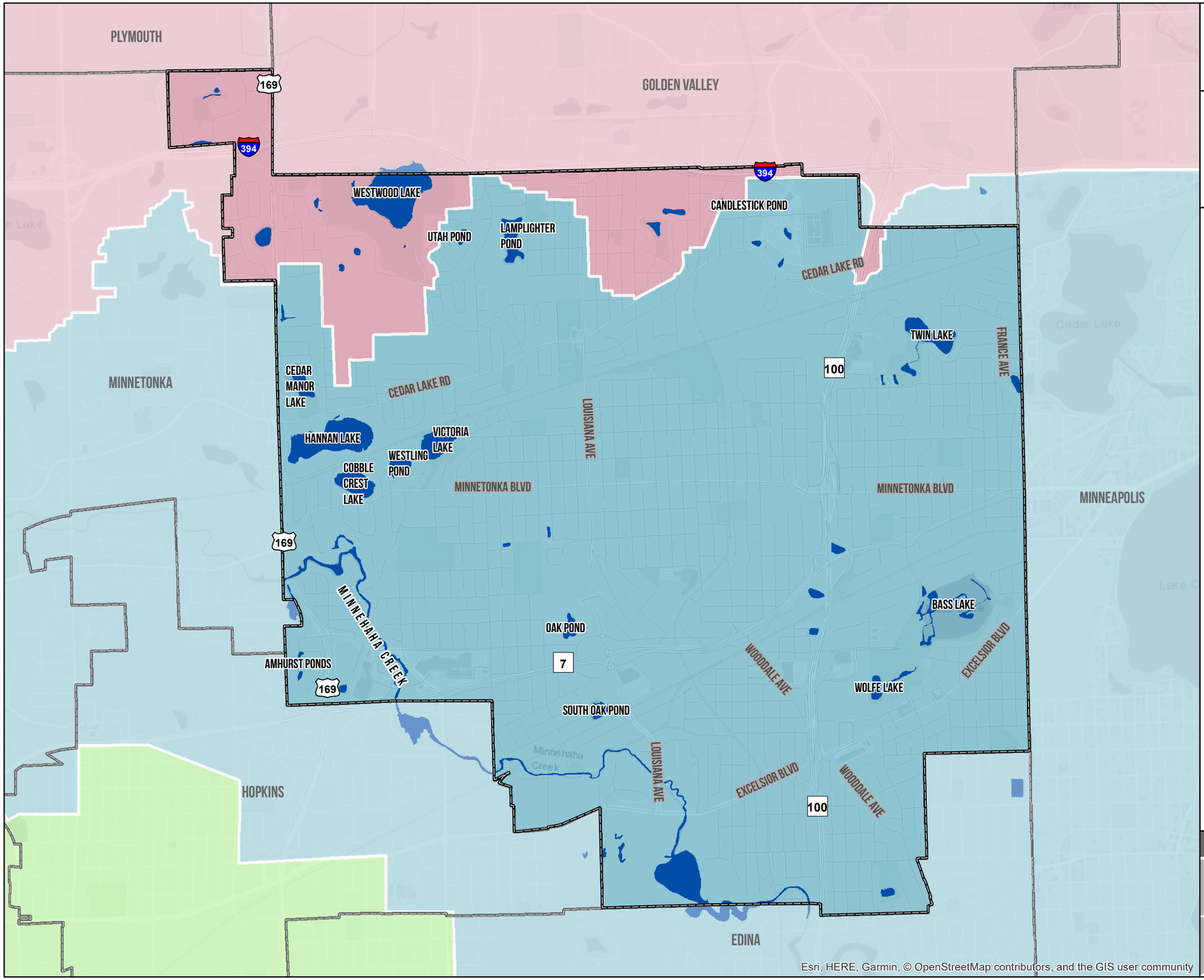
Known flood-prone areas include: 34th Street Bridge, 36th Street Bridge, 6851 Oxford St, Boone Ave, Cobble Crest Lake, Lake St & Monitor St, Oak Hill Park, 3117 Hillsboro Ave/Minnehaha Creek Wetlands, Methodist Hospital Campus, Meadowbrook Golf Course, Oak Pond, Oregon Ave & Hwy 7 Frontage, Oregon Pond, Westling Pond; Victoria Way new development

2.8.7 Twin Lakes Drainage District

The Twin Lakes drainage district is a 1,636-acre watershed that is located in the northeast corner of the City. It is loosely bounded by the Westwood Lake and Bass Lake drainage districts and receives stormwater runoff from MnDOT TH 100 and the CP and BNSF railroad corridors. Major water features include Utah Pond, Lamplighter Pond, Boneyard Ditch, Twin Lakes Sediment Basin, and Twin Lake, as well as remnants of Judicial Ditch 6 and County Ditch 29. There are two stormwater lift stations in the Twin Lakes watershed; one at Lamplighter Pond and one at Nelson Park to alleviate surface flooding.

The Twin Lakes model interacts with the Bass Lake model by discharge via a 30-in RCP at Colorado Ave and Minnetonka Blvd. The Twin Lakes model also discharges to the Minneapolis models via the Twin Lakes outlet.

Known flood-prone areas include: Lamplighter Pond, Twin Lakes, Peace Presbyterian Church gardens, 2710 Monterey Ave, Northeast Boneyard Ditch.



St. Louis Park
MINNESOTA

FIGURE 2-9: WATERSHEDS

LEGEND

- Bassett Creek Watershed Management Commission
- Minnehaha Creek Watershed District
- Nine Mile Creek Watershed District
- City Boundary
- Lakes

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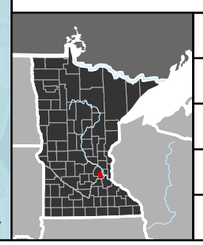

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St. Louis Park
MINNESOTA

FIGURE 2-10: DRAINAGE DISTRICTS, SUBWATERSHEDS & DRAINAGE PATTERNS

LEGEND

- 01-Westwood Lake (740 acres)
- 02-Golden Valley (219 acres)
- 03-Hannan Lake (605 acres)
- 04-Minnehaha Creek (3,783 acres)
- 05-Twin Lake (1,636 acres)
- 06-Minneapolis (649 acres)
- 07-Bass Lake (1,362 acres)
- 08-Edina (497 acres)
- Intercommunity Flow Locations
- Flow Arrows
- City Boundary
- Lakes

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2.8.8 Westwood Lake Drainage District

The Westwood Lake drainage district is a 740-acre watershed located in the northwest corner of the City of St. Louis Park. It includes Kilmer Pond, Shelard Sedimentation Basin, and Westwood Lake as major water features. This watershed is one of two drainage districts entirely within the Bassett Creek WMC and flows into Bassett Creek directly in the north and indirectly via the Westwood Lake outfall to Golden Valley and their municipal storm sewer.

The City provided the Bassett Creek WMC regional XPSWMM model as a basis for the development of the current SWMP modeling in this watershed. The BCWMC model has been refined within the City of St. Louis Park to reflect the City's stormwater infrastructure and updated topography (2013 MnDNR LiDAR), as well as to include any MnDOT drainage from TH 169 and TH 394.

The Westwood Lake watershed model has been combined with the Plymouth watershed from the previous SWMP study. This is due to the fact there are several connections between these two watersheds that may affect water elevations.

The Westwood Lake model interacts with the BCWMC model on both the upstream and downstream boundaries. It also receives discharge from the MnDOT right-of-way and Cities of Golden Valley, Minnetonka, and Plymouth.

Known flood-prone areas include Kilmer Pond and Westwood Lake.

2.8.9 Intercommunity Flows

There are several intercommunity flows into and out of the City of St. Louis Park, summarized in the following table.

Table 2-4: Intercommunity Peak Discharge Rates (cfs)

To	100-Year (ATLAS 14)	10-Year (ATLAS 14)	100-Year (TP40)	10-Year (TP40)
City of Minneapolis/ Bass Lake	127.2	70.5	150.0	0.0
City of Minneapolis/Edina	275.9	155.6	189.9	126.6
City of Edina	409.5	243.05	299.48	207.78
City of Golden Valley/ Bassett Creek	353.14	273.83	294.28	246.74
City of Golden Valley	142.89	83.11	99.49	68.85
City of Minneapolis	169.31	100.94	114.49	82.42
City of Minneapolis/ Brownie Lake	404.11	318.43	337.52	295.16
City of Minneapolis/ Cedar Lake	177.48	136.86	156.09	128.02
MnDOT	243.58	164.42	201.21	145.13

To	100-Year (ATLAS 14)	10-Year (ATLAS 14)	100-Year (TP40)	10-Year (TP40)
MnDOT/Golden Valley	322.32	218.3	256.43	176.77
City of Golden Valley	127.2	70.5	150.0	0.0
City of Minneapolis	275.9	155.6	189.9	126.6
City of Minneapolis/ Brownie Lake	409.5	243.05	299.48	207.78
City of Minneapolis/ Cedar Lake	353.14	273.83	294.28	246.74
MnDOT/Minneapolis	142.89	83.11	99.49	68.85
MnDOT/Golden Valley	169.31	100.94	114.49	82.42

2.9 Water-based Recreation Areas

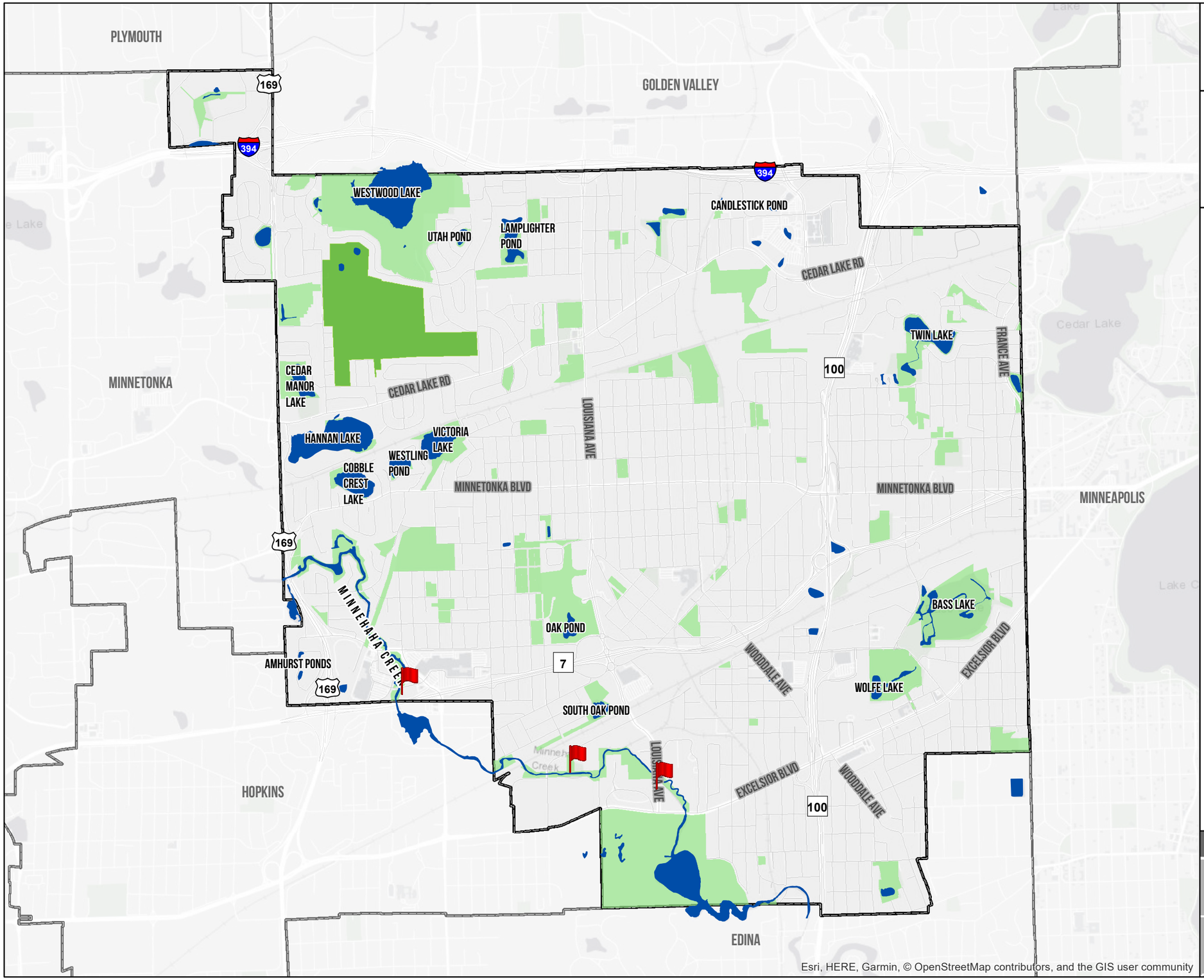
The City of St. Louis Park has 52 parks and open space areas that cover more than 790 acres. About 50 percent of this area comprises open water or wetlands. Additionally, there are about 290 acres of privately-owned golf courses and another 165 acres of open spaces associated with schools and community centers.

Lakes, ponds, and creeks are often key attractions in public parks. Examples within St. Louis Park include Bass Lake, Isaac Walton League/Creekside Park, Minnehaha Creek, Twin Lakes Park, Westwood Hills Nature Center, and Wolfe Park Lake, all of which are presented below in Table 2-4. All water-based recreation in St. Louis Park is limited to noncontact, passive recreation activities, such as canoeing, fishing, hiking and walking on trails around the waterbodies, and wildlife and aesthetic viewing. Figure 2-11 shows the location of these recreational areas as well as the official public access points to lakes and creeks within the City of St. Louis Park.

Table 2-5: St. Louis Park Water-based Recreation Areas

Water and Natural Resource Recreation Areas in St. Louis Park
Bass Lake is a significant part of the city's stormwater system, acting as both a detention and water quality treatment pond. This waterbody also provides significant wildlife habitats and the walking and biking trails around the lake that provide recreation opportunities.
Isaac Walton League/Creekside Park is primarily used as a canoe landing and launching site along Minnehaha Creek.

Water and Natural Resource Recreation Areas in St. Louis Park
Minnehaha Creek and Parkway. Minnehaha Creek is not only a main drainageway through the city; it also offers a corridor of natural habitats within an urban setting, and it provides recreational opportunities such as hiking, canoeing, and nature observation. Throughout the city, much of the land bordered by the creek is publicly owned. Minnehaha Creek Parkway provides two canoe landing and creek access locations. These access locations include crossings at Louisiana Avenue and at 37th Street. The city, along with other communities along Minnehaha Creek, has worked with the MCWD to create a detailed canoe map to increase public awareness and use of the creek.
Twin Lakes Park includes a lake and wetland that are major components of the drainage system in the northern portion of the city, providing flood control as well as water quality treatment. Water from the Twin Lakes eventually drains to Cedar Lake and the Minneapolis Chain of Lakes.
Westwood Hills Nature Center is owned and operated by the City of St. Louis Park. It encompasses a total of 150 acres, of which 90 acres are wetlands. Westwood Hills Nature Center is composed of 60 percent wetland (including one small lake), 35 percent woodland, and 5 percent grassland/prairie. The center conducts year-round programs for visitors of all ages to increase their understanding and appreciation of our natural world and aspects of surface water quality and quantity management. There are three miles of walking and hiking trails, including a loop around Westwood Lake.
Wolfe Park is part of the recent town center development called Park Commons. The park includes a variety of recreational opportunities, such as the REC Center, which offers indoor ice rinks, an outdoor recreation center known as the ROC, and an amphitheater. There are several ponds in the park that provide stormwater detention and create recreational opportunities such as outdoor ice skating in the winter. In addition, there are walking and biking trails throughout the park.



St. Louis Park
MINNESOTA

FIGURE 2-11: RECREATION AREAS AND PUBLIC ACCESS

LEGEND

- Paddling Access
- Golf Courses
- Park and Open Space
- Lakes
- City Boundary

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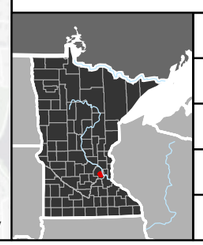

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2.10 Wildlife and Aquatic Habitat

The waterbodies and open spaces interspersed throughout the city provide habitats for numerous fish and wildlife species, including birds, mammals, and reptiles. Ducks and geese are present in large numbers in the lakes, wetlands, and open water areas. Vegetative cover in the undeveloped open areas support many mammalian species such as deer, raccoon, squirrels, chipmunks, and rabbits. The numerous wetlands in St. Louis Park provide habitats for a variety of aquatic species, including snakes, turtles, and frogs.

2.10.1 Fisheries

Wolfe Lake, Westwood Lake, and Lamplighter Pond are stocked regularly with several species of fish. Through a partnership with Fishing in the Neighborhood, an MnDNR program, the city can provide fishing piers and annually stock fish such as bluegills, crappies, northern pike, largemouth bass, and yellow perch. Wolfe Lake was stocked with black crappie and bluegill in 2015, yellow perch in the spring of 2016, and northern pike in the fall of 2016. Westwood Lake was stocked with bluegill in 2015 and 2016. Lamplighter Lake was stocked with black crappie and bluegill in 2015 and with bluegill and pumpkinseed in 2016 and 2017.

A fish survey was conducted in July 2017 at Wolfe Lake. Bluegill, pumpkinseed, and largemouth bass were found in high abundance. Northern pike and black crappie were moderately abundant. Black bullheads and white suckers were found in low abundance.

A fish survey was conducted in October 2009 at Meadowbrook Lake in the Minnehaha Creek corridor. A total of 12 fish species were sampled, including black crappie, dogfish, and pumpkinseed. Black bullheads were the dominant fish species, with a population well above the normal range. Overall, the survey was dominated by low-oxygen-tolerant species like bullheads, carp, and dogfish. This likely has an adverse impact on water quality in the creek and in shallow, connected lakes like Meadowbrook Lake.

2.10.2 Invasive Aquatic Species

Several lakes in St. Louis Park are considered "infested waters" by the MnDNR because they contain aquatic invasive species (AIS). AIS are introduced to new locations, where they are able to rapidly spread, outcompete native species and cause harm to the native habitats. For example. Twin Lake, Wolfe Lake, and Minnehaha creek contain Eurasian watermilfoil. Minnehaha Creek also contains flowering rush, and the creek between Minnetonka and Lake Nokomis contains zebra mussels.

In order to prevent their spread through local lakes, a rapid response plan has been created to contain AIS and eliminate them from threatening local lakes (Barr, 2018). This response plan only works when it is used for AIS which are detected early in their infestation or

before it is distributed widely in a lake (Barr, 2018). Barr, on behalf of the BCWMC, has prepared a report "BCWMC Aquatic Invasive Species Rapid Response Plan", which identified "Priority 1" lakes – those with public access or adjacent public land – and lays out a framework for response to newly detectly AIS (2018). Westwood Lake is a Priority 1 lake in St. Louis Park (Barr, 2018).

The AIS Rapid Resposne Plan for Westwood Lake developed by Barr is as follows:

1. Notify MnDNR of AIS infestion and MnDNR then verifies the infestation.
    a. BCWMC/SLP/WHNC: The first entity to find or be notified of AIS infestation contacts MnDNR and other agencies (BCWMC/SLP/WHNC).
    b. MnDNR: verifies infestation.
2. Communicate the infestation to stakeholders (including those downstream) and the public.
    a. SLP/WHNC: In conjunction with or immediately following MnDNR press release, communicates infestion to all stakeholders and the public.
    b. MnDNR: Issues press release prior to or in conjunction with stakeholder communication.
3. Monitor the extent of the infestation.
    a. BCWMC/SLP/WHNC: The entity taking the lead depends on the scale of the project. For small projects, SLP performs the monitoring or hires a contractor. For larger projects, BCWMC hires a contractor to perform the monitoring.
    b. MnDNR: Collaborates with SLP, BCWMC and MAISRC.
    c. MAISRC: Collaborates with SLP, BCWMC and MnDNR on monitoring design.
4. Determine if isolation of the infestation is necessary and if so, isolate the AIS.
    a. BCWMC/SLP/WHNC/MnDNR: Make a uniform decision after collaborating as needed with MAISRC. SLP implements quarantine for small projects; BCWMC implements for large projects.
5. Collaborate with MnDNR, MAISRC and stakeholders to determine what rapid response treatment or removal method is appropriate.
    a. For small projects, SLP will make the decision after considering recommendations from BCWMC/MnDNR/MAISRC.

b. For large projects, BCWMC will make the decision after considering recommendations from SLP/MnDNR/MAISRC.

6. Obtain a treatment/removal permit from MnDNR.
    a. BCWMC: Works with MnDNR to obtain treatment/removal permit for large projects.
    b. SLP/WHNC: Works with MnDNR to obtain treatment/removal permit for small projects.
    c. MnDNR: Works with BCWMC/SLP/WHNC to issue treatment/removal permit.
    d. MAISRC: Collaborates with BCWMC/SLP/WHNC/MnDNR to provide technical information.
7. If required (by MnDNR permit), perform additional pre-treatment monitoring.
    a. For small projects, SLP/WHNC performs the monitoring or hires a contractor.
    b. For large projects, BCWMC hires a contractor to perform the monitoring.
    c. MnDNR: Collaborates with BCWMC/SLP/WHNC/MAISRC regarding monitoring requirements of the permit.
    d. MAISRC: Collaborates with BCWMC/SLP/WHNC/MnDNR regarding monitoring design.
8. Hire a contractor to perform the AIS rapid response treatment or removal.
    a. For a small project, SLP/WHNC hires the contractor to perform the treatment/removal.
    b. For a large project, it will be a collaborative effort with BCWMC taking the lead.
9. Fund the AIS treatment/removal.
    a. BCWMC: Partners with Hennepin County and SLP to fund larger projects.
    b. SLP/WHNC: Seeks Hennepin County AIS rapid response monies if available. If they are not available and the project is small SLP funds it. For larger projects, SLP partners with BCWMC and Hennepin County to fund it.
    c. Hennepin County: Considers providing AIS rapid response grand funding if available.

10. Perform, or hire a contractor to perform, post-treatment monitoring to determine the effectiveness of the treatment/removal.
    a. For a small project, SLP/WHNC performs the monitoring or hires a contractor.
    b. For a large project, BCWMC hires a contractor to perform the monitoring.
    c. MnDNR: Collaborates with BCWMC/SLP/WHNC/MAISRC regarding monitoring requirements of the permit.
    d. MAISRC: Collaborates with BCWMC/SLP/WHNC/MnDNR regarding monitoring design.
11. Communicate information about the treatment/removal and its effectiveness to stakeholders (including those downstream) and the public.
    a. BCWMC: Collaborates with SLP/WHNC/MnDNR.
    b. SLP/WHNC: Communicates about the AIS infestation and management after collaborating with BCWMC and MnDNR.
12. Design and implement an education program to help prevent future AIS infestion.
    a. Collaboration between SLP/WHNC and BCWMC.
        i. SLP/WHNC takes the lead to educate City staff.
        ii. SLP/WHNC collaborates with BCWMC to obtain available education materials to disseminate.
    b. MnDNR: Provides any available education materals to SLP.
    c. MAISRC: May provide available education materials to SLP.

(Barr, 2018: "BCWMC Aquatic Invasive Species Rapid Response Plan")

2.10.3 Unique Features and Scenic Areas

Westwood Hills Nature Center is a unique and scenic area in the City of St. Louis Park. The center, which is nestled in an urban setting, houses a large variety of wildlife including deer, raccoon, waterfowl, egrets, blue herons, mink, red fox, grey squirrel, red squirrel, flying squirrel, painted and snapping turtles, American toads, barred owls, great horned owls, Cooper's hawks, and bats.

The MnDNR Natural Heritage Program and Nongame Wildlife Program maintain a database of rare plant and animal species and significant natural features. This database does not include any records of rare species or ecosystems found in St. Louis Park. Other

information was reviewed to determine whether other unique features are present in St. Louis Park. Based on this review, no "outstanding resource value waters" (Minnesota Rules, 7050.0180), no designated Scientific and Natural Areas (Minn. Stat. 86A.05), no State Wildlife Management Areas (Minn. Stat. 86A.05), and no State Aquatic Management Areas (Minn. Stat. 86A.05) are located within the city of St. Louis Park.

2.11 Pollutant Sources

2.11.1 Groundwater Contamination Hazards

There are currently two EPA superfund sites within the city that have resulted in significant groundwater contamination (MPCA, 2006). The first site is the Reilly Tar site. This 80-acre site was the location of the old Republic Creosote operation from 1917–1972. There, extensive soil and groundwater contamination occurred, resulting from the discharge of contaminated wastewater overland to wetlands adjacent to Minnehaha Creek as well as from spills. Six of St. Louis Park's municipal wells were closed due to the contamination of the Prairie du Chien-Jordan aquifer by polynuclear aromatic hydrocarbons. The city continues to monitor the groundwater in several different aquifers.

Additionally, the city continues to run gradient control wells, to pump and treat the groundwater. Between 2011 and 2014, the EPA conducted an extensive study into possible vapor intrusion from site contamination on properties on and near the site. EPA and its contractors took samples from indoor air; soil gas beneath the basements and foundations; and off-site, background soil gas, and the results showed no danger to humans from vapor intrusion. All of the contaminants detected in the indoor air were graded to be within EPA's acceptable ranges (EPA, 2015).

The second site is the Schloff Chemical site. This was the site of a chemical supply company that primarily distributed bulk 1,1,2,2, -Tetrachroloethylene. The soil, ground, and surface waters are contaminated with volatile organic compounds (VOCs). Interim remedial actions were implemented by Schloff Chemical, and the MPCA implemented the final remedial actions and conducted the operations and maintenance of the site. The Unterdruck-Verdampfer-Brunnen wells and equipment were removed, and several monitoring wells were abandoned. The MPCA is studying the site further to evaluate the effects of natural attenuation at this site.

2.11.2 Hazardous Waste and Materials

Figure 2-12 shows the approximate location of registered storage tanks, hazardous waste generators, leaking above- and below-ground tanks, dump sites, and Voluntary Investigation and Cleanup (VIC) sites, as obtained from the Hennepin County Department of Environmental Services. The original data source is the MPCA. The Hennepin County

Department of Environmental Services should be contacted for details about specific sites, because many of the sites have been cleaned up or are in the clean-up process now.

The MPCA VIC Program provides technical assistance and administrative and/or legal assurances for individuals or businesses seeking to investigate or clean up contaminated property and to bring contaminated land back into productive use. The City of St. Louis Park's Hazardous Materials Emergency Response Plan establishes procedures for the migration of hazardous material incidents (i.e., a spill, leak, or release of a hazardous material). The city's fire department is responsible for the implementation of this plan.

2.12 Water Quality

Historically, as the city developed, the city's lakes and ponds have been used for stormwater runoff detention in association with flood protection efforts. Unfortunately, the urbanization of a watershed often accelerates the degradation of waterbodies through a natural process known as eutrophication. Nonpoint source pollution associated with stormwater runoff creates adverse impacts; the degree of impact depends on the waterbody's natural ability to remove, absorb, or process the pollutants through chemical, physical, or biological processes. Poor water quality usually indicates a situation where the resource receives more nutrients or other pollutants than can be processed naturally.

The water quality management activities in the city have included the inventorying and monitoring of the water resources to provide an understanding of the water quality of the city's waterbodies. Waterbodies that are managed as lakes are classified based on the MPCA's shallow and deep lake criteria, which establish water quality goals and standards that, if met, will help prevent additional waterbodies from being listed on the MPCA 303(d) impaired waters list.

Additionally, the pollutant loading from all the key waterbodies within the city were modeled using the recently updated city-wide EPA SWMM modeling. This evaluation was used to estimate pollutant loads to the impaired waterbodies in the city as well as provide a baseline to determine the pollutant removal efficiencies of the waterbodiesfuture water quality improvement projects. and regional BMPs. Additionally, the model can be used to evaluate the impact of proposed development and BMPs on pollutant load reductions.

St. Louis Park
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FIGURE 2-12:
HAZARDOUS WASTE SITES

LEGEND

- Multiple Programs
- Air Quality
- Hazardous Waste
- Investigation and Cleanup
- Solid Waste
- Stormwater
- SSTS
- Tanks
- Water Quality
- Lakes
- City Boundary

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2.12.1 Water Quality Monitoring

The quality of water resources within the City of St. Louis Park has been monitored by a variety of agencies. These groups include BCWMC, MCWD, and the Metropolitan Council Citizen Assisted Monitoring Program (CAMP). Figure 2-13 shows the location of the various water quality (as well as water quantity) monitoring sites within St. Louis Park.

General information about lakes and monitoring data can also be found at the Mn https://www.dnr.state.mn.us/lakefind/index.html.

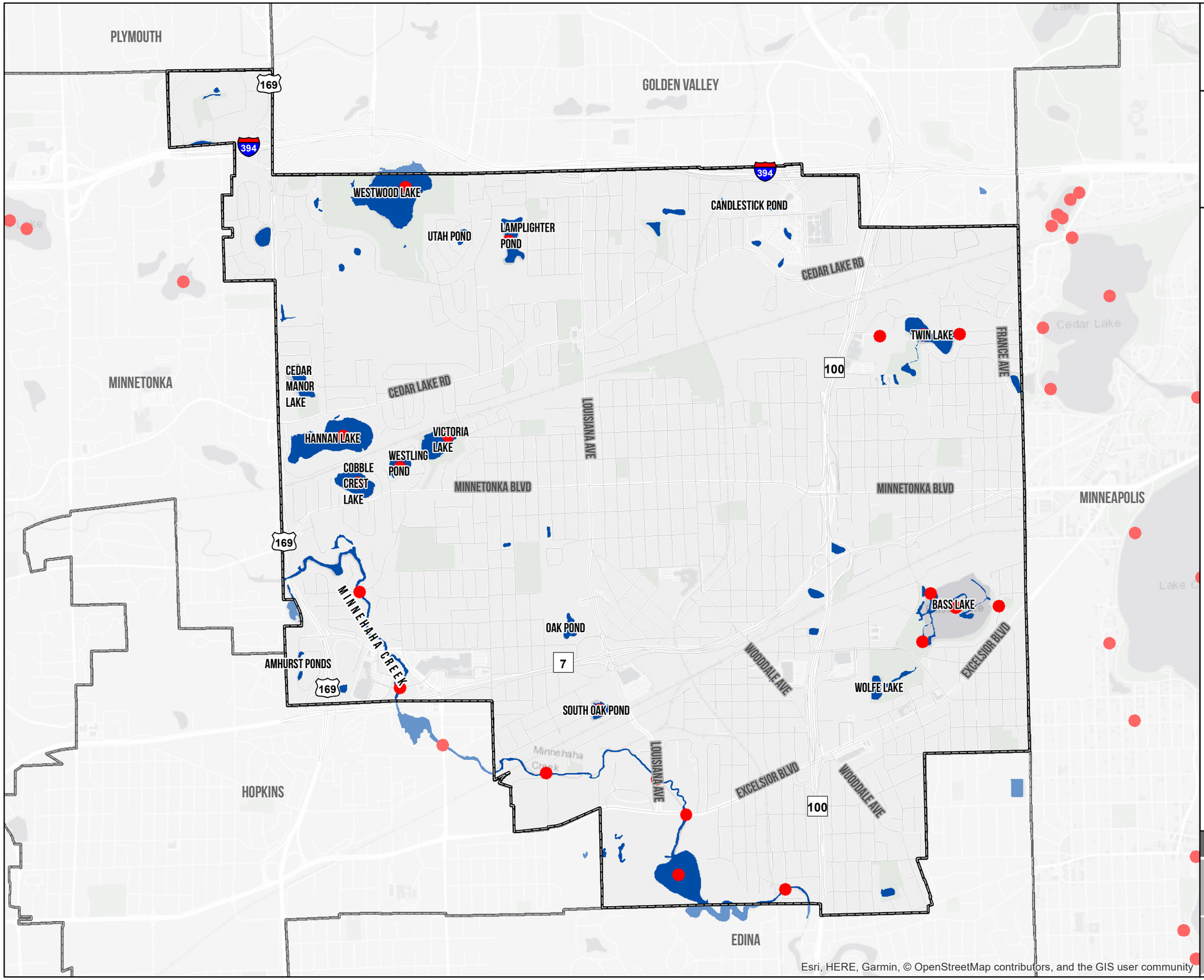
2.12.1.1 BCWMC

The BCWMC has performed detailed water quality monitoring of Westwood Lake. This detailed monitoring includes evaluation of chemically -based water quality parameters as well as biota such as zooplankton, phytoplankton, and macrophytes. Water quality samples were collected monthly from April through September. The water quality parameters that were monitored included dissolved oxygen, temperature, specific conductance, pH, Secchi disc transparency, total phosphorus, soluble reactive phosphorus, total nitrogen, and chlorophyll-a. Biota sampling for zooplankton and phytoplankton occurred monthly from April through September. Macrophyte surveys were completed in June and August. The most recent water quality data for Westwood Lake is summarized in the BCWMC 2015 Lake Water Quality Study: Westwood Lake (BCWMC, 2016). For more information related to the water quality monitoring performed by BCWMC, see www.bassettcreekwmo.org/projects/all-projects/westwood-lake-water-quality-improvement-project.

2.12.1.2 MCWD

MCWD does not monitor any of the lakes or wetlands within the City of St. Louis Park. However, the MCWD does monitor water quality at 10 stations along the length of Minnehaha Creek, including two within the City of St. Louis Park. The first station is located at the 34th Street crossing (MCWD ID: CMH02). The second station is at the Excelsior Boulevard crossing (MCWD ID: CMH11).

Each year, from mid-March through mid-October, MCWD staff collect weekly grab samples and analyzes them for a variety of parameters including dissolved oxygen, total phosphorus, total suspended solids, and chloride. The MCWD staff also performs biweekly testing for the presence of *E. coli* bacteria.



St. Louis Park
MINNESOTA

FIGURE 2-13: WATER QUALITY AND QUANTITY MONITORING

LEGEND

- Monitoring Sites
- Lakes
- City Boundary

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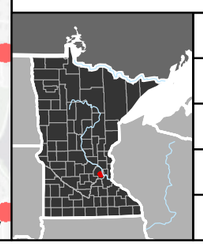

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In 2013, the MPCA collected aquatic macroinvertebrates in Minnehaha Creek from Lake Minnetonka to the Mississippi River and from five tributary streams to Lake Minnetonka. These same sites were monitored in 2003 by MCWD.

In 2015, selected sites from Minnehaha Creek and the tributary streams to Lake Minnetonka were monitored again. The 2015 results had some variation from 2013 but overall were similar in showing the impact of urbanization and stream channelization in this area. The results of this study can be found in the Macroinvertebrate Assessment report (MCWD, 2015).

More information about the water quality monitoring the MCWD performs is available at www.minnehahacreek.org/project?field_city_tid=All&field_project_type_tid=781.

2.12.1.3 Other Monitoring Programs

The Metropolitan Council's CAMP has been collecting water quality data on several Twin Cities metropolitan area lakes since 1980. On a biweekly basis (April–October), citizen volunteers collect a surface water sample for laboratory analysis of total phosphorus, total Kjeldahl-nitrogen, chlorophyll-*a*, and a Secchi transparency measurement, and they provide some information about each lake's physical and recreational condition. Five lakes within St. Louis Park have been monitored as part of the CAMP program: Cobblecrest, South Oak, Twin, Bass, and Westwood Lakes.

For more information about the CAMP program, please see the following website: https://metrocouncil.org/Wastewater-Water/Services/Water-Quality-Management/Lake-Monitoring-Analysis.aspx.

2.12.2 Water Quality Management Classification

MPCA, MnDNR, MCWD, and BCWMC have all established their own methods of classifying water resources based on their water quality. St. Louis Park will manage its waterbodies using the MPCA's criteria if they are stricter than the criteria outlined by the WMOs; otherwise, the WMO water quality criteria will apply. The City of St. Louis Park is located in the North Central Hardwood Forest (NCHF) ecoregion of Minnesota and manages its lakes based on the criteria for this ecoregion.

Table 2-5 provides a summary of the major waterbodies within the City of St. Louis Park, their physical characteristics, a summary of the most recent water quality data, and the water quality management classifications and goals set by the various agencies. More detailed information on each of the management classification systems is included in the following sections.

2.12.2.1 Watershed Management Organization Classification

Each WMO has developed its own method to classify waterbodies based on their water quality, desired uses, and water quality goals. Table 2-5 summarizes each of the WMOs' water quality classification systems. MCWD is in the process of revamping its waterbodies classification system to the ecosystem evaluation assessment program or E-Grade. The information presented is what currently exists for waterbodies in the City

Table 2-6: Summary of Physical Characteristics, Water Quality, and Management Classifications for Water Resources in St. Louis Park, MN

Waterbody Name	Waterbody Physical Characteristics		Most Current Water Quality Conditions	Waterbody Classification by Regulatory Agency				
	Surface Area (Acres)	Max Depth (feet)		City Water Quality Goals	Watershed Organization & Classification	MPCA Shallow Classification & Criteria	MPCA 303(d) Impaired Waters List	City Wetland Management Classification
Westwood	92.8	5.0	Year of Record: 2007 [TP] = 47 µg/L [Chla] = 11.6 µg/L SD = 1.3 m	TP < 45 µg/L Chla < 20 µg/L SD > 1.4 m	BCWMC Priority 1 - Shallow lake TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	NCHF -- Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	Manage I
Cobblecrest	8.5	N/A	Year of Record: 2007 [TP] = 168.5 µg/L [Chla] = 126.4 µg/L SD = 0.3 m	TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	MCWD/2006 F TP > 152 µg/L Chl*a* > 77 µg/L SD < 0.7 m	NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	Yes - See Table 2-7	Manage II
Twin	12.4	N/A	Year of Record: 2007 [TP] = 154.1 µg/L [Chla] = 62.1 µg/L SD = 0.5 m	TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	MCWD/2006 D TP = 62-152 µg/L Chl*a* = 48 - 77 µg/L SD = 1.2 - 0.7 m	NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	Yes - See Table 2-7	Manage II
Bass	52.2	N/A	Year of Record: 2006[2] [TP] = 195.5 µg/L [Chla] = 12 µg/L SD = 0.9 m	TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	Manage I
Hannan	34.6	N/A	Year of Record: 1991[7] [TP] = 220 µg/L [Chla] = 205 µg/L SD = 0.25 m	TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	Manage II
Victoria	9.2	N/A	N/A	TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	Manage II
Lamplighter	7.6	N/A	N/A	TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	Manage II

Waterbody Name	Waterbody Physical Characteristics		Most Current Water Quality Conditions	Waterbody Classification by Regulatory Agency				
	Surface Area (Acres)	Max Depth (feet)		City Water Quality Goals	Watershed Organization & Classification	MPCA Shallow Classification & Criteria	MPCA 303(d) Impaired Waters List	City Wetland Management Classification
Wolfe	2.5	N/A	N/A	TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	Manage II
Meadowbrook[3]	74.6	N/A	N/A	TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	Manage I
Unnamed	2.8	N/A	N/A	TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	Manage II
Unnamed	2.7	N/A	N/A	TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	Manage II
Unnamed	10.6	N/A	N/A	TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	NCHF - Shallow TP < 60 µg/L Chla < 20 µg/L SD > 1.0 m	N/A	Manage II
Minnehaha Creek	N/A	N/A	N/A	N/A	-	N/A	Yes - See Table 2-7	-

Table 2-7: Summary of the WMO Water Quality Classification Systems

Water Quality Category	Desired Recreational Use	Desired Total Phosphorus Concentration (µg/L)	Desired Chlorophyll-*a* Concentration (µg/L)	Desired Secchi Disc Depth (meters)
Priority 1 - Deep lake	N/A	40	14	1.4
Priotiy 1 - Shallow lake	N/A	60	20	1
Priority 2 - Shallow lake	N/A	60	20	1
Minnehaha Creek Watershed District				
A	Crystal clear, beautiful. These lakes are exceptional and are enjoyed recreationally without question or hesitation.	< 23	< 10	> 3
B	These lakes generally have good water quality, but algae may limit swimming, particularly toward the end of summer.	23 - 32	10 - 20	3.0 - 2.2
C	Average quality. Swimming, boating, and fishing may be undesirable relatively early in the season. Algae blooms occasionally.	32 - 68	20 - 48	2.2 - 1.2
D	These lakes have severe algae problems. People are generally not interested in recreation on these lakes.	68 - 152	48 - 77	1.2 - 0.7
F	Not enjoyable. Such a lake would have severe limitations to recreational use.	> 152	> 77	< 0.7

a. BCWMC

The BCWMC classifies waterbodies into four levels based on desired water quality goals and recreational uses. The degree to which a waterbody can support a particular recreational use is primarily controlled by the quality of the water. The BCWMC established goals for total phosphorus and chlorophyll-*a* concentrations as well as for Secchi depth, because these are the parameters that are typically used to determine water quality. Level -I waterbodies have good water quality that supports all recreational uses, whereas Level -IV classifications indicate very poor water quality with uses primarily for runoff management.

b. MCWD

The MCWD's lake water quality rating is based on the standards established by the Metropolitan Council. This system assigns a water quality grade to each waterbody based on the summer average total phosphorus and chlorophyll-a concentrations as well as the Secchi depth. The total grade for the waterbody is the average of the grades for each of the three parameters. Grades are an indicator of the perceived condition of the open waterbody but are not a water quality goal. A grade of A indicates very good water quality, whereas a grade of F indicates very poor water quality.

As mentioned, the MCWD is in the process of migrating to the E-Grade system for classifying waterbodies. The MCWD felt its current method of grading the health of its waters only provides a partial picture of lake health by looking only at three factors: phosphorus, chlorophyll and water clarity. The E-grade would consider biodiversity, habitat diversity, nutrient cycling, recreation potential and flood control. The E-grade release for resources within the City is unknown.

Several waterbodies in the City of St. Louis Park are included on the MPCA 2018 draft impaired waters [303(d)] list. These waterbodies include Twin Lake, Cobblecrest Lake, and Minnehaha Creek. Typically, impaired waters are listed as such when they exceed the MPCA ecoregion eutrophication criteria for a given waterbody. Waterbodies on the impaired waters list are required to have a total maximum daily load (TMDL) assessment completed that addresses the causes and sources of the impairment and provides a waste load allocation (WLA) needed to restore them. Figure 2-14 shows the location of the impaired waters within the City of St. Louis Park, and Table 2-7 includes a summary of the impaired lakes, including the reason for impairment. WLA for Twin and Cobberstone Lakes has not been assessed. Minnehaha Creek's TMDL was done and the city's approximate WLA is 450 pounds.

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FIGURE 2-14:
IMPAIRED WATERS

LEGEND

- Impaired Streams
- Impaired Lakes
- Lakes
- City Boundary

MINNEHAHA CREEK SUMMARY:

Impaired uses: Recreation

TMDL needed for: Dissolved Oxygen, Fish Bioassessments, Aquatic Macro-Invertebrate Bioassessments

TMDL Approved For: Chlorides, Fecal Coliform

TWIN LAKE SUMMARY:

Impaired Uses: Aquatic Recreation

TMDL Needed For: Nutrients

COBBLE CREST LAKE SUMMARY:

Impaired Uses: Aquatic Recreation

TMDL Needed For: Nutrients

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Table 2-8: Summary of Impaired Waterbodies in St. Louis Park, MN

Waterbody	Reach	Affected Use	Pollutant/ Stressor	Year Listed	Target Start	Target Completion	Comments
Twin Lake	Lake	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	2006	2013	2017	
Cobblecrest Lake	Lake	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	2008	2013	2017	First listed in 2008
Minnehaha Creek	Lake Minnetonka to Mississippi River	Aquatic Life	Fish Bioassessments	2004	2009	2012	
		Aquatic Recreation	Fecal Coliform	2008	2009	2012	First listed in 2008
		Aquatic Life	Chloride	2008	2009	2012	First listed in 2008
		Aquatic Life	Dissolved Oxygen	2010 [2]	2009	2012	First listed in 2010 Draft 303(d) Impaired Waters List

2.12.3 Water Quality Modeling

The City of St. Louis Park and WMOs have undertaken many water quality modeling efforts that have been used to estimate the water quality of stormwater runoff and water bodies within the city. Previous efforts have provided a patchwork of models across the city, including a P8 (Program for Predicting Polluting Particle Passage through Pits, Puddles, and Ponds) model developed by BCWMC for their 2015 Watershed Management Plan, which includes total flow and phosphorus loadings for Westwood Lake and northern portions of the City. The following sections summarize the most recent water quality modeling efforts.

2.12.3.1 City-Wide Water Quality Modeling

As part of the development of this SWMP, the entire City of St. Louis Park was modeled using EPA SWMM to estimate pollutant loading from each subwatershed as well as the pollutant removal efficiencies of the impaired waterbodies. The city provided all available hydrologic and hydraulic models for this SWMP update. As part of the modeling update, discussed in Section 2.13.3, a water quality component was included in the EPA SWMM models. Using monitoring data from MPCA and MCWD to verify results where available, these updated city-wide models may now be used to evaluate the current pollutant loads entering waterbodies and the effectiveness of potential water quality treatment projects. Using an open-source software such as EPA SWMM, will allow city staff to update the models as needed in the future. The results from the water quality analysis are provided in Appendix **F**.

2.12.3.2 City-wide MS4 Nondegradation Modeling

The MPCA requires select NPDES MS4s, including St. Louis Park, to complete a nondegradation analysis for the time periods between 1988 to the 2007 and between 2007 to 2020. St. Louis Park quantified the change in stormwater discharge loading during these time periods in terms of average annual flow volume, total suspended solids (TSS), and total phosphorus (TP). A simple method was used to estimate stormwater and pollutant loadings for 1988, current conditions (defined by land use data from 2000/2002), and 2020. This method analyzes land use and imperviousness to estimate water and pollutant loads. Additionally, a P8 water quality model was used to assess the benefits that expected future BMP implementation will have on flow volume, TSS, and total phosphorus loading.

The city developed the loading model to estimate the treatment required between 2007 and 2020 so that runoff volumes and pollutant loads from the city will not exceed that of the 1988 baseline loading conditions. For more information about this modeling, see the

City of St. Louis Park Nondegradation Report Submittal to the Minnesota Pollution Control Agency for Selected MS4 Permit Requirements (December 2007), which can be found in **Appendix E**.

2.13 Water Quantity/Flooding

This section discusses the water quantity monitoring programs that exist within the City of St. Louis Park. It also discusses the flood insurance studies that indicate flood levels along major water courses and WMO flood criteria that must be followed to meet regional flood control goals. The hydrologic modeling efforts of the city and the WMOs are also presented.

2.13.1 Water Quantity Monitoring

Water quantity monitoring programs include the operation of continuous flow gauging stations, manual flow measurements, and the measurement of water levels in lakes and wetlands. All water quantity monitoring data within the City of St. Louis Park are currently collected by the two WMOs within the city.

The BCWMC is responsible for the monitoring of water levels on the primary lakes within the Bassett Creek watershed. In the City of St. Louis Park, this includes Westwood Lake.

The MCWD maintains two monitoring stations within of St. Louis Park. The first station is located at the 34th Street crossing (MCWD ID: CMH02). The second station is at the Excelsior Boulevard crossing (MCWD ID: CMH11). Both stations monitor flow as well as water quality parameters. Information about the monitoring done by MCWD can be found here: www.minnehahacreek.org/data-center.

2.13.2 Flood Insurance Studies

The current effective FEMA Flood Insurance Study (FIS) for the City of St. Louis Park is dated November 6, 2016. The current effective Flood Insurance Rate Maps (FIRMs) for the City of St. Louis Park are dated November 4, 2016. The FIS and FIRMs are available on the FEMA Flood Map Service Center website: msc.fema.gov/portal/home.

2.13.3 Hydrologic and Hydraulic Modeling

The City of St. Louis Park has had numerous H&H models developed over the years, including HEC-2 models of Minnehaha Creek used by FEMA for the original Flood Insurance Study of 1979. More recently the WMOs have developed regional models using XP-SWMM, including modeling for the proposed Southwest Corridor Light Rail project. Unfortunately, despite this wealth of information, no single and comprehensive city-wide model existed until the development tof this SWMP.

2.13.3.1 City Modeling

a. City-wide Model

For this SWMP, the disparate H&H models were combined, standardized, and updated with available as-built information, the city's GIS data, and recently completed MnDOT projects. The models were developed in EPA SWMM to allow city staff to update the models as new and redevelopment occurs, as well as to evaluate potential benefits and impacts of proposed stormwater projects. It is the city's goal to be able to use these models to support the continued update and maintenance of FEMA's Flood Insurance Rate Maps.

The city-wide models were used to quantify the 10-year and 100-year 24-hour design storm events using both NOAA's Atlas 14 and TP40 rainfall data for comparison. The modeling efforts included the delineation of watersheds and subwatersheds throughout the city. The results of the model are used to estimate flood elevations on waterbodies and low-laying areas within the city as well as to evaluate the capacity of the existing storm sewer conveyance system.

The results from these models are provided in **Appendix F**.

b. City Updates

Since the previous SWMP was completed, the city has undergone several major construction projects, including MnDOT reconstruction projects on TH 7, TH 100, and US 169. In 2017, the city installed a new underground stormwater treatment facility at Carpenter Park to provide water quality treatment for 40 acres of residential and commercial land, for the benefit of Bass Lake.

2.13.3.2 Watershed Management Organization Modeling

Both the BCWMC and the MCWD have performed hydrologic and hydraulic modeling within the City of St. Louis Park.

a. BCWMC

The BCWMC, in conjunction with the COE, developed a HEC-1 model of the entire Bassett Creek watershed decades ago. The district was broken down into several watersheds of a relatively large scale, focusing mainly on the contributing areas to the larger flood storage areas. In 2012 and 2013, the BCWMC converted and updated the HEC models to XP-SWMM.

In 2017 the XP-SWMM model was updated again to incorporate more detailed subwatershed, storage, and storm sewer information for the watershed, including the major ponds and wetlands. The updated model, referred to as the Phase-2 XP-

SWMM model update, increased the number of subwatersheds from 55 to approximately 1,160. This model was developed to fully capture and route the Atlas 14 100-year design storm event. The model was calibrated at several locations, and the calibrated model was used to estimate the Atlas 14 100-year flood elevations along the Bassett Creek system and within the contributing watershed.

The Phase-2 XP-SWMM model is intended for use by the BCWMC, member cities, and other entities to evaluate projects and make informed watershed management decisions.

b. MCWD

From 2001 to 2003, the MCWD completed its Hydrologic/Hydraulic and Pollutant Loading Study (HHPLS) of the existing conditions within the watershed. This study included the development of an XP-SWMM model for the entire Minnehaha Creek watershed to evaluate flows, hydraulics, flooding, and structures. The watershed was broken up into several large drainage districts, including much of the City of St. Louis Park. These drainage districts were further broken down into many smaller subwatersheds.

2.14 Land Use

St. Louis Park is designated by the Metropolitan Council as a "developed community" geographic planning area in the 2040 Regional Development Framework. In general, St. Louis Park is fully developed, with the major land use being residential. The population projections included in the city's current comprehensive plan show slow, steady growth for the community. Growth will be accomplished primarily through redevelopment of certain sites. Existing and projected land use within the City of St. Louis Park are shown in Figure 2-15 and Figure 2-16, respectively.

St. Louis Park is committed to being a connected and engaged community. The city's land use plan is guided by the idea of creating a "livable community" that uses the best design practices from the past and the present to build a connected community that contains housing, schools, shops, workplaces, water resources, parks, and civic facilities essential to the daily life of the city's citizens. As stated in Metropolitan Council 2040 Water Resources Policy Plan, "Water resoources has strategic important in achieving economic growth, competitiveness and high quality of life". To achieve this goal, the land use plan provides guidance for the community's desired land use patterns, mix of uses, density, site and building design, and neighborhood planning. It also includes policies and encourages strategies that promtes the livability of the city and region thgough access to adequate water supplies for drinking and promiting the protection and restoration of water resources for recreational use.

Although many redevelopment parcels and adjacent street patterns may not be conducive to the city's goals, there is a need to find ways to adapt these principles without compromising their general intent. Rather than just looking within the boundaries of the project, redevelopment will consider how pedestrians, residents, and nearby workers will be affected. The intent of the land use plan is for all development to add to and fit into the larger context of the street, neighborhood, and community.

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FIGURE 2-15:
EXISTING LAND USE

LEGEND

- Civic
- Commercial
- Industrial
- Mixed Use
- Office
- Parks and Open Space
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Right-of-Way
- Railroad
- Lakes
- City Boundary

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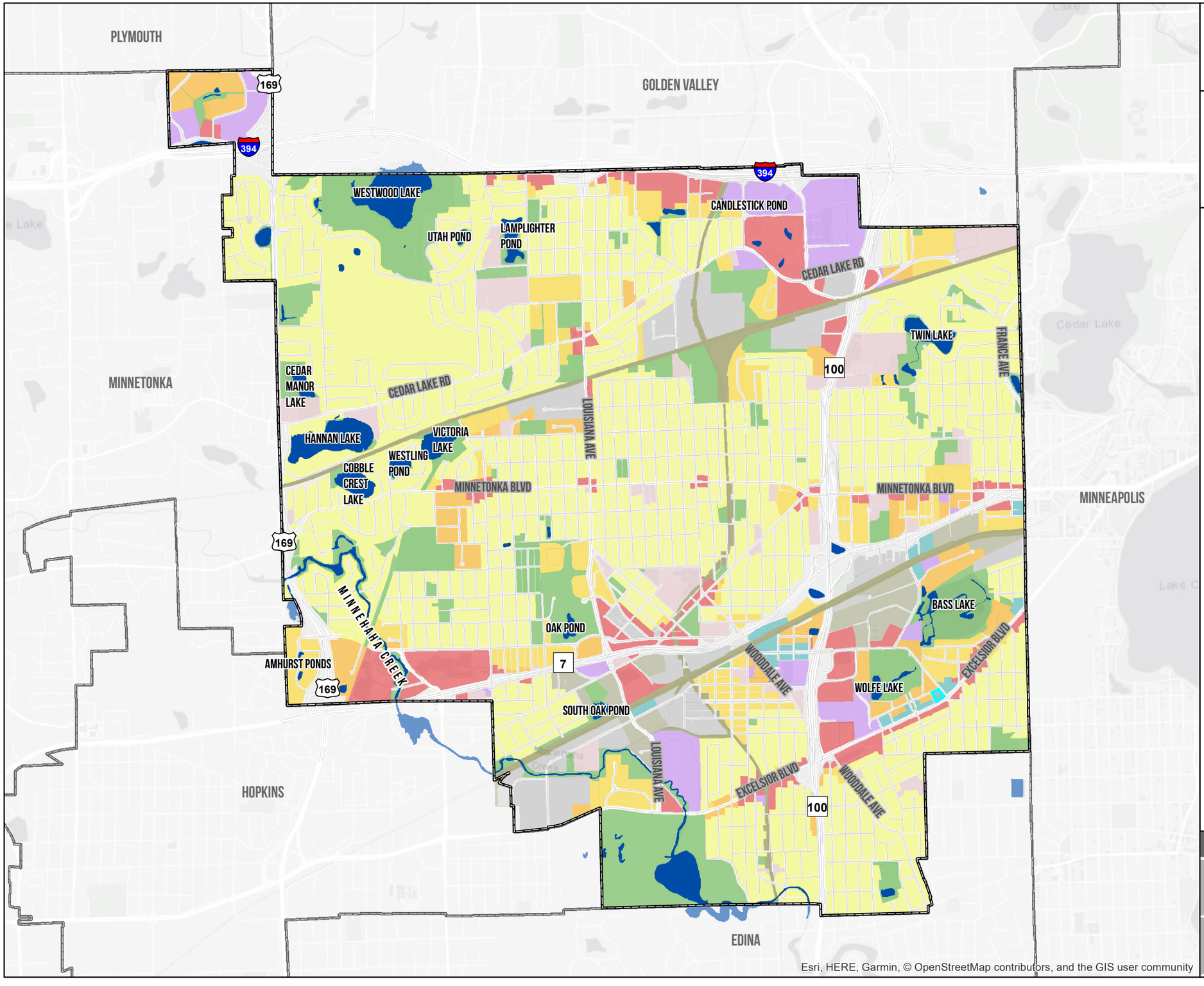

St. Louis Park
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FIGURE 2-16:
FUTURE LAND USE

LEGEND

- Business Park
- Civic
- Commercial
- Industrial
- Mixed Use
- Office Park
- Park and Open Space
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Right-of-Way
- Railroad
- Lakes
- City Boundary

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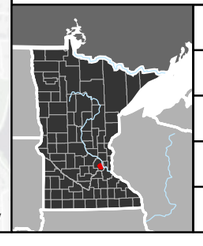

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Chapter 3.0 Existing and Potential Water Resource-Related Problems

City of St. Louis Park Surface Water Management Plan

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Chapter 3.0 Existing and Potential Water Resource-Related Problems

This chapter describes the complex set of surface and storm water management issues facing the City of St. Louis Park. It also assesses the adequacy of the city's programs to address the issues, as outlined.

3.1 Water Quality Issues

Pollutants are discharged to surface waters as either point sources or nonpoint sources. Point source pollutants discharge to receiving surface waters at a specific point and from a specific identifiable source. Discharges of treated sewage from a wastewater treatment plant or from an industry are examples of point sources. Unlike point sources, nonpoint source pollution cannot be traced to a single source or pipe. Instead, pollutants are carried from land to water in stormwater or snowmelt runoff, in seepage through the soil, and via atmospheric transport. All these forms of pollutant movement from land to water make up nonpoint source pollution.

For lakes, ponds, and wetlands, phosphorous is typically the pollutant of major concern. Point sources of phosphorus typically come from municipal and industrial discharges to surface waters, whereas nonpoint sources of phosphorus come from urban runoff, construction sites, and individual septic treatment systems (ISTS), and in agricultural areas from fields and feedlots. Point sources frequently discharge continuously throughout the year, whereas nonpoint sources discharge in response to precipitation or snowmelt events.

For most waterbodies, nonpoint source runoff—especially stormwater runoff—is a major contributor of phosphorus. In urban areas, nutrient and sediment inputs (i.e., loadings) from stormwater runoff can far exceed the natural inputs to the city's waterbodies. In addition to phosphorus, stormwater runoff may contain pollutants such as oil, grease, chemicals, nutrients, metals, litter, and pathogens, which can severely reduce water quality.

Even in areas that are already well-developed, land disturbance activities (e.g., construction or redevelopment) may also result in increased amounts of phosphorus carried in stormwater runoff. In addition to watershed sources, other possibly significant sources of phosphorus include atmospheric deposition, internal loading (e.g., release from anoxic sediments, algae die-off, aquatic plant die-back, and fish disturbed sediment), and failing ISTS.

As phosphorus loadings increase, it is likely that water quality degradation will accelerate, resulting in unpleasant consequences such as profuse algae growth or algal blooms. Algal blooms, overabundant aquatic plants, and the presence of nuisance and/or exotic species, such as Eurasian watermilfoil, purple loosestrife, and curlyleaf pondweed, interfere with ecological functions as well as the recreational and aesthetic uses of waterbodies. Phosphorus loadings must be reduced often to control and/or reverse water quality degradation.

3.1.1 National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Program (SWPPP)

The City of St. Louis Park is included in a group of communities with populations greater than 10,000 that are federally required to obtain an MS4 permit for managing nonpoint source stormwater. The permitting process requires cities such as St. Louis Park to file a Phase-II NPDES permit with the MPCA, which addresses how the city will regulate and improve stormwater discharges. The City of St. Louis Park's SWPPP, presented in **Appendix B,** addresses the six minimum control measures required by the permit:

1. Public outreach and education
2. Public participation and involvement
3. Illicit discharge detection and elimination
4. Construction site runoff control
5. Post-construction runoff control
6. Pollution prevention and good housekeeping

3.1.2 Nondegradation Report

The city developed a nondegradation report in 2007(see **Appendix E**). **Appendix C** covers discharges to wetlands that are applicable to the City of St. Louis Park. **Appendix D** covers the city's nondegradation requirements, including the development of the loading assessment and nondegradation report.

The City of St. Louis Park's "Nondegradation Report Submittal to the Minnesota Pollution Control Agency for Selected MS4 Permit Requirements" (City of St. Louis Park, 2007) examines proposed land use changes and the resulting changes in impervious areas to estimate future phosphorus loading.

The results of the nondegradation analysis show that total average annual flow volume from the city has not increased or changed significantly from 1988 and will remain approximately the same through 2020, regardless of future BMP implementation. The analysis also shows that total phosphorus loading from the city decreased by 4 percent between 1988 and 2000/2002. The analysis presented in the nondegradation report assumed future BMP implementation would achieve a phosphorus removal efficiency of 56 percent from all redevelopment sites within the city. No phosphorus load reductions from additional BMPs were quantified at the time. With future BMP implementation, total phosphorus loading is expected to decrease by 5 percent relative to current conditions, resulting in an average total phosphorus load of 5,536 lbs. per year. The predicted future load with BMP implementation is 446 lbs. per year less than the estimated future phosphorus load, assuming

no BMP implementation (5,982 lbs. per year), and 307 lbs. per year less than the 2000/2002 estimated load (5,843 lbs. per year).

Current and future implementation of BMPs have provided significant treatment for flow volume and TP and TSS loadings in runoff to the city's receiving waters compared with the 1988 condition. In the future, the city intends to implement infiltration practices to mitigate any volume and loading increases wherever it is practical and reasonable to do so.

The city's 2007 nondegradation report also includes a qualitative assessment of BMP selection considerations, including channel erosion, wetland impacts, source water protection, and retrofitting. The complete City of St. Louis Park Nondegradation Report (City of St. Louis Park, 2007) is included in this plan as **Appendix E**.

3.1.3 Impaired Waters and TMDL Issues

The federal Clean Water Act (CWA) requires states to adopt water quality standards to protect the nation's waters. Water quality standards designate beneficial uses for each waterbody and establish criteria that must be met within the waterbody to maintain the water quality necessary to support its designated use(s). Section 303(d) of the CWA requires each state to identify and establish priority rankings for waters that do not meet the water quality standards. The list of impaired waters, or 303(d) list, is updated by the state every two years.

For impaired waterbodies, the CWA requires the development of a TMDL. A TMDL is a threshold calculation of the amount of a pollutant that a waterbody can receive and still meet water quality standards. A TMDL establishes the pollutant loading capacity within a waterbody and develops an allocation scheme among the various contributors, which include point sources, nonpoint sources, and natural background levels as well as a margin of safety. As a part of the allocation scheme, a waste load allocation (WLA) is developed to determine allowable pollutant loadings from individual point sources (including loads from storm sewer networks). A load allocation (LA) establishes allowable pollutant loadings from nonpoint sources and natural background levels in a waterbody.

The city's SWPPP also requires review of the impaired waters list to determine whether there are any impaired waters located within five miles of the city's boundaries that receive discharge from the city's MS4. The city must identify the location(s) of discharge(s) from the city's system to the identified impaired waters; delineate watershed areas within the city's jurisdiction that discharge to each impaired water; prepare an impaired waters evaluation addressing hydrology, land use, and other characteristics of each delineated watershed area; and determine whether changes to the city's SWPPP are warranted to reduce the impact from the city's stormwater discharge to each impaired water of concern.

The criteria used to determine if a lake is impaired vary according to the lake's ecoregion. St. Louis Park is within the MPCA's designated North Central Hardwood Forest (NCHF)

ecoregion. The MPCA defines "shallow lakes" as having (a) a maximum depth of 15 feet or less, or (b) wherein 80 percent or more of the lake is littoral (i.e., the percentage of the lake that is 15 feet deep or less). These criteria are included in Table 3-1.

Table 3-1: MPCA Impaired Waters Listing Criteria*

Ecoregion/ Lake Type	Water Quality Constituent		
	Total Phosphorus ug/L (ppb)	Chlorophyll-a ug/L (ppb)	Secchi Disc (meters)
North Central Hardwood Forest			
Trout Lakes	<20	<6	>2.5
Deep Lakes	<40	<14	>1.4
Shallow Lakes	<60	<20	>1.0

*From Minnesota Rules Chapter 7050 (MPCA, December 18, 2007)

Impaired waters located within the City of St. Louis Park include Twin Lake, Bass Lake, Cobblecrest Lake, and Minnehaha Creek. These waterbodies are listed in Chapter 2, along with the affected MPCA designated use, the pollutant and/or stressor that is not meeting the MPCA water quality criteria, the year listed, and the MPCA target for starting and completing the TMDL process.

For these waterbodies, load reductions will be assigned to the city based on the TMDL results. This surface water management plan will likely need to be amended to incorporate these TMDL requirements. Also, the TMDL requirements and could be incorporated into the city's NPDES Phase -II MS4 permit.

In addition to TMDLs for specific impaired waters, the MPCA has developed a statewide TMDL for mercury. Mercury in Minnesota fish comes almost entirely from atmospheric deposition, with approximately 90 percent originating outside of Minnesota (MPCA, 2004). Because the main source of mercury comes from outside the state and because the atmospheric deposition of mercury is relatively uniform across the state, the TMDL for mercury is 11 kg/year for the entire state.

3.1.4 2018 Water Quality Modeling

Using Event Mean Concentration (EMC) data for total phosphorus and total suspended solids, collected for the various land use types in the city, and a 10-year rainfall record, the watershed loading rates were calculated in the hydrologic and hydraulic SWMM models.

Given the significant area occupied by state highways in the city, the pollutant loading from MnDOT right-of-way was separated out along I-394, Trunk Highways 7 and 100, and US 169. Loading rates from the watershed were allocated to each entity based on their proportional areas in each subwatershed. The results for the City of St. Louis Park are provided in Table 3-4. The loads within the drainage areas of the three impaired lakes in the city are included in Table 3-6.

Table 3-2: City of St. Louis Park Pollutant Loading Summary

	St. Louis Park
Area (ac)	6,645
Annual TP Load (2008-2017) (lb/yr)	7,989
TP Loading Rate (lb/ac/yr)	1.20
Annual TSS Load (2008-2017) (lb/yr)	2,893,431
TSS Loading Rate (lb/ac/yr)	435.45
ac = acres. lb/yr = pounds per year. lb/ac/yr = pounds per acre per year.	

Table 3-3: Annual Total Phosphorus Load (2008–2017) to Nutrient-Impaired Waters in St. Louis Park

Impaired Water	City of St. Louis Park (lb/yr)
Bass Lake	1,975.7
Cobblecrest Lake	327.6
Twin Lake	2,303.9
lb/yr = pounds per year.	

3.2 Stormwater Runoff Rate and Volume Issues

In a natural, undeveloped setting, the ground is often pervious, meaning water (including stormwater runoff) can infiltrate the soil. Land development dramatically changes how stormwater runoff moves in the local watershed. During construction or redevelopment, clearing and grading of the site results in less infiltration, higher rates and volumes of stormwater runoff, and increased erosion. Ground surfaces covered with impervious materials (e.g., asphalt and

concrete) prevent infiltration of water into the soil. As a result, the rate and volume of stormwater runoff from the site increases even more, which can create significant problems for downstream water resources. Further, the reduced amount of infiltration means less water is being recharged into the groundwater system, which can result in decreased base flows in creeks, normal water levels in lakes, and potential losses to the long-term sustainability of groundwater drinking supplies.

If the land drains to a landlocked basin, the additional volume of runoff can increase the normal water level and flood level of the basin. If the land drains to a creek, the additional runoff volume can cause the creek to flow full for longer durations, which increases erosion potential.

Although both high water levels (flooding) and low water levels are of concern to city residents and city staff, more concern and attention is usually paid to flooding because it is a greater threat to public health and safety and can result in significant economic losses. Damages caused by flooding include the following:

- Damage to homes, businesses, and other buildings
- Damage to infrastructure (e.g., roads, bridges, wells)
- Flooding of individual septic treatment systems, rendering them unusable
- Damage or destruction of recreational trails and bridges

Flooding may cause other damages that are harder to quantify, including the following:

- Flooding of roads so they are impassable to emergency vehicles, residents, and school buses
- Shoreline erosion
- Destruction of vegetation, such as grass, shrubs, and trees due to extended inundation
- Unavailability of recreational facilities for use by the public (e.g., inundation of shorelines) and/or restricted recreational use of waterbodies
- More strain on budgets and personnel for repairing flood-damaged facilities and controlling public use of facilities during flooding events
- Alterations to mix and diversity of wildlife species as a result of inundation of upland habitats

Of special concern is flooding on landlocked waterbodies, which prolongs the damages and impacts. Because there is no surface outlet, runoff that collects in these depressions can only be removed by seepage and evaporation. As the water tables rise during periods of above-average precipitation, seepage out of landlocked basins can also decrease. As a result, landlocked basins are subject to wide variations in water levels, and their 100-year floodplains typically cover large areas.

Landlocked basins can also provide benefits. The long-lasting seepage from landlocked basins provides important groundwater recharge benefits. Also, landlocked basins do not discharge surface waters to downstream basins, which could otherwise be negatively impacted by additional stormwater volume.

The city may need to provide outlets from landlocked basins to prevent damages that occur during periods of sustained high-water levels, but it is not always feasible or reasonable for the city to do so. For example, it may not be feasible to provide outlets because of the long distances to the nearest receiving water, the depth of the pipe, and the capacity of the nearest outlet or receiving water. It may not be reasonable to provide outlets because of the downstream impacts on flood levels and/or water quality. It can also be difficult for the city to provide even temporary relief during flooding situations for the same reasons that it is difficult to provide permanent outlets.

Floodplain management is the management of development and other activities in or near the floodplain to prevent flood damages. The MnDNR defines floodplain management as "the full range of public policy and action for ensuring wise use of the floodplains. It includes everything from collection and dissemination of flood control information to actual acquisition of floodplain lands, construction of flood control measures, and enactment and administration of codes, ordinances, and statutes regarding floodplain land use."

Minnesota law defines the floodplain as the land adjoining lakes, water basins, rivers, and watercourses that have been or may be covered by a 100-year or regional flood. Floodplains of larger basins and creeks are mapped by the Federal Emergency Management Agency (FEMA) on Flood Insurance Rate Maps (FIRMs), which are included in county-based Flood Insurance Studies (FISs). The city manages activities in the FEMA-designated floodplain areas through the St. Louis Park floodplain ordinance (Chapter 36, Division 11). The city has determined 100-year flood levels for many waterbodies that are not mapped on FEMA FIRMs. The city manages activities within the floodplains of these waterbodies through its permit and approval processes (See Appendix M).

3.2.1 2018 Hydrology and Hydraulic Modeling

The results of the updated hydrologic and hydraulic SWMM analyses are presented in Appendix F, including the approximate extents of surface flooding and pipe capacities in the City. Excessive surface flooding, which are defined as more than 2-ft deep even during the smaller 10-year event, excluding ponds and lakes, include the following:

- City Hall parking lot
- Edgewood Industrial Area
- Franklin Avenue and Lamplighter Pond area
- Franklin Avenue and Louisiana Avenue
- Minnetonka Boulevard and Georgia Avenue
- Minnetonka Boulevard and Highway 7
- Morningside Road and Browndale Avenue
- Nelson Park
- West 26th Street and Raleigh Avenue

- West 27th Street and Zarthan Avenue
- West 28th Street and Jersey Avenue
- West 29th Street and Vernon Avenue
- West 34th Street and Xylon Avenue
- West 39th Street and Kipling Avenue

The large waterbodies in the City were evaluated for freeboard under TP-40 and Atlas 14 rainfall events for both the 100-year and 10-year events. A comprehensive list of modeled water surface elevations for all events is provided in Appendix F. All modeled lake elevations increased with the change from NOAA's TP-40 to Atlas 14 rainfall depths and as a result, all lakes show a decrease in available freeboard between the lowest primary structure elevation and the 10- and 100-year water surface elevation. Some lakes have negative freeboard, indicating the potential for the flooding of residential structures. Lakes with negative freeboard (i.e. possible flooding of the lowest structure) are shown in Table 3-2 for all four of the modeled events. The models were used to summarize the stormwater runoff leaving the City. The peak discharges and locations are summarized in Table 3-3.

Table 3-4. City of St. Louis Park Lakes with Flooding Potential

Lake	10-Year TP -40	100-Year TP-40	10-Year Atlas 14	100-Year Atlas 14
Bass Lake		X	X	X
Browndale Pond				X
Candlestick Pond				X
Kilmer Lake				X
Lamplighter Pond				X
Natchez Pond		X		X
Oak Pond		X		X
Oregon Pond	X	X	X	X
Otten Pond		X		X
Rhino Pond				X
South Oak Pond	X	X	X	X
Sumter Pond				X

Finally, the peak flows leaving the City of St. Louis Park and entering neighboring communities, these intercommunity flows are presented in Table 3-3.

Table 3-5. Peak Outflows from the City of St. Louis Park

Receiving Cities	Drainage District	10-Year Technical Paper-40	100-Year Technical Paper-40	10-Year Atlas 14	100-Year Atlas 14
Minneapolis	Bass Lake	85	177	141	365
Edina	Edina	2,008	299	243	410
Minneapolis	Edina	127	190	153	276
Golden Valley/MnDOT	Golden Valley	177	256	218	322
Minneapolis/Storm Sewer	Minneapolis	82	114	101	169
Minneapolis/Cedar Lake	Minneapolis	128	156	137	177
Minneapolis/MnDOT	Minneapolis	145	201	164	244
Plymouth (Bassett Creek)	Westwood	247	294	274	353
Golden Valley	Westwood	69	99	83	143
Note that all units are in cubic feet per second (cfs)					

3.3 Wetland Issues

Shallow, seasonal wetlands have equal value in the landscape to deep, open water wetlands, but their designated uses are as different as creeks are different from rivers or lakes. It is generally recognized that damming a stream to form a ponded reservoir causes significant changes in its habitat, hydrology, and downstream water quality as well as the plants and animals utilizing the resource.

In the same way, wetlands deserve careful consideration before they are converted into other types of wetlands or removed from the landscape altogether. Water resources are often interconnected and are not isolated from each other or from the ecosystem. Wetland benefits such as nutrient uptake, stormwater storage, erosion control, low flow augmentation, wildlife habitat, and groundwater recharge are extremely valuable even in remote wetlands that are only

distantly connected to other resources in the watershed. Wetland removal has reverberations throughout the fabric of the landscape at large.

The City of St. Louis Park has developed a wetland management plan as a means to manage its wetlands (City of St. Louis Park [WSB], 2001). The management plan enables the city to evaluate the impact of redevelopment on wetland resources and the potential for restoration of wetland functions and values. The city's wetland management plan is intended as an additional resource, not to replace the rules or policies of local watershed districts. The city's wetland management plan is included in this plan as **Appendix D.**

The BCWMC, MCWD, and MnDOT serve as the LGU for the WCA within the city. The city has included the MCWD's wetland classification in this plan. The city also recognizes the MCWD's functional assessment for wetlands within the MCWD area of St. Louis Park. This has resulted in some changes in the designations of some wetlands. For example, this change results in an increase in the number of preserve-designated wetlands.

Stormwater ponds that are classified as jurisdictional wetlands fall under the WCA, and the maintenance of these wetlands is more regulated. Ponds that are included in the MCWD wetland assessment will be evaluated as necessary to determine if they must be regulated by the WCA. The wetlands in question can be classified as historical wetlands, historical wetlands that have been used for stormwater treatment prior to the WCA, or stormwater ponds that were created in upland areas for stormwater treatment. Wetlands used for stormwater treatment prior to WCA must follow the guidelines for maintenance outlined by the WCA. Wetlands that were created in upland areas to treat stormwater runoff are maintained as stormwater basins.

3.4 Creek Issues

Creeks are subject to stress brought on by urbanization and development in the same ways that waterbodies in general are. Generally, as impervious surface area is increased, creek flow rates and volume increase, leading to higher flood elevations, accelerated erosion, and pollutant loading. As streams become more unstable and prone to erosion, public infrastructure is increasingly at risk of failure.

The Minnehaha Creek is an important community amenity. The desire for recreational access and open space enhancement has led to the placement of creek corridors as high-priority rehabilitation and acquisition targets.

3.5 Erosion Control and Sedimentation Issues

Sediment is a major contributor to water pollution. Stormwater runoff from streets, parking lots, and other impervious surfaces carries suspended sediment consisting of fine particles of soil, dust, and dirt carried in moving water. Abundant amounts of suspended sediment are carried by stormwater runoff when erosion occurs.

Although erosion and sedimentation are natural processes, they are often accelerated by human activities, including construction and redevelopment. Prior to construction, the existing vegetation on a site intercepts rainfall and slows down stormwater runoff rates, which allows

more time for runoff to infiltrate into the soil. When a construction site is cleared and graded, the vegetation (and its beneficial effects) is removed. Also, natural depressions that provided temporary storage of rainfall are filled and graded, and soils are exposed and compacted, resulting in increased erosion and sedimentation and decreased infiltration. As a result, the rate and volume of stormwater runoff from the site increases (Metropolitan Council, 2001). The increased stormwater runoff rates and volumes cause increased soil erosion, which releases significant amounts of sediment that may enter the city's water resources.

Regardless of its source, sediment deposition decreases water depth, degrades water quality, smothers fish and wildlife habitats, and degrades aesthetics. Sediment deposition can also wholly or partially block culverts, manholes, and storm sewers, causing flooding. Sediment deposition in detention ponds and wetlands also reduces the storage volume capacity, resulting in higher flood levels and/or reducing the amount of water quality treatment that can be provided.

Suspended sediment is carried in water. It clouds lakes and creeks and disturbs aquatic habitats. Sediment also reduces the oxygen content of water and is a major source of phosphorus, which is frequently bound to the fine particles. Erosion also results in the channelization of stormwater flow, increasing the rate of stormwater runoff and further accelerating erosion.

As erosion and sedimentation increase, the city's stormwater management systems (e.g., ponds, pipes) require more frequent maintenance, repair, and/or modification to ensure they can function as designed. Monitoring the stormwater system, including inspection of sediment build-up in stormwater ponds, will be an increasingly important task for the city. The urban conditions in the city will result in erosion and sedimentation unless effective erosion prevention and sediment control measures are implemented before, during, and after construction.

St. Louis Park ordinances and approval processes address erosion and sediment control at construction sites. The current ordinance requires implementation of temporary and permanent erosion and sediment control measures for developments and other projects.

3.6 Adequacy of Existing Programs

The level of service that a storm sewer system provides is defined by its capacity to remove runoff and prevent frequent interference with normal daily transportation, commerce, and access that might result from a rain event. This design level should not result in the surface flooding of streets flooding of intersections and right-of-way systems, and public infrastructure should operate normally. However, in many older communities, the storm sewer systems were typically designed to handle flows from storms up to a two-year frequency rainfall event, much less than the level of service provided by the capacity of storm sewers designed for today's standards.

The level of protection that a storm sewer system provides is defined as its capacity provided by a drainage system to prevent property damage and assure a reasonable degree of public safety following a rain event. Large storm flows, such as the 100-year flood event, may exceed the capacity of the storm sewers and bypass its catch basins, with excess water collecting in low areas, such as intersections and designed ponding areas. Water accumulation at this level of

protection may interfere with traffic or access but should not damage right-of-way systems or structures, such as bridges. The level of protection is typically based on the critical 100-year frequency storm event.

Because portions of St. Louis Park were developed in the early to mid-1900s, some areas have undersized stormwater systems and experience flooding during a variety of storm events, including small frequent events.

The following section presents existing program adequacy to address surface and stormwater issues facing the city.

3.6.1 City Ordinances and Official Controls

St. Louis Park actively and progressively manages stormwater to protect life, property, and waterbodies within the city as well as receiving waters outside the city. Toward this end, St. Louis Park creates and implements regulatory programs that accomplish these aims. The city's regulations and programs are detailed in **Chapter 5**.

The City of St. Louis Park is required to meet the conditions of its NPDES Phase II MS4 permit and implement the St. Louis Park SWPPP. The city continues to actively engage the MPCA and others to keep its permit and implementation up to date with regard to technology and regulations.

To continue improving the city's efficacy regarding surface water management, the city will review and update its existing ordinances and processes to bring them into conformance with the policies and goals of this plan, the BCWMC and MCWD plan requirements, and the NPDES MS4 permit requirements.

3.6.2 Education and Public Involvement Program

The City of St. Louis Park maintains various education and communication programs aimed at water resources issues. The city develops and distributes articles and information regarding impacts of stormwater on water quality as well as the city's SWPPP. Details of the city's education program are presented in the city's SWPPP (included as **Appendix B** of this plan). The city also works collaboratively with the BCWMC and the MCWD in distributing educational materials and promoting and supporting outreach programs.

3.6.3 Groundwater Protection

The water supply for St. Louis Park is obtained from 11 primary wells. These water supply wells meet current standards for construction and maintenance and thus do not contribute to the source water's susceptibility to contamination. The city is also implementing its wellhead protection plan, as approved by the MDH under Minnesota Rules 4720.

3.6.4 Maintenance of Stormwater System

The City of St. Louis Park is responsible for maintaining its stormwater system, including storm sewer pipes, ponds, pond inlets and outlets, and channels. To comply with this requirement, the City has developed and maintains a GIS geodatabase of storm sewer coverage for the entire city.

The St. Louis Park stormwater maintenance program integrates activities undertaken by the City of St. Louis Park that can affect stormwater quality and conveyance. These activities range from grounds, vehicle, and street maintenance to construction projects, facility management, and routine inspection tasks.

The stormwater maintenance program includes routine line cleaning, catch basin cleaning, manhole sump cleaning, lift station upkeep, pump replacement program, general pond maintenance, and delta removal as well as inspection of structural pollution control devices, outfalls, stockpiles, and infrastructure. The program covers city operations that have an effect on the stormwater system. The stormwater maintenance plan shall define expectations describing how to carry out duties to minimize adverse impacts on stormwater runoff quality. The stormwater maintenance program is managed by the superintendent of utilities.

The SWPPP in **Appendix B** presents measurable stormwater maintenance program goals and responsibilities, which include operation and maintenance program documentation, staff training, and biannual program evaluations.

3.6.5 Existing Capital Improvement and Implementation Programs

This plan, along with its capital improvement and implementation programs, combined with the existing Storm Water Utility Fund gives the city adequate tools to correct current and future problems.

The city will continue to use the Storm Water Utility Fee program to fund stormwater system improvements, maintenance, and other activities. The Storm Water Utility Fee is the primary funding source for all stormwater improvements related to the city's Water Resources Management Plan and NPDES Phase-II requirements. In 2017, the stormwater utilities raised annual revenues of approximately $2.816 million. This program is periodically reviewed to determine its adequacy for funding projects and programs.

CHAPTER 4.0 Goals and Policies

City of St. Louis Park Surface Water Management Plan

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Chapter 4.0 Goals and Policies

This chapter presents the goals and policies developed for the management of water resources within St. Louis Park. Goals are provided for water quality, flood control, groundwater protection, and erosion and sedimentation control. Goals propose the desired end, policies provide the means to achieve the goals, and ordinances allow for implementation of the policies. The implementation program discussed in **Chapter 5** provides more specific detail on how these goals and policies will be implemented.

4.1 Surface Water Quality

Goals:

1. Manage surface water resources within the City of St. Louis Park, with input from the public, so that the beneficial uses of wetlands, lakes, and streams remain available to the community, including aesthetic appreciation, wildlife observation, swimming, and boating.
2. Maintain or improve the quality of water in lakes, wetlands, streams, and rivers within or immediately downstream of the City of St. Louis Park.
3. Manage surface water on a regional basis to protect designated waterbodies and meet regional water quality standards in concert with the watershed organizations and the Metropolitan Council.
4. Reduce illicit discharge to the city's storm sewers and receiving waters.
5. Work to meet the phosphorous load reductions required by the city's NPDES permit, the BCWMC, and the MCWD for the City of St. Louis Park.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.1.1: Work to meet or exceed all water-related regulations that apply as promulgated by the Federal Government, the State of Minnesota, Hennepin County, the Minnesota Pollution Control Agency (MPCA), the Bassett Creek Watershed Management Commission (BCWMC), Minnehaha Creek Watershed District (MCWD), and the Metropolitan Council.

Policy 4.1.2: Implement all aspects of the city's NPDES Phase- II MS4 permit SWPPP (see **Appendix B**) and nondegradation report (see **Appendix E**) as feasible.

Policy 4.1.3: Require development to comply with the conditions and policies of the city's SWPPP (see **Appendix B**), nondegradation report (see **Appendix E**), and the SWMP.

Policy 4.1.4: Continue to use the MCWD to permit activities within the city that fall under the jurisdiction of these agencies.

Policy 4.1.5: Coordinate with the BCWMC on the implementation of the BCWMC AIS Rapid Response Plan for Westwood Lake.

Policy 4.1.6: Cooperate with the MPCA, the BCWMC, the MCWD, and other stakeholders in the preparation of TMDL studies for waterbodies in the city or waterbodies that receive water directly from the city that are on the MPCA's current or future impaired waters [303(d)] list.

Policy 4.1.7: Cooperate with the WMOs in water quality monitoring, modeling, and planning to protect priority resources; provide city staff for surveying; provide information on storm drainage features, topographic information, and inventory data; serve as a liaison between the WMO and city residents; and implement prescribed education programs and BMPs.

Policy 4.1.8: Work with stakeholders to manage waterbodies and work toward attaining MPCA, BCWMC, MCWD, and city water quality goals.

Policy 4.1.9: Manage stormwater consistent with the water quality standards (see Chapter 2).

Policy 4.1.10: Work with the BCWMC and the MCWD to implement the WMO capital improvement programs based on feasibility, prioritization, and available funding.

Policy 4.1.11: Require that temporary and permanent stormwater basins incorporate recommendations from the Nationwide Urban Runoff Program (NURP).

Policy 4.1.12: Strive to meet water quality goals.

Policy 4.1.13: Review and maintain the water quality management classification (see Chapter 2) of the city's waterbodies.

Policy 4.1.14: Reduce phosphorus loading from development and redevelopment sites by 50 percent, in accordance with city and watershed management organizations standards/rules.

Policy 4.1.15: Explore the feasibility of providing regional stormwater treatment facilities to treat stormwater runoff from multiple redevelopment sites; if feasible, construct and/or install these facilities as opportunities arise and as funding allows; seek grants, cost-share funds, and so on from regional, state, and federal agencies as well as other sources (e.g., watershed management organizations) to support the funding of these projects.

Policy 4.1.16: Continue the cash-dedication policy requiring developers to pay into a fund to cover costs for the installation and/or construction of regional stormwater treatment facilities.

Policy 4.1.17: Promote a reduction in runoff rates from new developments.

Policy 4.1.18: Use existing natural retention and detention areas for stormwater management to maintain and/or improve existing water quality to the extent possible.

Policy 4.1.19: Continue to require BMPs such as wet and dry detention ponds, underground storage, bio-engineering techniques, infiltration basins, trenches, and rain gardens, as physical conditions allow.

Policy 4.1.20: Encourage homeowners to apply stormwater BMPs on their individual properties.

Policy 4.1.21: Update surface water quality modeling of major subwatersheds and diagnose potential problems, as resources allow.

Policy 4.1.22: Continue the implementation of procedures for site plan review that incorporate reduction of potential water quality impacts.

Policy 4.1.23: Work to reduce phosphorus loading to receiving waters per requirements of the city's NPDES permit, the BCWMC, and the MCWD.

Policy 4.1.24: Continue to implement, inspect and enforce its ordinances and SWPPP tasks regulating illicit discharge to the stormwater system.

Policy 4.1.25: Update storm drainage systems based on appropriate surface water quantity and quality modeling, as opportunities allow; the design shall consider potential flood, wetland, and surface water quality impacts to upstream and downstream areas.

Policy 4.1.26: Ensure stormwater collection and management systems are maintained, as resources allow.

Policy 4.1.27: Inspect, maintain, operate, and clean structural, publicly owned BMPs such as sedimentation and detention structures as needed to preserve the intended performance.

Policy 4.1.28: Continue and develop a regular pond cleaning and dredging schedule.

Policy 4.1.29: Continue street-sweeping program and vacuum cleaning of settlement devices and manholes as described in the city SWPPP.

Policy 4.1.30: Adopt the lake classification scheme and set goals according to the information provided in Chapter 2.

4.2 Streams

Goals:

1. Maintain or enhance the natural beauty, public access, and wildlife habitat value of the Minnehaha Creek running through St. Louis Park.
2. Implement stream restoration measures in partnership with MCWD wherever feasible to maintain health, safety, and ecological integrity.
3. Minimize the volume of stormwater runoff entering streams.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.2.1: Continue to evaluate opportunities to enhance recreational opportunities and access to streams.

Policy 4.2.2: Reduce areas of impervious surfaces by considering changes to city ordinances and policies; encourage the use of innovative materials to reduce impervious surfaces and enhance infiltration.

Policy 4.2.3: Implement a streambank stabilization program using bioengineering and natural products in partnership with the WMOs as opportunities arise.

Policy 4.2.4: Cooperate with the MCWD on the implementation of stream restoration projects.

4.3 Wetlands

Goal:

1. Protect and restore wetlands to improve or maintain their functions and values in accordance with the Minnesota Wetland Conservation Act and the city's Wetland Management Plan.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.3.1: Continue to defer LGU authority for administration of the Wetland Conservation Act (WCA) to the MCWD and BCWMC.

Policy 4.3.2: Manage wetlands in a way that is consistent with the city's Wetland Management Plan (see **Appendix D**) and other local, state, and federal wetland regulations.

Policy 4.3.3: Maintain and periodically update the wetland inventory data and the wetland management classifications provided in the St. Louis Park Wetland Management Plan (see **Appendix D**).

Policy 4.3.4: Work to achieve zero net loss of wetland quantity, quality, and biological diversity.

Policy 4.3.5: Work to protect wetlands from chemical, physical, biological, or hydrological changes so as to prevent significant adverse impacts to the following designated wetland functions: maintaining biological diversity, preserving wildlife habitat, providing recreational opportunities, erosion control, groundwater recharge, low flow augmentation, stormwater retention, stream sedimentation, and aesthetic enjoyment, as specified in Minnesota Rules 7050.

Policy 4.3.6: Improve or enhance wetlands when feasible.

Policy 4.3.7: Require that the normal elevation of all wetlands be maintained at the existing invert elevation level or at the established wetland elevation level.

Policy 4.3.8: Require avoidance of wetland hydrologic impacts by maintaining proper inundation periods and storm bounce.

Policy 4.3.9: Continue to coordinate with other agencies involved in the protection of wetlands.

4.4 Surface Water Quantity and Flooding

Goals:

1. Manage the rate and volume of runoff entering rivers, streams, lakes, and wetlands within the City of St. Louis Park.
2. Manage floodplain areas to minimize flooding and protect and restore the functions of the floodplain.

3. Protect the public from flooding through measures that ensure public safety and prevent inundation of occupied structures.
4. Minimize flooding potential in a cost-effective manner.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.4.1: Require that stormwater conveyance systems, in design and function, follow the standards and criteria specified by the city engineer.

Policy 4.4.2: Manage the rate and volume of runoff in general accordance with the stormwater management criteria set by the BCWMC and the MCWD and as presented in this SWMP.

Policy 4.4.3: Continue to use the MCWD to permit activities within the city that fall under the jurisdiction of these agencies.

Policy 4.4.4: Require new and redevelopment to apply best management practices to reduce the rate and volume of stormwater runoff to the maximum practical extent.

Policy 4.4.5: Promote and support a reduction in runoff volumes and seek opportunities to retrofit sites under redevelopment with low impact development techniques.

Policy 4.4.6: Consider assuming authority for the three county ditches (#14, #17, and #29) located within the City of St. Louis Park.

Policy 4.4.7: Maintain, clean, and replace public storm drainage systems as needed to preserve the design capacity, as feasible.

Policy 4.4.8: Seek opportunities to reduce flows in storm drainage systems that experience capacity problems (i.e., through reductions in stormwater runoff rates and volumes).

Policy 4.4.9: Require owners of private stormwater systems to maintain, clean, and replace systems as needed to preserve design capacity.

Policy 4.4.10: Notify the BCWMC of any proposed maintenance to Westwood Lake, which is part of the BCWMC's designated trunk system.

Policy 4.4.11: Allow outlets from landlocked basins only when such outlets are consistent with state and federal regulations and when the downstream, riparian, and habitat impacts of such outlets have been analyzed and no detrimental impacts have resulted.

Policy 4.4.12: Review development and redevelopment proposals for consistency with this plan.

Policy 4.4.13: Continue to implement its Floodplain District ordinance (Chapter 36, Article IV, Division 9) and manage activities within the floodplain in accordance with state and federal regulations as well as criteria set by the BCWMC and the MCWD.

Policy 4.4.14: Require all new permanent structures located within or around the 100-year floodplain to meet the following minimum building elevations outlined in the Floodplain District ordinance (Chapter 36, Article IV, Division 9) and BCWMC's standards.

Policy 4.4.15: Continue to participate in the National Flood Insurance Program and seek opportunities to improve the City's level of flood protection and readiness.

Policy 4.4.16: Maintain zero net loss of floodplain storage and manage floodplains to maintain critical 100-year flood storage volumes.

Policy 4.4.17: For areas within the city where the city's modeled flood elevation is higher than the established Flood Insurance Study elevation, use the city's designated floodplain elevation for the application of floodplain regulations.

Policy 4.4.18: Evaluate flood control in conjunction with minimization of impacts to wetland areas and surface water quality management.

Policy 4.4.19: Continue to prohibit expansion of existing nonconforming land uses within the floodplain unless they are fully floodproofed in accordance with existing codes and regulations.

Policy 4.4.20: Obtain flood and drainage easements as well as easements for maintenance access and emergency overflow routes during development and/or building permit processes.

Policy 4.4.21: Correct existing flooding problems within available funding constraints by upgrading the storm drainage system, flood protection, or acquiring the property; develop and follow operation and maintenance plans to minimize flooding potential around landlocked areas.

Policy 4.4.22: Assist the BCWMC, the MCWD, and other agencies with development and distribution of educational materials or support programs that provide information regarding floodplain locations, protection, and floodplain land use and land alteration restrictions.

Policy 4.4.23: Review and update the city's floodplain ordinance to be consistent with the requirements of the watershed management organizations and this plan.

4.5 Groundwater

Goal:

1. Protect groundwater quality and quantity to preserve it for sustainable and beneficial purposes.
2. Manage surface water runoff to meet requirements for groundwater protection from Hennepin County, the MPCA, and/or the MDH.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.5.1: Continue implementation of the City of St. Louis Park Wellhead Protection Plan (WHPP).

Policy 4.5.2: Cooperate with the Minnesota Department of Health (MDH), Hennepin County, and other agencies to periodically assess the vulnerability of groundwater used for drinking water supplies.

Policy 4.5.3: Promote the infiltration of stormwater and resulting groundwater recharge where it is feasible and does not pose a threat to groundwater quality; develop infiltration systems in

accordance with the MDH's Evaluating Proposed Storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas (2007), and the MPCA's Minnesota Stormwater Manual (2005) for guidance for potential stormwater hotspots.

Policy 4.5.4: Work to see that groundwater quality is not sacrificed to manage surface water; design holding ponds, wetlands, and other surface water storage areas to protect groundwater.

Policy 4.5.5: Avoid watershed diversion to sustain water levels in other watersheds and surface water.

Policy 4.5.6: Cooperate with Hennepin County Health Department to ensure that abandoned wells are properly sealed according to the MDH Well Code.

Policy 4.5.7: Cooperate with other agencies to promote and coordinate groundwater monitoring and inventorying.

Policy 4.5.8: Cooperate with efforts to educate the general public concerning the importance and proper use of BMPs to prevent contamination of groundwater supplies.

Policy 4.6.9: Share groundwater elevation data with WMOs.

4.6 Erosion and Sedimentation

Goal:

1. Prevent sediment from entering the city's surface water resources and to minimize and control the erosion and sedimentation in drainageways within the city.

To work toward this goal, the City of St. Louis Park will do the following:

Policy 4.6.1: Require land use planning and development that minimizes sediment yield through compliance with established city, BCWMC, and MCWD policies.

Policy 4.6.2: Continue to require and review erosion and sedimentation control plans for all new development and redevelopment to ensure consistency with the NPDES General Stormwater Permit for Construction Activity, MPCA's Minnesota Stormwater Manual (2008 update), the city's NPDES MS4 Permit and Storm Water Pollution Prevention Program, and the city's erosion control ordinance (Chapter 12, Division, Article V, Sections 12–156), as amended.

Policy 4.6.3: Continue to actively administer the program for controlling sediment erosion from single-family home construction sites.

Policy 4.6.4: Inspect construction sites and provide enforcement for conformance to the site's approved erosion and sediment control plans.

Policy 4.6.5: Continue its program to control construction site debris storage and waste disposal.

Policy 4.6.6: Continue to enforce its tree protection ordinance.

Policy 4.6.7: Continue and enhance its street-sweeping program.

Policy 4.6.8: Require the installation of treatment devices or other devices that do not flush sediment during large precipitation events in lieu of sump manholes, where appropriate.

4.7 Recreation, Habitat, and Shoreland Management

Goals:

1. Maintain and enhance recreational facilities within St. Louis Park.
2. Protect and enhance fish and wildlife habitats within St. Louis Park.
3. Preserve or enhance the ecological function of shoreland areas within St. Louis Park.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.7.1: Work to support, to the extent practical, the efforts of the MnDNR, the COE, EPA, and the USFWS in promoting public enjoyment and protection of fish, wildlife, and recreational resource values in the watershed.

Policy 4.7.3: Encourage land owners to maintain wetlands, open spaces, and natural areas for the benefit of wildlife, recreations, and aesthetics.

Policy 4.7.4: Continue to seek opportunities to enhance and restore wetlands based on its Wetland Management Plan.

Policy 4.7.5: Require infiltration of runoff from developed and redeveloped areas creating new impervious surfaces.

Policy 4.7.6: Prevent fertilizers from entering waters through planting vegetation, creating berms, and/or altering grades.

Policy 4.7.7: Limit excavation and grading activities near waterbodies.

Policy 4.7.8: Prevent the water resource impacts of development and redevelopment by requiring appropriate structure setbacks from water.

Policy 4.7.9: Encourage riparian vegetation along creeks, streams, and wetlands.

Policy 4.7.10: Maintain, enhance, and provide new open spaces and/or habitats as part of wetland creation or restoration, stormwater facility construction, development, redevelopment, and other appropriate projects.

4.8 Education and Public Involvement

Goals:

1. Involve and educate the residents of the city in water-resource-related issues.
2. Offer programs, educational opportunities, and information that facilitate an understanding of water resource issues in St. Louis Park and downstream.

To work toward these goals, the City of St. Louis Park will do the following:

Policy 4.8.1: Continue the educational components outlined in the city's Stormwater Pollution Prevention Program via regular articles in the city newsletter, instructional classes at local schools, presentations to neighborhood groups and businesses, and via the city's website.

Policy 4.8.2: Develop and implement a strategic education program that identifies key water resource stakeholder groups and outlines an educational strategy for each group.

Policy 4.8.3: Continue to support and facilitate existing volunteer programs in St. Louis Park such as the CAMP, the Volunteer Stream Monitoring Program (VSMP), and the WHEP.

Policy 4.8.4: Seek new opportunities for collaboration with volunteer groups.

Policy 4.8.5: Continue and improve the surface water quality monitoring program for city lakes and streams.

Policy 4.8.6: Educate St. Louis Park residents about household BMPs to protect the city's water resources.

4.9 Funding

Goal:

1. Provide sufficient funding to implement measures and policies contained in this plan.

To work toward this goal, the City of St. Louis Park will do the following:

Policy 4.9.1: Continue to use a combination of funding sources to fund the stormwater-related activities identified in this plan. The city will use its stormwater utility fee for stormwater infrastructure maintenance and repair, implementation of the city's NPDES Phase-II MS4 SWPPP requirements (including education), and implementation of larger projects (e.g., flood mitigation, pipe replacement), as funding allows. The city will use its general fund, bonds, and funding from other sources (e.g., developers, tax increment financing, state aid funds, grants) to complete larger projects. In situations where funding is inadequate, the city will defer the proposed projects.

Policy 4.9.2: Consider increasing stormwater utility fees to increase the available funding for implementation of stormwater-related activities.

Policy 4.9.3: Seek grant programs to leverage city contributions.

Chapter 5.0 Implementation Program

City of St. Louis Park Surface Water Management Plan

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Chapter 5.0 Implementation Program

This chapter provides details of the City of St. Louis Park's programs and regulations that affect water resources management within the city. The plans, ordinances, and programs referenced in this chapter are intended as a resource for staff, residents, and people doing business in St. Louis Park.

This chapter describes the City of St. Louis Park's implementation program addressing the issues identified in the SWMP, including operation and maintenance of the stormwater system, education and public involvement, funding of the implementation program, design standards, ordinance implementation and official controls, and potential projects, and the implementation program.

5.1 Water Quality/NPDES Phase- II MS4 Permit

The City of St. Louis Park is federally required to obtain and maintain an MS4 permit and SWPPP for managing nonpoint source stormwater discharge. During each year of the five-year permit cycle, the city must hold an annual public meeting. At this meeting, the city distributes educational materials and presents an overview of the MS4 program and the city's SWPPP. The city also solicits oral and written statements and considers them for inclusion into the SWPPP. The city must submit an annual report to the MPCA. This annual report summarizes the following:

- **Status of Compliance with Permit Conditions**: The annual report contains an assessment of the appropriateness of the BMPs and the city's progress toward achieving the identified measurable goals for each of the minimum control measures. This assessment is based on results collected and analyzed, inspection findings, and public input received during the reporting period.
- **Work Plan**: The annual report lists the stormwater activities that will be undertaken in the next reporting cycle.
- **Modifications to the SWPPP**: The annual report identifies any changes to BMPs or measurable goals for any of the minimum control measures.
- **Notice of Coordinated Activities**: A notice is included in the annual report for any portions of the permit for which a government entity or organization outside of the MS4 is being utilized to fulfill any BMP contained in the SWPPP.

The SWPPP BMP implementation program is incorporated into the city's overall stormwater implementation and maintenance programs, as presented in Table 5-1 and **Appendix B**.

5.2 Operation and Maintenance of Stormwater Systems

The City of St. Louis Park is responsible for maintenance of its stormwater system, which includes pipes, constructed ponds, pumps, lakes, wetlands, ditches, swales, and other drainageways.

Other units of government are responsible for maintaining the stormwater systems under their control. MnDOT is responsible for maintaining the storm sewers located along Interstate 394, Highway 7, Highway 100, and Highway 169. Hennepin County is responsible for maintaining ditches, culverts, storm sewer catch basins, and leads in county roads such as Minnetonka Boulevard (CR 5), Excelsior Boulevard (CR 3), and CR 25 (old Highway 7 east of Highway 100), but the city is responsible for maintaining the trunk storm sewer lines.

Owners of private stormwater facilities are responsible for properly maintaining their facilities, so they remain consistent with the original performance design standards. The city also requires maintenance agreements for private stormwater facilities, as outlined in the city's Stormwater, Soil Erosion, and Sedimentation ordinance (Environmental and Public Health 12-151).

City crews sweep the city streets at least twice each year, once in early spring (April) and then again in the autumn after the leaves fall. Critical streets and direct deposit areas are swept more frequently on an as-needed basis. Additional street sweeping of other areas is performed as needed and as resources allow. The city (or its contractor) also cleans out accumulated sediment from storm sewers.

For safety reasons and to prevent pipe plugging, trash racks are typically installed on storm sewer and culvert inlets. These trash racks prevent people from entering the pipes and keep large debris from becoming lodged in the pipes. If not inspected and maintained, the trash racks can become plugged with debris such as branches, leaves, and other materials carried by storm flows. Plugged or even partially plugged trash racks can result in additional flooding. The city recognizes the importance of periodic removal of collected debris from its trash racks and inlets.

Stormwater ponding and water quality treatment facilities perform a desirable function by settling sediment out of the stormwater. However, if accumulated sediments are not periodically removed, such basins can experience a significant loss in necessary stormwater detention capacity, sediment storage volume, and groundwater recharge. Therefore, the City of St. Louis Park will periodically inspect stormwater storage basins and water quality treatment facilities to look for excessive sediment buildup and collected debris. If problems are noted, maintenance is ordered and performed.

For sedimentation basins, the thresholds for maintenance are triggered once sediment deposition reaches a point greater than is allowed under the design's standard criteria or when such deposition begins to have a substantial effect on the water quality or holding capacity of the pond. For planning purposes, it is often assumed that such dredging may occur every 10 to 20 years. However, basins that treat runoff from construction or redevelopment areas may need to be cleaned more frequently due to the increased quantity of sediment loads.

In general, vegetation in existing ponding facilities should be allowed to grow naturally on the side slopes of the basins and should not be mowed. This practice allows ponding facilities to act like natural wetland areas by providing nearby upland wildlife with proper habitats.

Riprap areas along banks, in overflow swales, or around storm sewer or culvert outlets frequently need maintenance due to vandalism, natural degradation, or a combination thereof. Riprap is placed in those locations to prevent damage that would result from highly erosive flow velocities. If not periodically maintained, erosion will occur, resulting in pipe damage, downstream sediment problems, and potential safety issues. The city will inspect riprap areas as part of its regular stormwater outfall inspections (as governed by the MS4 permit) and perform the necessary maintenance.

The city maintains information about stormwater facilities to assist in determining maintenance requirements. The city will notify owners of public and private stormwater facilities of the need to conduct periodic maintenance as part of the private maintenance agreements.

The city will continue and expand upon its operation and maintenance activities to ensure that the city's stormwater system functions as designed (see **Appendix B**). The city also performs a host of good housekeeping BMPs aimed at pollution prevention. In addition, they periodically assess the performance of maintenance programs (in compliance with SWPPP requirements) and revise maintenance programs or develop new maintenance practices as necessary. The city's stormwater maintenance strategy will continue to be assessed with respect to the goals and standards of the MCWD, the BCWMC, Hennepin County, and applicable regulatory agencies.

5.3 Specific WMO Tasks

The BCWMC and MCWD Comprehensive Water Resources Management Plans require the City of St. Louis Park to address specific items as part of this SWMP's implementation program (see Table 5-2).

5.4 Education and Public Involvement

During the update of this SWMP, the city hosted an open house, conducted a survey, and facilitated a "water and coffee" discussion, all of which was focused on engaging the public and acquiring input from residents about what they know, what they wanted to know, and how they wanted to be reached in the future. The information gleaned from those connections directly influenced updates to the City of St. Louis Park's education and communication programs. Specifically, as a result, the city will develop and distribute an electronic newsletter, continue building its social media presence, and produce articles for the local newspapers on natural resources successes and challenges. Details about the educational program and plan can be found in the city's SWPPP, which is presented as **Appendix B** of this SWMP.

The city's website is located at: www.stlouispark.org

5.5 Cost of Implementation Program

The estimated costs of the individual elements of the City of St. Louis Park's stormwater implementation program are included in Table 5-1 and **Appendix B**.

5.6 Funding of Implementation Program

This section discusses the city's existing and possible future mechanisms for funding its implementation program. The city intends to use stormwater utility as the primary funding source for stormwater system operation and maintenance as well as for most stormwater-related projects and studies. Additional funding sources might be used when deemed appropriate or necessary. If funding is not available, the city will defer certain projects to a later date.

5.6.1 Stormwater Utility

Minnesota Statute 444.075 allows cities to establish and implement stormwater utilities. Under a utility system, a stormwater utility fee is charged against all parcels within the city. The fees are usually proportionate to the amount of runoff each parcel of land contributes to a drainage system, often determined by the amount of impervious area per parcel. Many cities currently use this funding mechanism, including the City of St. Louis Park. The city's stormwater utility fee is designed to be used for routine maintenance and repairs to the stormwater system, investigative studies, education programs, and to review and/or revise city ordinances. This will be used to pay for as many stormwater projects as possible.

5.6.2 Other Funding Sources

5.6.2.1 General Taxes

The City of St. Louis Park provides additional funds for stormwater system operation and maintenance through the use of general tax funds. The city's general fund is used to pay for elements of stormwater system maintenance and occasional one-of projects. Typical maintenance tasks include street sweeping and storm sewer cleaning. Maintenance is part of the city's street budget. The city intends to avoid large increases in general tax funds applied to stormwater system maintenance and improvement.

5.6.2.2 Ad Valorem Taxes

Although not proposed at this time, other special taxing authorities are available, such as those via Minnesota Statute 103B.241, which allows the city to levy a tax to pay for projects identified in the city's surface water management plan. The city may accumulate these levy proceeds as an alternative to issuing bonds to finance projects. Minnesota Statute 103B.245 allows the city to establish a watershed management tax district in the city to pay for water management facilities described in the plan (including maintenance). The tax district must be established by an ordinance and must be included in the city's plan. Similar to Minnesota Statute 103B.241, this statute allows the city to either accumulate funds or issue bonds to pay for these important projects.

5.6.2.3 Special Assessments

Special assessments can be used to finance special services, ranging from maintenance to construction improvement projects, and are levied against properties benefiting from the special services. The philosophy of this method is that the benefited properties pay in relation to the benefits received. The city does not typically use special assessments to pay for stormwater projects. The disadvantages of using special assessments include the difficulty of determining and proving the benefits of these projects, the city's relative inability to assess runoff contributions, and many rigid procedural requirements.

5.6.2.4 Watershed Funding

The BCWMC funds capital improvement projects that are identified in the BCWMC capital improvement program. These projects are constructed by member cities. The member cities are reimbursed for these projects by the BCWMC.

5.6.2.5 State Funding Sources

In addition to stormwater utility fees, taxes, assessments, and the other funding sources, the City of St. Louis Park could obtain funding from various state sources, such as grant and loan programs. The following paragraphs list various state-funded sources grouped according to the state agency that administers the various funding programs.

The BWSR administers several grant programs, some of which could be applied to cities. Applicable BWSR grant programs include Clean Water Legacy (CWL) funding and local water management challenge grants (Minnesota Statute 103B.3369). Other applicable programs include cost-share grants and special projects or "turn-back" monies, but BWSR funding is available only through the local soil and water conservation district (SWCD).

The MPCA administers the CWL fund program, Watershed Resource Restoration grants (EPA-funded Section-319 program), and the Minnesota Water Pollution Control Revolving Loan Fund.

The MnDNR administers many grant programs that could be appropriate for the City of St. Louis Park, including the Flood Hazard Mitigation Grant Assistance Program, local grants program, trail grants program, the cooperative water recreation program, and dam safety program. However, funding for many of these programs changes after each legislative session. The MnDNR prepares individual fact sheets for each grant program.

Other state funding programs include the Legislative-Citizen Commission on Minnesota Resources (LCCMR) funds for nonurgent demonstration and research projects, the Minnesota Department of Trade and Economic Development's Contaminant Cleanup Development Grant Program, the Minnesota Department of Transportation State Aid Funds, and federal transportation funds.

5.6.2.6 Federal Funding Sources

The City of St. Louis Park could also receive funding from various federal sources, a few of which are discussed in the following paragraphs.

The EPA has discretionary funds available through each division and program area and administers the Clean Lakes Program (CLP), which was established by Section 314 of the Clean Water Act; the CLP is similar to the MPCA's CWP program. The EPA also administers the 604b grant program, which targets water quality improvements in urban areas, and the Environmental Education Grant, which finances local environmental education initiatives.

The COE administers the Planning Assistance to States (section 22) Program, the Project Cooperation Agreement (PCA) Program, also known as the LCA (Local Cooperation Agreement) Program for construction of flood control projects, the Section-14 Bank Protection Program, the Flood Plain Management Services Program, and the Aquatic Plant Control Program, and it provides many GIS products through its Army Geospatial Center.

The U.S. Fish and Wildlife Service administers the North American Wetlands Conservation Fund as part of the North American Wetlands Conservation Act (NAWCA).

The Natural Resource Conservation Service (NRCS) has funds available for technical assistance on various surface water projects, operations, maintenance, inspections, and repairs. The NRCS also administers the Environmental Quality Incentives Program (EQIP), which was established through the 1996 Farm Bill Program.

The Federal Emergency Management Agency (FEMA) has funds available to restore areas (including water resources) that have been damaged or destroyed by a disaster and proactively prepare for future floods by buying out repetitively flooded homes.

5.6.2.7 Private Funding Sources

In addition to state and federal funding sources, some private funding sources may be available.

Ducks Unlimited and Pheasants Forever funds are available for projects that enhance, create, or protect waterfowl or pheasant habitats.

Individual entities that want to provide wetland mitigation in compliance with the WCA may have funds and/or technical resources available to them to restore or create wetland function and value that is lost or is intended to be destroyed.

5.6.3 Levy Limit Constraints

The city's stormwater utility fee funds routine maintenance and repairs to the stormwater system, investigative studies, education programs, and stormwater projects. Additionally, some elements of regular stormwater system maintenance are funded by general tax funds (i.e., property taxes). The city hopes to avoid increasing the amount of general tax funds used for stormwater-related tasks. The city also seeks to avoid using ad valorem taxes or special assessments to pay for stormwater projects.

5.6.4 Effect on Other City Funding Needs

The stormwater utility fee can sometimes provide assistance in financing stormwater capital improvements as resources allow. However, if funding from the stormwater utility is

insufficient to complete proposed stormwater projects, those projects will be deferred to a later date, when possible, to avoid drawing from the general tax fund or special assessments.

5.6.5 Impact on Households

The city's stormwater utility generated approximately $2.8 million in 2017. The stormwater utility rates vary by land use but include a rate of $21.83 per quarter per single-family residence. The city plans to increase the stormwater utility rates in the future based on planned 10-year programming and capital project needs.

5.7 Local Controls and Regulatory Responsibilities

The City of St. Louis Park actively manages stormwater to protect life, property, waterbodies within the city, and receiving waters downstream of the city. It creates and implements regulatory programs that accomplish these aims and intends to continue the implementation of the regulations and programs contained in this section.

The city is nearly fully developed, and as such, most of the changes occurring within the city that may impact stormwater management will proceed in the form of redevelopment. Redevelopment will provide the primary opportunity to upgrade the city's stormwater management system, restore and improve natural resources, and add or expand recreational opportunities. The city will continue to be proactive in using the controls at its disposal to ensure that opportunities presented by redevelopment to improve the stormwater systems and implement the policies of this plan are not lost.

All redevelopment occurring within the City of St. Louis Park must also comply with the standards and rules established by the MCWD and the BCWMC. The city has also established policies designed to promote stormwater system improvements through redevelopment. The city will seek opportunities to retrofit sites under redevelopment with low-impact development techniques, and it continues to require BMPs, such as wet and dry detention ponds, underground storage, bioengineering techniques, infiltration basins, trenches, and rain gardens, as physical conditions allow. The highly developed nature of the city limits opportunities for stormwater system enhancements. Despite this, the city will continue to evaluate the feasibility of regional ponding facilities designed to treat runoff.

Regulations and land use controls used by the city including water resource-related plans, ordinances, standards, guidelines, and permits are presented below.

- The St. Louis Park NPDES Phase-II MS4 Stormwater Pollution Prevention Program (2008)— (see **Chapter 5.1** and **Appendix B**)
- The Wetland Management Plan (see **Appendix D**)
- Floodplain Management Regulations (see **Appendix J**)
- Development and redevelopment performance standards (See **Appendix M**1 - Erosion and Sediment Control Plans Guidelines and **Appendix M2** - Stormwater Management Requirements)

- City of St. Louis Park, Minnehaha Creek Watershed District and Bassett Creek Watershed Management Commissions Coordination Plan Framework (see **Appendix N**)
- The St. Louis Park City Code of Ordinances
  - Zoning ordinance (Chapter 36, Division 11) which includes provisions for floodplain protection
  - Stormwater regulations (Chapter 12, Article V) including the following:
    - Erosion control requirements (Section12-156)
    - Illicit connection and discharge (Section 12-157)
    - Stormwater construction and maintenance requirements (Section 12-158)
    - Wetland protection (Section 12-159)
  - Subdivision standards (Chapter 26)
  - Landscaping ordinance (Section 36-364) with tree protection and planting provisions
  - Fertilizer application regulation ordinance (Section 34-213)
  - Vegetation ordinance (Section 34-114)
  - Stormwater utility ordinance (Chapter 32, Article IV)

5.8 Implementation Program

Table 5-1 provides a comprehensive list of the projects, studies, programs, and official controls that comprise the City of St. Louis Park's implementation program. The city developed Table 5-1 by reviewing existing information, identifying potential and existing problems, developing goals and policies, and assessing the need for programs, studies, and/or projects, taking into consideration the needs identified by the MCWD and the BCWMC. Table 5-1 may require revision as new issues or needs arise. Such revisions may require a plan amendment (see **Chapter 1**).

Table 5-1: 2018–2027 Proposed Implementation Plan for the City of St. Louis Park, MN

Project Name/Description	Cost	Year	Funding Source
Program and Administration			
Review and update the CIP	$5,000	Annually	SWUF
Maintain hydrology and hydraulic (H&H) and water quality modeling tools	$15,000	Annually	SWUF
Maintain the stormwater system operations and maintenance program	$500,000	Annually	SWUF
Continue active participation in watershed management organizations' activities located within St. Louis Park	$10,000	Annually	SWUF
Review development and redevelopment plans	$25,000	Annually	SWUF
Maintain the Stormwater Education Program	$5,000	Annually	SWUF
Continue environmental programming at Westwood Hills Nature Center (WHNC)	$350,000	Annually	SWUF
Review and revise the education plan	$2,000	Annually	SWUF
Evaluate public education and outreach strategies	$3,000	Annually	SWUF
Implement and coordinate the communications plan	$3,000	Annually	SWUF
Facilitate the MS4 Employee Training Program	$2,000	Annually	SWUF
Participate in Clean Water Minnesota	$ 3,000	Annually	SWUF
Maintain the Rainwater Rewards Program	$35,000	Annually	SWUF
Coordinate household cleanup events	$3,000	Annually	SWUF

Project Name/Description	Cost	Year	Funding Source
Coordinate and facilitate volunteer opportunities	$5,000	Annually	SWUF
Maintain the city's storm sewer map	$15,000	Annually	SWUF
Maintain the Regulatory Control Program	$5,000	Annually	SWUF
Maintain the Illicit Discharge Detection and Elimination Program	$10,000	Annually	SWUF
Coordinate illicit discharge inspection training and inspections	$2,000	Annually	SWUF
Host and facilitate illicit discharge webpage and reporting	$3,000	Annually	SWUF
Implement the Wellhead Protection Plan	$50,000	Annually	Operations /SWUF
Maintain Enforcement Response Procedures (ERP)	$2,000	Annually	SWUF
Review and revise the site plan review procedures	$3,000	Annually	SWUF
Coordinate and facilitate construction sites and erosion control inspections	$15,000	Annually	SWUF
Coordinate erosion control inspection training	$5,000	Annually	SWUF
Review and revise design and construction standards	$3,000	Annually	SWUF
Review and revise review and approval procedures	$3,000	Annually	SWUF
Coordinate development agreements	$10,000	Annually	SWUF
Coordinate and facilitate the long-term operation and maintenance of BMPs	$25,000	Annually	SWUF
Review impaired waters with approved total maximum daily loads (TMDLs) and applicable waste load allocations (WLAs)	$10,000	Annually	SWUF and Grants
Maintain the Municipal Operations and Maintenance Program	$2,000,000	Annually	Operations /SWUF

Project Name/Description	Cost	Year	Funding Source
Maintain the Municipal Street Sweeping Program	$1,500,000	Annually	Operations /SWUF
Conduct annual inspections of all structural pollution control devices	$10,000	Annually	SWUF
Continue the quarterly Stockpile, Storage, and Material Handling Program	$3,000	Annually	SWUF
Manage the Fertilizer, Pesticide, and Herbicide Application Program	$5,000	Annually	Parks / SWUF
Maintain the Street Deicing Program	$150,000	Annually	Operations /SWUF
Maintain the Fleet and Building Maintenance Program	$400,00	Annually	Facilities
Maintain the Hazardous Material Storage and Recycling Program	$5,000	Annually	Facilities
Assess stormwater treatment effectiveness	$15,000	Annually	SWUF
Coordinate facilities inventory	$5,000	Annually	Facilities / SWUF
Capital Improvement Projects			
Bass Lake Preserve Rehabilitation Project: This proposed work is necessary to provide for continued or improved treatment of surface water as it flows through the Bass Lake Preserve. The rehabilitation of a drainage ditch and catch basin system near a city public works snow storage and excess material area is aimed at improving water quality to the Bass Lake Preserve. This project will be designed to implement best management practices (BMPs) to treat stormwater to remove phosphorus, remove sediment, and/or promote groundwater infiltration before water reaches the Bass Lake Preserve. This project is meant to address the need to properly maintain and/or improve our existing natural stormwater infrastructure.	$291,500	2017	SWUF
The Oregon Pond Basin Rehabilitation Project: The proposed work is necessary to provide for continued or improved treatment of surface water as it flows through the Oregon Pond. The rehabilitation and maintenance plan presented in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011) is based on MPCA requirements aimed at improving water quality (impaired waters). Specifically, the basis for this project is the removal of suspended solids (sediment) and phosphorous from waters exiting the city. The engineering staff has updated the scope of the needs outlined in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011) . Engineering, permitting, and cost details have been updated to reflect current stormwater regulations and goals. This proposed work is necessary to provide for the continued and/or improved treatment of surface water as it flows through Oregon Pond.	$165,000	2018	SWUF

Project Name/Description	Cost	Year	Funding Source
The Park Glen Improvements Project: The proposed Park Glen Storm Sewer Improvements include redesign of an existing structure to redirect its discharge to a new sediment basin before runoff enters the storm sewer system.	$82,500	2018	SWUF
Louisiana Station Area Project: The purpose of this project is to provide a water quality filter system in the area of the existing lift station at South Oak Pond and to remove phosphorus and sediment from the stormwater prior to being discharged into Minnehaha Creek. This project will help the city meet the future water quality standards (TMDL) for Minnehaha Creek as they pertain to the reduction of phosphorus and total suspended solids.	$90,000	2018	SWUF
Sumter Pond Rehabilitation Project: The rehabilitation and maintenance plan presented in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011) is based on current MPCA requirements aimed at improving the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city. The engineering staff has updated the scope of the needs outlined in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011). Engineering, permitting, and cost details have been updated to reflect current stormwater regulations and goals. This proposed work is necessary to provide for the continued and/or improved treatment of surface water as it flows through Sumter Pond.	$275,000	2019	SWUF
Edgewood Business Park Project: This study will evaluate the significant flooding of the businesses and adjacent properties at Edgewood Avenue South near 23rd Street. The study area is known to experience excessive flooding of streets, parking lots, and businesses during large rainfall events. This study will examine options to prevent these businesses from being flooded from high rainfall events. The recommendations of this report will be incorporated into the design of the 2019 Pavement Management Project.	$1,430,000	2018–2019	SWUF
Wetland Inventory Update: This project consists of surveying and updating the city's wetland inventory and wetland management plan.	$190,000	2019	SWUF
Aquila Park WQ Improvements Project: As a part of the 2018 Surface Water Management Plan Update, we have identified strategic opportunities for regional stormwater treatment across the city. The purpose of this project is to utilize existing public space in Aquila Park for stormwater treatment and volume control via infiltration. This project will provide stormwater treatment by trapping nutrients and sediments from the city's storm sewer system as well as promoting stormwater volume reduction by the use of infiltration. This project will meet the City of St. Louis Park's current requirements imposed by the MPCA and the MCWD, which are designed to improve the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city, reducing the TMDL. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.	$1,650,000	2020	SWUF
Klodt Pond WQ Project: This project, located near the Beltline Station area, may have some redevelopment credit potential. This project will remove accumulated sediment within the pond and review opportunities for stormwater filtration retrofit.	$165,000	2020	SWUF

Project Name/Description	Cost	Year	Funding Source
Minnehaha Creek Equalizer Pipe Project: This meander of Minnehaha Creek was cut off before a rail line was constructed in the 1930s. The rail line was removed in the 1960s, and a sanitary sewer was installed along the same alignment. This area becomes inundated during periods of high water along the creek and overtops the existing berm, leaving the water no exit. The standing water become stagnant, produces algae, and emits odors that affect wildlife and adjacent residents. The project consists of installing one-direction equalizer pipes to the creek meander that was cut off years ago between Hillsboro Avenue and 31st Street to allow the area to reach water levels that will naturally equalize it.	$82,500	2021	SWUF
Louisiana Oaks and South Oak Pond WQ Project: South Oak Pond appears to have been excavated out of a historic wetland. By 1937, the region around South Oak Pond was already highly disturbed, with soil disturbance and numerous paved and unpaved road crossings, but it appears that the area that is now South Oak Pond was a historic wet meadow. It appears to have been hydrologically connected to the stream to the south. By 1957, perhaps under naturally wetter conditions, inundated conditions are more apparent, and the shape suggests it may have been excavated. Residential development had occurred in the immediate vicinity by this time. Surrounding soils consist of extensive “urban land-Udorthents, wet substratum, 0–2 percent slopes,” indicating that the area may have been a wetland or historic floodplain prior to development. The pond is mapped by NWI as a freshwater pond. Today, the shape of the pond is unnaturally triangular, further suggesting that if it were a historic wetland or natural pond, it may have been excavated to increase its capacity. The purpose of this project is to provide a water quality filter system in the area of the existing lift station at South Oak Pond to remove phosphorus and sediment from the stormwater prior to being discharged into Minnehaha Creek. This project will help the city meet the future water quality standards (TMDL) for Minnehaha Creek as they pertain to the reduction of phosphorus and total suspended solids.	$385,000	2021	SWUF
Westdale Sediment Basin Rehabilitation Project: This proposed work is necessary to provide for the continued and/or improved treatment of surface water as it flows through the Westdale sediment basin into Westwood Lake and beyond. The rehabilitation and maintenance plan presented in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011) is based on current MPCA requirements that are aimed at improving water quality (impaired waters). Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city. This project is meant to address the need to properly maintain and/or improve our existing natural stormwater infrastructure.	$275,000	2021	SWUF

Project Name/Description	Cost	Year	Funding Source
Ainsworth Park WQ Improvements Project: As a part of the 2018 Surface Water Management Plan Update modeling effort, we have identified strategic opportunities for regional stormwater treatment across the city. The purpose of this project is to utilize existing public space in Ainsworth Park for stormwater treatment and volume control by filtration and infiltration. This project will provide stormwater treatment by trapping nutrients and sediments from the city's storm sewer system as well as promoting stormwater volume reduction by the use of infiltration. This project will meet the City of St. Louis Park's current requirements imposed by the MPCA and the MCWD, which are designed to improve the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city, reducing the TMDL. This project is meant to address the need to properly maintain and/or improve our existing natural stormwater infrastructure.	$1,650,000	2022	SWUF
Otten Pond Rehabilitation Project: Otten Pond appears to have been excavated out of a historic wetland. In 1937, historic aerial photography shows that the entire area was bounded by the roadways to the north and east. It appears to have been wet meadow that was hydrologically connected to the large wetland system to the southeast. By 1957, earthwork was occurring in this wet meadow, and the surrounding area was developed. Otten Pond remained as a shrubby, wooded wetland remnant. Today, the oblong shape of this pond clearly suggests that it was a man-modified excavation intended to provide drainage for the surrounding development. The soils are "urban land–Udorthents, 0–6 percent slopes," which reflects the disturbed nature of native soils; the original soil type is not known. The pond is recognized by NWI as a freshwater pond. The topography is level around the pond, further suggesting this area was wet meadow prior to development. The level topography also allowed for the establishment and/or persistence of wetland hardwood and herbaceous species, which are present today around the perimeter. This proposed work is necessary to provide for continued and/or improved treatment of surface water as it flows through Otten Pond. The rehabilitation and maintenance plan presented in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011) is based on current MPCA requirements aimed at improving water quality (impaired waters). Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.	$275,000	2022	SWUF
Shelard Sediment Basin WQ Improvement Project: In order to meet the city's MS4 Stormwater Discharge permit and local water quality requirements, existing stormwater facilities must be regularly maintained, opportunities for retrofit and water quality improvements must be explored, and upland areas must be maintained. This project removes accumulated sediment within the pond and evaluates opportunities for stormwater filtration retrofit.	$82,500	2023	SWUF

Project Name/Description	Cost	Year	Funding Source
Lamplighter Pond Rehabilitation Project: The purpose of this project is to provide a water quality filter system in the area of the existing lift station at South Oak Pond to remove phosphorus and sediment from the stormwater prior to being discharged into Minnehaha Creek. This project will help the city meet future water quality standards (TMDL) for Minnehaha Creek as they pertain to the reduction of phosphorus and total suspended solids. The rehabilitation and maintenance plan presented in Stormwater Pond Evaluation and Prioritization Report (St. Louis Park, 2011) is based on current MPCA requirements aimed at improving water quality (impaired waters). Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.	$220,000	2024	SWUF
Keystone Park WQ Improvement Project: This project will provide stormwater treatment by trapping nutrients and sediments from the city's storm sewer system as well as promoting stormwater volume reduction by the use of infiltration. This project will meet the City of St. Louis Park's current requirements imposed by the MPCA and the MCWD, which are designed to improve the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city reducing the TMDL. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.	$1,650,000	2024	SWUF
Lake Street Basin WQ Improvement Project: This project will provide stormwater treatment by trapping nutrients and sediments from the city's storm sewer system as well as promoting stormwater volume reduction by the use of infiltration. This project will meet the City of St. Louis Park's current requirements imposed by the MPCA and the MCWD, which are designed to improve the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city reducing the TMDL. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.	$1,650,000	2026	SWUF
Hampshire Pond WQ Improvement Project: To meet the city's requirements for a MS4 Stormwater Discharge Permit and local water quality requirements, existing stormwater facilities must be regularly maintained, opportunities for retrofit and water quality improvements must be explored, and upland areas must be maintained. This project removes accumulated sediment within the pond and assesses opportunities for stormwater filtration retrofit.	$165,000	2027	SWUF

Project Name/Description	Cost	Year	Funding Source
Webster Park WQ Improvement Project: As part of the 2018 Surface Water Management Plan Update, we have identified strategic opportunities for regional stormwater treatment across the city. The purpose of this project is to utilize existing public space in Webster Park for stormwater treatment and volume control by infiltration. This project will provide stormwater treatment by trapping nutrients and sediments from the city's storm sewer system as well as promoting stormwater volume reduction by the use of infiltration. This project will meet the City of St. Louis Park's current requirements imposed by the MPCA and the MCWD, which are designed to improve the water quality of impaired waters. Specifically, the basis for this recommended capital improvement is the removal of suspended solids (sediment) and phosphorous from waters exiting the city, reducing the TMDL. This project is meant to properly maintain and/or improve our existing natural stormwater infrastructure.	$1,650,000	2028	SWUF

Table 5-2: Watershed Management Organizations Specified SWMP Inclusion for the City of St. Louis Park, MN

Required by	WMO Requirement	Addressed in SWMP
BCWMC	Local controls must be implemented within two years of adoption of the BCWMC Plan (September 2017). Two BCWMC policies require specific ordinances: floodplain standards in Policy 4.2.2-39 and shoreland regulations in Policy 4.2.8-80. Ordinances and/or controls may also be needed to appropriately implement the following BCWMC policies (the referenced BCWMC policies are included in an attached table): water quality: 4.2.1-3, 4.2.1-12, 4.2.1-13, 4.2.1-15; flooding and rate control: 4.2.2-29, 4.2.2-31, 4.2.2-32, 4.2.2-34, 4.2.2-35, 4.2.2-36, 4.2.2-38, 4.2.2-39; groundwater management: 4.2.3-48; erosion and sediment control: 4.2.4-51, 4.2.4-54, 4.2.4-55; stream restoration and protection: 4.2.5-64; wetland management: 4.2.6-65, 4.2.6-66, 4.2.6-68, 4.2.6-69; recreation, habitat, and shoreland management: 4.2.8-80, 4.2.8-89; and administration: 4.2.10-112, 4.2.10-113, 4.2.10-120, 4.2.10-121.	Chapters 1, 3 and 5
BCWMC	The SWMP (also known as the LWMP) must outline the city's permitting process, including the preliminary and final platting process. The SWMP must describe the city's collaborative role in the BCWMC review of development and improvement projects, as described in Section 5.1.1.1 of the BCWMC Plan.	Chapter 1
BCWMC	The SWMP must include an assessment of problems affecting the city that are identified in Section 3 of the BCWMC Plan. These issues are related to water quality, water quantity, flooding, floodplain management, erosion and sedimentation management, stream management, wetlands, habitats, shoreland areas, invasive species management, groundwater, education and outreach, and maintenance of stormwater systems.	Chapter 3
BCWMC	The SWMP must include proposed corrective actions for issues identified in the SWMP. Proposed corrective actions must be consistent with the individual and collaborative roles of the BCWMC and the city at large. Corrective actions may include policies, action items, or implementation items within the SWMP.	Chapter 4; Appendices B, C, D, E and F
BCWMC	The SWMP must describe the city's existing and proposed ordinances, permits, and procedures addressing erosion and sediment control.	Chapters 3 and 4
BCWMC	Goals, policies, and activities (e.g., strategies, actions) included in the SWMP must be consistent with the BCWMC goals and policies, as identified in Section 4 of the BCWMC Plan. Specific policies in the BCWMC Plan that should be included or referenced among SWMP policies, strategies, or actions include water quality: 4.2.1-3, 4.2.1-5, 4.2.1-11, 4.2.1-12, 4.2.1-13, 4.2.1-15, 4.2.1-16; flooding and rate control: 4.2.2-22, 4.2.2-23, 4.2.2-24, 4.2.2-29, 4.2.2-31, 4.2.2-32, 4.2.2-34, 4.2.2-35, 4.2.2-36, 4.2.2-38, 4.2.2-39; groundwater management: 4.2.3-48, 4.2.3-50; erosion and sediment control: 4.2.4-51, 4.2.4-54, 4.2.4-55, 4.2.4-56; stream restoration and protection: 4.2.5-62, 4.2.5-64; wetland management: 4.2.6-65, 4.2.6-66, 4.2.6-68, 4.2.6-69, 4.2.6-70, 4.2.6-72; public ditches: 4.2.7-77; recreation, habitat and shoreland management: 4.2.8-80, 4.2.8-85, 4.2.8-89; and administration: 4.2.10-106, 4.2.10-112, 4.2.10-113, 4.2.10-118, 4.2.10-119, 4.2.10-120, 4.2.10-121, 4.2.10-122.	Chapter 4

Required by	WMO Requirement	Addressed in SWMP
BCWMC	The SWMP must assess the need for maintenance of local storm sewer systems under city jurisdiction, including public works facilities and natural conveyance systems. The SWMP must reference the city's responsibilities related to management of local storm sewer systems. (The SWMP may reference the city's MS4 permit if the current permit clearly describes the required information.)	Chapter 5; Appendix B
BCWMC	The SWMP must adopt the BCWMC waterbody classification system (as per Section 2.7.2.2 of the BCWMC plan). The LMWP must assess the need for a local waterbody management classification system and, if needed, correlate the system to the BCWMC waterbody classification system.	Chapter 2
BCWMC	The SWMP must assess the need for other water quality and water quantity management programs, if necessary, in addition to existing programs already described in the SWMP (or included in the city's SWPPP and referenced in the SWMP).	Chapter 3; Appendix B
BCWMC	The SWMP implementation table shall include BCWMC projects located within the city, to the extent those projects are known.	Chapter 5, Table 5.1
BCWMC	The SWMP is required to conform to Minnesota Statute 103B.235. Minnesota Statute 103B.235 (Subp. 2) includes specific requirements for SWMP contents: (a) Describe existing and proposed physical environment. (b) Define drainage areas and the volumes, rates, and paths of stormwater runoff existing and proposed physical environment. (c) Identify areas and elevations for stormwater storage adequate to meet performance standards established in the watershed plan. (d) Define water quality and water quality protection measures adequate to meet performance standards established in the watershed plan. (e) Identify regulated areas. (f) Set forth an implementation program, including a description of official controls and, as appropriate, a capital improvement program.	The SWMP and its appendices comply with these requirements.

Required by	WMO Requirement	Addressed in SWMP
BCWMC	The SWMP is required to conform to Minnesota Rules 8410. According to Minnesota Rules 8410.0160 Subp. 3, the SWMP must include the following components: (a) An executive summary that summarizes the highlights of the local water plan (b) Summaries of appropriate water resource management-related agreements that have been entered into by the local community, including joint powers agreements related to water management that the local government unit may be party to between itself and watershed management organizations, adjoining communities, or private parties. (c) Descriptions of the existing and proposed physical environment and land use; definitions of drainage areas and the volumes, rates, and paths of stormwater runoff; and data incorporated by reference. (d) An assessment of existing or potential water resource-related problems for only those areas within the corporate limits of the city. (e) Inclusion of a local implementation program for the year in which the local water plan extends. This program must describe nonstructural, programmatic, and structural solutions to issues identified in the SWMP. The program must be prioritized, and it shall ▪ include areas and elevations for stormwater storage adequate to meet performance standards or official controls established in WMO plans; ▪ define water quality protection methods that are adequate to meet performance standards and/or official controls in WMO plans and identify regulated areas; ▪ clearly define the city's responsibilities of the city that are distinct from those of WMOs for carrying out the implementation components; ▪ describe official controls and any changes to official controls relative to requirements of WMO plans; ▪ include a table that briefly describes each component of the implementation program and clearly details the schedule, estimated costs, and funding sources for each component including annual budget totals; and ▪ include a table for a capital improvement program that sets forth, by year, details of each contemplated capital improvement and includes details of schedules, estimated costs, and funding sources.	The SWMP and its appendices comply with these requirements.
BCWMC: Water quality	Member cities shall classify other waterbodies according to the BCWMC classification system and include this information in their local water management plans.	Chapter 2
BCWMC: Water quality	The BCWMC and the member cities will implement the improvement options listed in the BCWMC's CIP (Table 5-3) to address the water quality of priority waterbodies based on feasibility, prioritization, and available funding (see Policy 110 regarding CIP prioritization criteria).	Chapter 5

Required by	WMO Requirement	Addressed in SWMP
BCWMC: Water quality	The BCWMC will coordinate monitoring efforts with other programs, including member city monitoring, the Metropolitan Council Citizen-Assisted Monitoring Program (CAMP), the Watershed Outlet Monitoring Program (WOMP), Three Rivers Park district monitoring, Minneapolis Park and Recreation Board monitoring, the MPCA Citizen Lake Monitoring Program (CLMP), and the Hennepin County River Watch Program.	Chapters 2 and 4; Appendices B
BCWMC: Water quality	The BCWMC requires all stormwater to be treated in accordance with the MPCA's Minimal Impact Design Standards (MIDS) performance goal for new development, redevelopment, and linear projects. If the MIDS performance goal is not feasible and/or not allowed for a proposed project, the project proposer must implement the MIDS flexible treatment options, as shown in the MIDS Design Sequence Flow Chart, or a BCWMC-approved alternative.	Chapter 4
BCWMC: Water quality	The BCWMC will review projects and developments to evaluate compliance with the MPCA's MIDS, performance goals, triggers, and flexible treatment options (which are adopted by the commission as BCWMC water quality management standards) if the projects are located in member cities that have not adopted the MIDS performance goals, triggers, and flexible treatment options, or at the request of the member city. For projects located in member cities that have adopted the MIDS performance goals, triggers, and flexible treatment options, the member cities shall review projects for conformance with MIDS water quality treatments standards, unless commission review is requested by the member cities.	Chapter 4
BCWMC: Water quality	Member cities shall not allow the drainage of sanitary sewage or nonpermitted industrial wastes onto any land or into any watercourse or storm sewer discharging into Bassett Creek.	N/A (Water from the city does not drain directly into Bassett Creek)
BCWMC: Water quality	The BCWMC will maintain a water quality model (e.g., P8) for the watershed. Each year, member cities shall provide the BCWMC with plans for BMPs constructed within their city. The BCWMC will update the model annually to incorporate completed BCWMC capital improvements and BMP information provided by the member cities. The BCWMC will develop a summary report of the water quality model results and provide that report to the member cities to assist in their MS4 reporting.	Chapters 3, 4 and 5; Appendices B and F
BCWMC: Flooding and rate control	During the first five years of plan implementation, the BCWMC will work with the member cities to determine responsibilities for major rehabilitation and replacement of the BCWMC Flood Control Project features and establish the associated funding mechanisms.	Chapters 4 and 5
BCWMC: Flooding and rate control	The BCWMC will finance major maintenance and repair of water level control and conveyance structures that were part of the original BCWMC Flood Control Project on the same basis as the original project. New road crossings of the creek that were installed as part of the project will be maintained by the city where the structure is located.	Chapters 4 and 5

Required by	WMO Requirement	Addressed in SWMP
BCWMC: Flooding and rate control	Member cities shall be responsible for routine maintenance and repair of BCWMC Flood Control Project structures located within each city. Each member city shall be responsible for routine cleaning of these structures, including the removal of debris, brushing, and tree removal.	Chapters 4 and 5
BCWMC: Flooding and rate control	Member cities must implement the BCWMC's development policies, including minimum building elevations of at least two feet above the 100-year flood level for new and redeveloped structures, as outlined in the BCWMC's Requirements for Improvements and Development Proposals document (BCWMC, 2015, as revised).	Chapters 4 and 5; Appendices J, K and M
BCWMC: Flooding and rate control	The BCWMC and member cities must require rate control in conformance with the Flood Control Project system design and this plan. The BCWMC requires cities to manage stormwater runoff so that future peak flow rates leaving development and redevelopment sites are equal to or less than existing rates for the 2-year, 10-year, and 100-year events.	Chapters 4 and 5; Appendices J, K and M
BCWMC: Flooding and rate control	The BCWMC requires the retention of on-site runoff from development and redevelopment projects consistent with the MPCA's MIDS performance goals. These include the retention of (a) 1.1 inches of runoff from impervious areas for new development creating more than one acre of new impervious areas; (b) 1.1 inches of runoff from new or fully reconstructed impervious areas for redevelopment creating one or more acres of new or fully redeveloped impervious areas; and (c) 0.55 inch of runoff from new or fully reconstructed impervious areas for linear projects creating one or more acres of new or fully redeveloped impervious area (or 1.1 inches from the net increase in impervious area—whichever is greater). If an applicant is unable to achieve the performance goals due to site restrictions, the MIDS flexible treatment options approach shall be used, following the MIDS design sequence flow chart. For all other projects, the BCWMC encourages the use of infiltration, filtration, or other abstraction of runoff from impervious areas for all development and redevelopment projects as a best practice to reduce stormwater runoff.	Chapter 4; Appendix J
BCWMC: Flooding and rate control	The BCWMC will allow only those land uses in the BCWMC-established floodplain that will not be damaged by floodwaters and will not increase flooding. Allowable types of land use include recreation areas, parking lots, temporary excavation and storage areas, public utility lines, agriculture, and other open spaces.	Chapter 4; Appendix J
BCWMC: Flooding and rate control	The BCWMC prohibits the construction of basements in the floodplain; construction of all other infrastructure within the floodplain is subject to BCWMC review and approval.	Chapter 4; Appendices J and M
BCWMC: Flooding and rate control	The BCWMC prohibits permanent storage piles, fences, and other obstructions in the floodplain that could collect debris or restrict flood flows.	Chapter 4; Appendix J
BCWMC: Flooding and rate control	The BCMWC requires that projects within the floodplain maintain zero net loss in floodplain storage and no increase in flood level at any point along the trunk system. The BCWMC prohibits expansion of existing nonconforming land uses within the floodplain unless they are fully floodproofed in accordance with codes and regulations.	Chapter 4; Appendix J

Required by	WMO Requirement	Addressed in SWMP
BCWMC: Flooding and rate control	The BCWMC requires member cities to maintain ordinances that are consistent with BCMWC floodplain standards. Member cities must submit ordinances to the BCWMC for review.	Chapters 4 and 5; Appendix J
BCWMC: Groundwater	To protect groundwater quality, the BCWMC requires infiltration practices to be implemented in accordance with the following guidance documents for determining the feasibility of infiltration: the NPDES General Construction Stormwater Permit (2013, as amended); the Minimal Impact Design Standards (MIDS) Design Sequence Flow Chart (2013, as amended); and the Minnesota Department of Health's Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas (MDH, 2007). The BCWMC recommends that infiltration practices be designed with consideration for the following guidance documents: the BCWMC's Requirements for Improvements and Development Proposals (BCWMC, 2015, as revised and the Minnesota Pollution Control Agency's Minnesota Stormwater Manual (stormwater.pca.state.mn.us/index.php/Main_Page).	Chapters 3, 4 and 5; Appendices B, C, F, J, K and M
BCWMC: Groundwater	Member cities shall share groundwater elevation data, where available, with the BCWMC.	Chapter 4
BCWMC: Erosion and sediment control	Member cities shall continue managing erosion and sediment control programs and ordinances as required by their NPDES MS4 permit and NPDES Construction Stormwater general permit. These programs must address the permitting and inspection of erosion controls; erosion and sediment control at individual building sites; and requirements and procedures for reviewing, approving, and enforcing erosion control plans.	Chapters 4 and 5; Appendices B, K and M
BCWMC: Erosion and sediment control	Member cities shall perform regular erosion and sediment control inspections for projects triggering BCWMC review and projects subject to BCWMC erosion and sediment control standards. Member cities will annually report to the BCWMC regarding compliance with BCWMC standards as part of annual MS4 reporting or as requested by the commission.	Chapter 5; Appendices B, K and M
BCWMC: Erosion and sediment control	The BCWMC requires local water management plans to describe existing and proposed city ordinances, permits, and procedures that address erosion and sediment control.	Chapter 5; Appendices B, K and M
BCWMC: Streams	Member cities are responsible for funding maintenance and repairs that are primarily aesthetic.	Chapter 4 and 5
BCWMC: Streams	Member cities shall maintain and enforce buffer requirements adjacent to priority streams for projects that will result in more than 200 yards of cut or fill or more than 10,000 square feet of land disturbance. Buffer widths adjacent to priority streams must be at least 10 feet or 25 percent of the distance between the ordinary high-water level and the nearest existing structure, whichever is less. Allowable land uses and vegetative criteria for buffers are specified in the BCWMC's Requirements for Development and Redevelopment (BCWMC, 2015, as amended). Member cities may allow exemptions for public recreational facilities parallel to the shoreline (e.g., trails) up to 20 feet in width, with that width being added to the required buffer width.	N/A

Required by	WMO Requirement	Addressed in SWMP
BCWMC: Wetlands	The BCWMC requires member cities to inventory, classify, and determine the functions and values of their wetlands, either through a comprehensive wetland management plan or as required by the Wetland Conservation Act (WCA). Member cities shall maintain a database of wetland functions and corresponding value assessments. The BCWMC encourages member cities to complete comprehensive wetland management plans as part of their local water management plans or as an implementation task identified in their local water management plans. Completed comprehensive wetland management plans shall be submitted to the BCWMC for review and comment.	Chapter 4; Appendix D
BCWMC: Wetlands	The BCWMC requires member cities to develop and implement wetland protection ordinances that consider the results of wetland functions and value assessments, and which are based on comprehensive wetland management plans, if available. For wetlands classified as "Preserve" or "Manage 1," member cities shall implement standards for bounce, inundation, and runout control as per BWSR guidance. Member cities are encouraged to apply these standards to other wetland classifications as well.	Chapter 4; Appendix D
BCWMC: Wetlands	Member cities shall maintain and enforce buffer requirements for projects containing more than one acre of new or redeveloped impervious area. Average minimum buffer widths are required according to the MnRAM classification (or similar classification system): ▪ an average of 75 feet and minimum of 50 feet from the edge of wetlands is classified as "Preserve"; ▪ an average of 50 feet and minimum of 30 feet from the edge of wetlands is classified as "Manage 1"; and ▪ an average of 25 feet and minimum of 15 feet from the edge of wetlands is classified as "Manage 2" or "Manage 3." Allowable land uses and vegetative criteria for buffers are specified in the BCWMC's Requirements for Development and Redevelopment (BCWMC, 2015, as amended). Member cities may allow exemptions for public recreational facilities parallel to the shoreline (e.g., trails) up to 20 feet in width; that width is to be added to the required buffer width.	Chapter 4; Appendix D
BCWMC: Wetlands	Chapter 4; Appendix D	Chapter 4; Appendix D
BCWMC: Wetlands	The BCWMC will serve as the LGU responsible for administering the WCA for member cities as requested. (Currently, Medicine Lake, Robbinsdale, and St. Louis Park participate).	Chapter 4; Appendix D
BCWMC: Wetlands	The BCWMC requires that member cities annually inspect wetlands classified as "Preserve" for terrestrial and emergent aquatic invasive vegetation such as buckthorn and purple loosestrife and attempt to control or treat invasive species when feasible.	Chapter 4; Appendix D

Required by	WMO Requirement	Addressed in SWMP
BCWMC: Public ditches	The BCWMC will manage abandoned or transferred public ditches that are part of the trunk system as per the policies of this plan. Member cities will be responsible for management of abandoned or transferred public ditches that are not on the trunk system but are currently part of their municipal drainage systems.	Chapter 2
BCWMC: Recreation, habitat, and shoreland	Member cities are responsible for shoreland regulation and are required to adopt MDNR-approved shoreland ordinances in accordance with the MDNR's priority phasing list.	Chapter 4; Appendix M
BCWMC: Recreation, habitat, and shoreland	Member cities shall consider opportunities to maintain, enhance, or provide new open spaces and/or habitats as part of wetland creation or restoration, stormwater facility construction, development, redevelopment, and other appropriate projects.	Chapter 4
BCWMC: Recreation, habitat, and shoreland	Member cities shall adopt state buffer and/or shoreland management requirements for public waters in incorporated areas if and when they are promulgated.	Section 4.8Appendix M
MCWD	A summary of water resource management-related agreements, including the joint-power agreements into which the LGU has entered with watershed management organizations, adjoining LGUs, private parties or others.	Chapter 1; Appendix A
MCWD	According to Minnesota Rule 8410.0160, a local plan must include the following components: ▪ maps of current and projected land use; ▪ maps of drainage areas under current and future planned land use with paths, rates, and volumes of stormwater runoff; ▪ a stormwater conveyance map meeting standard of the current MS4 general permit and indicating an outfall or a connection at the LGU boundary; ▪ an inventory of public and private stormwater management facilities including the location, facility type, and party responsible for maintenance (e.g., landowner, homeowner's association, LGU, other third party); ▪ a listing and summary of existing or potential water resource-related problems wholly or partly within LGU corporate limits. (A problem assessment consistent with Minnesota Rules 8410.0045, Subp. 7, must be completed for each).	The SWMP and its appendices comply with these requirements.
MCWD	Minnesota Rules (8410.0160) requires that the local plan include (a) an executive summary stating highlights of the local water plan and (b) a statement of the process to amend the local plan. The latter must be consistent with Minnesota Statute 103B.235.	The SWMP and its appendices comply with these requirements.

Required by	WMO Requirement	Addressed in SWMP
MCWD	The LGU is invited to identify any District assistance or coordination that would benefit its implementation of any particular program. The following should be specifically addressed: ▪ The NPDES MS4 Stormwater Program ▪ The Total Maximum Daily Load Program ▪ Federal and state anti-degradation requirements ▪ Safe Drinking Water Act/state wellhead protections ▪ The National Flood Insurance Program ▪ State floodplain management laws ▪ State shoreland management laws ▪ The Minnesota Wetland Conservation Act	Chapter 3, 4 and 5; Appendices B, C, D, E, F, J, K and M
MCWD	Minnesota Rules 8410.0160 requires that the local plan contain a local implementation program. According to the state rule, the program must ▪ describe nonstructural, programmatic, and structural solutions to water resource problems identified; ▪ present these implementation elements in a table that briefly describes each element, details the schedule, estimated cost and funding sources for the element, and includes annual budget totals; ▪ explain, within this table, a capital improvement program that sets forth, by year, details of each contemplated capital improvement including schedules, estimated costs, and funding source; and ▪ prioritize implementation elements consistent with the principles of Minnesota Rules 8410.0045, Subpart 1.A, and district priorities as described in the WMP and communicated to the LGU.	Chapter 5

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