



# 2040 COMPREHENSIVE PLAN

## SURFACE WATER MANAGEMENT PLAN

HENNEPIN COUNTY | MEDINA, MINNESOTA

Adopted October 2, 2018

Prepared for:  
City of Medina  
2052 County Road 24  
Medina, MN 55340

WSB PROJECT NO. 2712-94



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## 1. EXECUTIVE SUMMARY

### 1.1. Local Surface Water Management Plan Purposes

This Local Surface Water Management Plan (Plan) serves as a comprehensive planning document to guide the City of Medina in conserving, protecting, and managing its surface water resources. The City will use the SWMP as a guide to reach goals related to water quality, volume reduction and flood management. The plan meets the requirements of Minnesota Statutes 103B.235, Minnesota Rules 8410, the Elm Creek and Pioneer-Sarah Creek Watershed Management Commissions' Third Generation Watershed Management Plans, Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan, and Minnesota Statute 103B.01. The purposes of the water management programs are to:

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

The Medina Surface Water Management Plan addresses these purposes.

### 1.2. Executive Summary

The Medina Surface Water Management Plan is divided into six sections:

- ***Section 1.0 Executive Summary*** provides background information and summarizes the plan contents.
- ***Section 2.0 Land and Water Resource Inventory*** presents information about the topography, geology, groundwater, soils, land use, public utilities, surface waters, hydrologic system and data, and the drainage system.
- ***Section 3.0 Agency Cooperation*** outlines other governmental controls and programs that affect stormwater management.
- ***Section 4.0 Assessment of Problems and Issues*** presents the City's water management related problems and issues.
- ***Section 5.0 Goals and Policies*** outlines the City's goals and policies pertaining to water management.

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- **Section 6.0 Implementation Program** presents the implementation program for the City of Medina, which includes defining responsibilities, prioritizing, and listing the program elements.
- **Section 7.0 Administration** outlines the continued administration of this plan with respect to plan updates and amendments, as well as annual reporting requirements to MCWD.

To implement this Plan, a coordinated water resource management approach must be used. This approach must utilize various City and watershed management organization personnel having jurisdiction within the City. Listed below is the contact information for personnel and organizations having responsibilities for administering and implementing portions of this Plan:

**City of Medina** – <http://www.ci.medina.mn.us>

Steve Scherer  
2052 County Road 24  
Medina, MN 55340  
763-473-8842 – [steve.scherer@ci.medina.mn.us](mailto:steve.scherer@ci.medina.mn.us)

**Elm Creek Watershed Management Commission** – <http://www.elmcreekwatershed.org>

Judie Anderson  
3235 Fernbrook Lane  
Plymouth, MN 55447  
763-553-1144 – [judie@jass.biz](mailto:judie@jass.biz)

**Minnehaha Creek Watershed District** – <http://www.minnehahacreek.org>

Becky Christopher  
15320 Minnetonka Blvd.  
Minnetonka, MN 55345  
952-471-0590 – [bchristopher@minnehahacreek.org](mailto:bchristopher@minnehahacreek.org)

**Pioneer-Sarah Creek Watershed Management Commission** – <http://www.pioneersarahcreek.org>

Judie Anderson  
3235 Fernbrook Lane  
Plymouth, MN 55447  
763-553-1144 – [judie@jass.biz](mailto:judie@jass.biz)

**Metropolitan Council** – <http://www.metrocouncil.org>

Judy Sventek  
390 N. Robert Street  
St Paul, MN 55101  
651-602-1000 – [judy.sventek@metc.state.mn.us](mailto:judy.sventek@metc.state.mn.us)

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## 2. LAND AND WATER RESOURCE INVENTORY

### 2.1. Physical Setting

#### 2.1.1. Topography and Geology

The bedrock beneath Medina is relatively flat, though intermittent ridges run from the center of the City to the southeast and southwest. Medina's bedrock is now buried beneath surficial Quaternary glacial and fluvial deposits. These deposits consist mainly of clayey till in the western half of the City with sandy till dominating the eastern half. Post-glacial organic deposits and pockets of Lacustrine sand and silt from the Des Moines and Grantsburg sublobe deposits are interspersed throughout the City and overlay the till material. The depth to bedrock within the City ranges from about 100 to 400 feet depending on the location within Medina. The Hennepin County Geologic Atlas shows the actual elevation of the bedrock being 650 to 800 feet.

The Tunnel City Group and St. Lawrence bedrock formations lie beneath the City's northwest corner and cover nearly half the municipal area. The formation transitions to a relatively thin band of Jordan Sandstone oriented from northeast to southwest. Much of the bedrock beneath southeastern Medina consists of St. Peter sandstone except for the extreme southeastern corner, from Holy Name Lake to the southern border, where Ordovician Prairie du Chien bedrock group is found. A ridge consisting of Jordan sandstone runs south above this Prairie du Chien formation from Holy Name Lake south to Lake Minnetonka.

The Minnesota Pollution Control Agency's (MPCA) Minnesota Stormwater Manual and other commonly used design guidance documents identify near surface bedrock as a constraint to infiltration practices. Medina's geology is such that bedrock depth constraints to infiltration will not occur.

Additional geological information can be found in the *Geological Atlas of Hennepin County* (Minnesota Geologic Survey, 1989).

Topography varies within the City from nearly level to gently and moderately sloping. The highest elevations range from approximately 1,050 to 1,060 feet (all elevations are mean sea level) at various points in the northwest and center of the City. The lowest elevations range from approximately 940 to 950 feet at points near the eastern edge of Lake Independence and near the Elm Creek crossing at Trunk Highway 55. The City of Medina has contour data that covers the entire City and is based on 2011 LIDAR (Light Detection and Ranging) data.

Medina's stormwater generally flows in five directions. Northeast Medina drains to Elm Creek. Elm Creek flows out of Medina near where Trunk Highway 55 leaves the City. A small watershed in the north central area of Medina drains north to Rush Creek. A majority of western Medina drains west to Lake Independence. A small portion of the northwest corner of Medina drains to Lake Sarah. In its southwest, Medina drains to Painter Creek while southeast Medina drains to Long Lake. Figure 3 provides an overview of drainage patterns within Medina. The City meet the volumes and rates of stormwater identified within the watershed District models

#### 2.1.2. Climate and Precipitation

The climate within the Twin Cities Metropolitan Area is typical of a continental climate. Without

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the buffering influence of large bodies of water, cold winters and hot summers predominate. It is generally understood that global climate change has an effect on the Metropolitan Area's local climate. One area where climate change manifests itself is in rainfall intensities and rainfall depths. The Metropolitan Area has seen more intense rainfalls the last two decades and even the average rainfalls seem more intense. The implications are clear:

- Flood control facilities, if designed for the 100-year rainfall, may get larger as the statistical 100-year rainfall gets larger.
- Facilities designed for smaller events, such as infiltration areas and small storm sewer may also get larger as rainfall depths increase for the 1-year to 5-year rainfall events.

The total average annual precipitation in the Metropolitan Area is approximately 30.6 inches. The total average annual snowfall is approximately 54.4 inches. Average monthly temperature, precipitation, and snowfall are shown in Table 2.1.

TABLE 2.1 – AVERAGE MONTHLY CLIMATE DATA, MINNEAPOLIS/ST. PAUL, 1981-2010

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Daily Temperature (°F)	15.6	20.8	32.8	47.5	59.1	68.8	73.8	71.2	62.0	48.9	33.7	19.7	46.2
Average Precipitation (in.)	0.90	0.77	1.89	2.66	3.36	4.25	4.04	4.30	3.08	2.43	1.77	1.16	30.61
Average Snowfall (in.)	12.2	7.7	10.3	2.4	0.1	0.0	0.0	0.0	0.0	0.6	9.3	11.9	54.4

*Source: Minnesota Climatology Working Group*

Additional climatological information for the area can be obtained from the Minnesota State Climatology Office at <http://www.climate.umn.edu/>.

Rainfall frequency estimates are used as design tools in water resource projects. In 2013, the National Oceanic Atmospheric Administration (NOAA) published the Atlas 14 Precipitation-Frequency document that showed an increase in rainfall intensity and design storms from the previous Technical Paper 40 precipitation values. Selected rainfall frequencies for Medina are listed in Table 2.2.

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TABLE 2.2 – ATLAS 14 RAINFALL FREQUENCIES

Recurrence Interval (yrs)	24-hr Rainfall Depth (in)
1	2.49
2	2.86
10	4.25
50	6.24
100	7.25

Additional precipitation information for the area can be obtained from the National Oceanic and Atmospheric Administration (NOAA) website at <http://hdsc.nws.noaa.gov/>

### *2.1.3. Soils*

Because of its preponderance of wetlands, Medina has many soils with little or no infiltration capacity. Hydrologic Soil Groups characterize diverse soils by similar infiltration capacity. Group A soils have the highest infiltration capacity while Group D have the lowest. Generally, infiltration is not an appropriate practice on Hydrologic Soil Group C and D soils.

**Group A** – These soils have high infiltration rates even when thoroughly wetted. Based on the Minnesota Stormwater Manual, published by the Minnesota Pollution Control Agency (MPCA), the infiltration rates range from 0.8 to 1.63 inches per hour. These soils consist chiefly of deep, well drained to excessively drained sands and gravel. Group A soils have a high rate of water transmission, therefore resulting in a low runoff potential.

**Group B** – These soils have moderate infiltration rates ranging from 0.3 to 0.45 inches per hour when thoroughly wetted. Group B soils consist of deep moderately well to well drained soils with moderately fine to moderately coarse textures.

**Group C** – These soils have slow infiltration rates 0.2 inches per hour when thoroughly wetted. Group C have moderately fine to fine texture.

**Group D** – These soils have very slow infiltration rates ranging from 0 to 0.06 inches per hour when thoroughly wetted. Group D soils are typically clay soils with high swelling potential, soils with high permanent water table, soils with a clay layer at or near the surface, or shallow soils over nearly impervious material.

Figure 4 provides hydrologic soil groupings for soils in Medina. Although the map indicates a significant percentage of Group B soils, historical knowledge indicates that Group C and D are more prominent. Additional information on Medina's soils can be obtained from the Hennepin County Soil Survey.



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### *2.1.4. Land Use*

The City's land use practices include agricultural, residential, commercial, industrial, and private and public open spaces. The majority of the City is rural with areas of urban development in the northeast along the Trunk Highway 55 corridor and east of Lake Independence where access to existing utilities and transportation makes such development more viable. Figure 6 shows Medina's 2040 land use.

Medina's 2040 land use plan is based on an existing land use inventory and maintains the City's rural focus while still providing areas for urban growth. These urban growth areas concentrate along the Trunk Highway 55 corridor where existing transportation facilities and utility infrastructure can support such density. A fairly low percentage of the City's overall land is anticipated to change. A large amount of land is designated as open space primarily due to expansive water and wetlands. Preserving these areas helps Medina maintain the rural and natural qualities of the community. The Land Use chapter of the 2040 Comprehensive Plan outlines each phase of development to occur up to 2040.

Land use data is an important factor for estimating surface water runoff. The hard or impervious surface areas associated with each land use greatly affect the amount of runoff generated from an area. Future land use projections indicate those areas that may be available for water resource enhancement and where improvements should be a priority. Significant changes in land use can increase runoff due to added impervious surfaces. However, changes in land use also allow for the construction of stormwater BMPs. Additionally, Medina is primarily a rural community. Agricultural row crop land uses generate relatively high total suspended solids loads and nutrient runoff. Development of agricultural land will result in a net reduction in the total suspended solids loads through construction of BMPs to meet local regulations for treatment.

## 2.2. Water Resources Data

### *2.2.1. Wetlands*

Figure 7 shows the wetland inventory and management class for wetlands located in Medina. The 2007 wetland inventory included an on-the-ground assessment of approximately 640 wetlands within the city. Each wetland was assessed for a variety of functions and values, and assigned a management classification based on the findings. Information gathered during the wetland assessment determines the stormwater management and buffer requirements for each wetland.

Figure 8 shows larger wetlands and lakes from the National Wetland Inventory over which the Minnesota Department of Natural Resources (MnDNR) has jurisdiction. Minnesota protects all wetlands through its Wetland Conservation Act. The wetlands and lakes under MnDNR jurisdiction have an added level of protection.

### *2.2.2. Major Bodies of Water*

Medina's major water bodies list includes all the named, largest MnDNR protected water bodies identified on Figure 8. These water bodies include the following: Ardmore, Half Moon, Holy

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Name, Independence, Katrina, Medina, Mooney, Peter, School, Spurzem, Thies and Wolsfeld Lakes. None of the lakes within the City of Medina are used for surface water appropriations.

The City has classified the MnDNR Public Waters/Wetlands within its Shoreland Overlay District regulations according to Table 2.3. Unnamed Lake #27-150 is often referred to as School Lake.

TABLE 2.3 – CITY WATER BODY CLASSIFICATIONS

<b>Water Body Name</b>	<b>MnDNR Protected Waters Inventory ID#</b>	<b>Classification</b>
Mooney	27-134P	Recreational Development
Peter	27-147P	Recreational Development
Winterhalter	27-148P	Natural Environment
Spurzem	27-149P	Natural Environment
Unnamed	27-150P	Natural Environment
School	27-151W	Natural Environment
Half Moon	27-152P	Natural Environment
Ardmore	27-153P	Recreational Development
Katrina	27-154P	Natural Environment
Unnamed	27-155W	Natural Environment
Thies	27-156W	Natural Environment
Wolsfeld	27-157P	Natural Environment
Holy Name	27-158P	Recreational Development
Independence	27-176P	Recreational Development

### *2.2.3. Water Courses*

Medina has no rivers, but does have some notable creeks within its jurisdiction. Elm Creek drains northeast to Medina. The Elm Creek Watershed Management Commission is charged with protecting Elm Creek and managing its watershed. Spurzem Creek drains northwest as it flows through Peter, Spurzem, and Half Moon lakes and the numerous wetlands and marshes adjacent to these. Spurzem Creek ends at Lake Independence. Lake Katrina in southwest Medina is the head waters for Painter Creek, which flows 6.2 miles, predominantly through ditches, to Jennings Bay in Lake Minnetonka. Sarah Creek drains northwest to Medina. Beginning at Trunk Highway 55 and passing near Loretto, Sarah Creek enters Lake Sarah soon after leaving Medina.

The City has one jurisdictional ditch identified within its boundaries and it drains to the north central portion of the City located within the Elm Creek Watershed Management Commission's boundaries. It is identified as County Ditch 26.

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### *2.2.4. Monitored Water Quality and Quantity Data*

The City will continue to support monitoring of surface waters within its jurisdictional boundaries and outside these boundaries for waters to which the City discharges. Data will be obtained through cooperation and coordination with other various agencies, including the Minnesota Pollution Control Agency, cities adjacent to Medina, the Metropolitan Council, the Minnesota Department of Natural Resources, the Elm Creek and Pioneer-Sarah Creek Watershed Management Commissions, the Minnehaha Creek Watershed District, and Three Rivers Park District.

Three Rivers Park District implements a comprehensive monitoring program to determine the quality of water resources in the Park District. Staff has collected samples from 10 lakes including Independence, Spurzem, Rebecca, Medicine, Auburn, Fish, Weaver, Zumbra, and 18 bays on Lake Minnetonka, at two week intervals throughout the summer. Of those, Lake Independence and Spurzem are within the boundaries of Medina. The monitoring is done to track water quality trends, and determine if management efforts are successful. The quantity and quality of inflow to lakes is also periodically measured by staff to determine the sources of pollution entering Park District water resources. Monitoring data from the lakes sampled by Three Rivers Park District staff is available on their website at: <https://www.threeriversparks.org/page/water>

Other water quality information can be found from the watershed management organizations having jurisdiction within the City, Metropolitan Council, and the Minnesota Pollution Control Agency on the following websites:

- Pioneer-Sarah Watershed Management Organization monitoring information can be found at: <http://www.pioneersarahcreek.org/water-quality.html>
- Elm Creek Watershed Management Commission monitoring information can be found at: <http://www.elmcreekwatershed.org/water-quality-overview.html>
- Minnehaha Creek Watershed District information can be found at: <http://www.minnehahacreek.org/data-center>
- Metropolitan Council monitoring information, including the Citizen-Assisted Monitoring Program (CAMP), can be found at: <http://www.metrocouncil.org/Wastewater-Water/Services/Water-Quality-Management.aspx?source=child>
- Minnesota Pollution Control Agency's Citizen Lake Monitoring Program (CLMP) information can be found at: <http://www.pca.state.mn.us/water/clmp.html>

### *2.2.5. Impaired Waters*

The Minnesota Pollution Control Agency (MPCA) is required to publish a list of impaired waters; these are lakes and streams in the state that are not meeting federal water quality standards. For each water body on the list, the MPCA is required to conduct a study to determine the allowable Total Maximum Daily Load (TMDL) for each pollutant that exceeds the standards. Impaired waters in Medina, or those receiving discharge from Medina, are summarized in Table 2.4.

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Table 2.4 – Impaired Waters

Waterbody/Watercourse	Year Added to List	Affected Use	Pollutant/Stressor	TMDL Status
Elm Creek	2004	Aquatic Life, Aquatic Recreation	Low Oxygen, Fish Bioassessments, Chloride, E.coli	Complete
Lake Independence	2002	Aquatic Recreation	Excess Nutrients	Complete
Lake Independence <sup>2</sup>	2004	Aquatic Consumption	Mercury, Fish Consumption Advisory	Complete
Spurzem Lake <sup>2</sup>	2006	Aquatic Consumption	Mercury, Fish Consumption Advisory	Complete
Spurzem Lake <sup>5</sup>	2008	Aquatic Recreation	Total Phosphorous	Underway
Lake Katrina	2007	Aquatic Recreation	Total Phosphorous	Not Underway
Lake Sarah <sup>1</sup>	2006	Aquatic Recreation	Excess Nutrients	Complete
Lake Sarah <sup>1, 2</sup>	1998	Aquatic Consumption	Mercury, Fish Consumption Advisory	Complete
Lake Rebecca <sup>1</sup>	2008	Aquatic Recreation	Excess Nutrients	Not Underway
Lake Rebecca <sup>1, 2</sup>	1998	Aquatic Consumption	Mercury, Fish Consumption Advisory	Complete
Lake Minnetonka - Jennings Bay <sup>1,3</sup>	2008	Aquatic Recreation	Excess Nutrients	Complete
Lake Minnetonka <sup>1, 2</sup>	1998	Aquatic Consumption	Mercury, Fish Consumption Advisory	Complete
Long Lake <sup>1, 2</sup>	1998	Aquatic Consumption	Mercury, Fish Consumption Advisory	Complete
Long Lake <sup>1,3</sup>	2010	Aquatic Recreation	Excess Nutrients	Complete
Rush Creek <sup>1</sup>	2002	Aquatic Life, Aquatic Recreation	Fish Bioassessments, Dissolved Oxygen, E.coli	Complete
Half Moon Lake <sup>2</sup>	2012	Aquatic Consumption	Mercury, Fish Consumption Advisory	Complete
Half Moon Lake <sup>4,5</sup>	2016	Aquatic Recreation	Excess Nutrients	Underway
Mooney Lake <sup>3</sup>	2010	Aquatic Recreation	Excess Nutrients	Complete
Peter Lake <sup>4,5</sup>	2016	Aquatic Recreation	Excess Nutrients	Underway
School Lake <sup>3</sup>	2014	Aquatic Recreation	Excess Nutrients	Complete
Lake Ardmore <sup>5</sup>	2016	Aquatic Recreation	Excess Nutrients	Underway
Wolsfeld Lake <sup>3</sup>	2010	Aquatic Recreation	Excess Nutrients	Complete
Holy Name Lake <sup>3</sup>	2010	Aquatic Recreation	Excess Nutrients	Complete
Rice Lake-Main <sup>6</sup> Basin	2012	Aquatic Recreation	Excess Nutrients	Complete
Painter Creek <sup>3</sup>	2010	Aquatic Recreation	E. coli	Complete
<sup>1</sup> Outside municipal boundary <sup>2</sup> Statewide Mercury TMDL developed, no action is necessary <sup>3</sup> Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Study <sup>4</sup> Added to the 2016 Impaired Waters List <sup>5</sup> Part of the Pioneer-Sarah Creek Watershed WRAPS/TMDL Study <sup>6</sup> Part of Elm Creek Watershed Management Commission TMDL Study				

Local governments will be required to incorporate completed TMDL studies into their surface water management plans and are required to incorporate any appropriate TMDL implementation activities within their Stormwater Pollution Prevention Program within 18 months of the approved date. A more detailed discussion on the status of the TMDLs can be found in Section 5.

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### *2.2.6. Groundwater Appropriations*

The City of Medina updated their Wellhead Protection Plan in August, 2013 and it is effective until 2023. The entire City is within either a low vulnerability or very low vulnerability Drinking Water Supply Management Area (DWSMA). The DWSMA vulnerability is determined using geologic, soils and groundwater chemistry information. The designation indicates that the aquifer is covered by at least 50 feet of clay material.

The City will be required to incorporate the requirements of the Wellhead Protection Plan into their Stormwater Pollution Prevention Program (SWPPP) for areas located within vulnerable source water protection areas (NPDES MS4 General Permit). Vulnerable Source Water Protection areas are those areas susceptible to contamination of the water supply from activities at the land surface and are based on the following three components: geologic sensitivity, well construction maintenance and use, and water chemistry and isotopic composition. The MDH has identified vulnerable source water protection areas and currently no areas within the City of Medina are identified as such.

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

The City will need to amend its groundwater appropriations permit from the DNR when their existing allocation is met. The City has also instituted an Irrigation Well Policy in its Code of Ordinances. The City gathers information on the water levels and usage from irrigation wells constructed with development through developer's agreements.

Protection of the aquifers described above is crucial in maintaining Medina's long term water supply. Achieving this will require cooperation with the Minnesota Department of Health (MDH) in developing their Wellhead Protection Plan. The goal of protecting Medina's water supply wells are to:

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

### 2.3. Natural Resources Data

#### *2.3.1. Water-based Recreation Areas*

The City of Medina has public areas for access to water based recreation and activities:

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**Baker Park Reserve:** Baker Park Reserve, an area encompassing approximately 2,108 acres and managed by the Three Rivers Park District, is located in the southwest area of the City and provides numerous water based recreation activities. In addition to the numerous trails and campgrounds located within the Reserve, boat access and fishing docks are provided at Spurzem Lake, Lake Independence and Half Moon Lake and swimming areas are provided at Lake Independence.

**Independence Beach Park – Lakeshore:** The City of Medina operates the relatively small Independence Beach Park, located along the eastern edge of Lake Independence and north of Baker Park Reserve.

**Holy Name Lake Park:** The City operates a small park along the south shore of Holy Name Lake.

### *2.3.2. MLCCS and MCBS*

The Minnesota Land Cover Classification System, or MLCCS, categorizes urban and built up areas in terms of land cover rather than land use. MLCCS serves as a tool for City staff to integrate natural area preservation into land planning, land use, and zoning decisions. The City is dominated primarily by a mixture of forested areas, planted or cultivated vegetation, and herbaceous vegetation. The remaining areas are classified as artificial surfaces mainly located along the Trunk Highway 55 corridor and pockets of shrubland can be found throughout the City. Figure 11 provides MLCCS coverage for Medina.

According to the MnDNR, the Minnesota County Biological Survey (MCBS) began in 1987 as a systematic survey of rare biological features on a county-by-county basis. Medina has several areas identified with rare biological features. These are generally in close proximity to Medina's open space and park land and include instances of cattail marsh, lowland hardwood forest, maple-basswood forest, oak forest, shrub swamp, tamarack swamp, wet meadow, and willow swamp. The survey shows areas of outstanding and high ratings of biodiversity in Medina in the southwest corner of the municipal boundary. The DNR has jurisdiction over these areas. Based on state statute any work within these areas is required to meet DNR permit requirements. Figure 12 provides the locations of rare and biological features in the City of Medina.

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

The Wolsfeld Woods Scientific and Natural Area (SNA) lies on Medina's south border. The Minnesota Department of Natural Resources manages Wolsfeld Woods and all other SNAs in Minnesota. Minnesota statute stipulates that any water within an SNA is an Outstanding Resource Value Water (ORVW). This designation provides statutory protection to Wolsfeld Lake that does not occur for other water bodies within Medina. Specifically, Minnesota Rule 7050.0180 on Nondegradation for Outstanding Resource Value Waters prohibits discharge from the City's storm water system to Wolsfeld Woods and Wolsfeld Lake. Additionally, Medina is not allowed any new or expanded discharges to Wolsfeld Woods since the date it was designated a Scientific and Natural Area. Under its NPDES permit requirements, Medina must submit with its permit application:

- A list of ORVWs within the City (Wolsfeld Woods being the sole ORVW in Medina),



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- A map of drainage areas to the ORVW,
- An estimate of the existing impervious coverage and proposed impervious coverage based on Medina's comprehensive plan,
- An assessment of how Medina's SWPPP will adequately eliminate new and expanded discharges,
- And suggested modifications to the SWPPP if new and expanded discharges are not adequately eliminated by the current SWPPP.

Medina completed this assessment in the spring of 2009 and provided it for public comment during their typical MS4 annual public meeting presentation. The assessment showed that due to the land use changing from primarily agriculture to low density rural residential (10 acre lots or greater) that the Total Phosphorous, Total Suspended Solids, and Volume has decreased since 1988 and is anticipated to decrease into the 2040 Comprehensive Planning year. Based on a review of the aerial image from 2009 compared to 2016, there has been limited development in the area tributary to Wolsfeld Woods. The City will continue to monitor this as development occurs.

### *2.3.4. Key Conservation Areas*

The Minnehaha Creek Watershed District has prepared a map identifying key conservation areas found throughout the District. The map identifies several areas with the City of Medina and they are located within the Wolsfeld Woods drainage area. The City will be able to use this, along with the MLCCS data as a tool to integrate preservation of natural resources, including upland areas, into land planning, land use, and zoning decisions. The map of the Key Conservation Areas can be found on the districts website under their comprehensive water resource management plan at: <http://www.minnehahacreek.org>.

## **2.4. Water Resources Related Agreements**

This section summarizes those water resources related agreements the City of Medina has established with other entities.

### *2.4.1. Elm Creek WMC Joint Powers Agreement*

The ECWMC was formed in 1973 as a joint powers organization by the cities of Champlin, Corcoran, Dayton, Maple Grove, Medina, Plymouth and the Hennepin Conservation District. In 2004, Medina became party to an amended and restated Joint Powers Agreement reestablishing the ECWMC with Champlin, Corcoran, Dayton, Maple Grove, Plymouth, Rogers and Hassan Township.

### *2.4.2. Pioneer-Sarah Creek WMC Joint Powers Agreement*

Medina was signatory to the 1994 Joint Powers Agreement, along with Corcoran, Greenfield, Independence, Loretto, Maple Plain, Minnetrista, Watertown Township, and Hennepin Conservation District, which established the PSWMC.

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### 3. AGENCY COOPERATION

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

Table 3.1 – Regulatory Control

Official Control	Responsibility	Mechanism
Stormwater Management	City, WMO	Chapter 8, Section 828.33 of City Code, Zoning- Performance Standards and Enforcement, Stormwater Management; Chapter 7, Section 745.00 of City Code, Public and Private Utilities, Storm Water Utility Ordinance
Erosion and Sediment Control	City, WMO, PCA	Chapter 8, Section 828.29 of City Code, Zoning – Performance Standards and Enforcement, Construction Site Storm Water Runoff Control Ordinance
Shoreland	City, WMO, MnDNR	Chapter 8, Section 827 of City Code, Zoning – Zoning Districts, Shoreland Overlay District
Floodplain	City, WMO, MnDNR	Chapter 8, Section 826.74 of City Code, Zoning – District Provisions, Floodplain District, Floodplain Management Ordinance
Wetlands	City as LGU, MnDNR, USACE, and Technical Advisory Panel (TEP) Members, & BWSR	Public Waters Rules (MnDNR). Section 404 of the Clean Water Act (USACE). WCA (TEP Members). Chapter 8, Section 828.43 of City Code, Zoning – Performance Standards and Enforcement, Wetland Conservation. A new Wetland Protection Ordinance was adopted upon completion of the City's Wetland Inventory and Assessment
Illicit Discharge	City	Chapter 7, Section 747 of City Code, Storm Water Illicit Discharge and Connections
Grading and Drainage	City, WMO	Chapter 8, Section 820 of City Code, Land and Building Regulations. Chapter 8, Section 825.55 of City Code, Land and Building Regulations, Site Plan Review – application of the requirements of this LSWMP

*\*Acronyms are defined in the sections below*

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### 3.1. City of Medina

The Medina Public Works Department is in charge of all the public facilities in Medina and the Public Works staff maintains city roads, parks, sanitary and storm sewers, and the water utility. Public Works staff provides the design, operation and repair work necessary to prevent flooding and improve water quality in Medina's drainage system. The Public Works Department coordinates with watershed management organizations and other outside agencies in water resource management and conservation.

The Medina Planning and Zoning Department manages comprehensive planning and administers the City's land and building code (City Code Chapter 8). Chapter 8 includes performance management standards that cover water resource management issues such as: construction site erosion control, floodplain management, shoreland preservation, tree preservation, and wetland protection. The Stormwater Management Ordinance is Section 828.33 of City Code Chapter 8. Additionally, the City is in the process of updating its Stormwater Design Guide. The Stormwater Design Guide has been incorporated by reference into Medina's City Code. Ordinances can be found in Appendix D.

The City's environment code (City Code Chapter 5) contains the additional regulations related to surface water management:

- Section 510      Boats, Harbors, and Waters
- Section 512      Surface Use of Lake Independence
- Section 520      Turf Fertilizer Containing Phosphorus

Further information on municipal regulations summarized in Table 3.1 can be obtained from the City's website at <http://www.ci.medina.mn.us>.

### 3.2. Hennepin County

The County provides many services within the City of Medina, including health services and property and vital records. Hennepin County was the first county to begin groundwater planning in 1988, with authority delegated to the Hennepin Conservation District. Hennepin County has assumed all duties and responsibilities of the Hennepin Conservation District. That groundwater plan received state approval in March 1994. Although the county has not formally adopted the plan, the county is proceeding with implementation of many aspects of the plan. In addition, the County's Department of Environment and Energy provides education, outreach, and funding to individuals and organizations. These programs include the Hennepin County River Watch and the Wetland Health Evaluation Program.

Hennepin County Department of Environment and Energy provides technical assistance to county residents, local government units, watershed organizations, and other agencies. They have assisted local governments with implementation of natural resource management plans, the Wetland Conservation Act, natural resource education, and application of sound natural resource practices. Their programs are funded through County allocation, grants, and contracts with local government units, contracts with watershed organizations, and state and federal cost share. Within the City of Medina, the Department of Environment and Energy provides administration and technical services, including project review, for the Pioneer-Sarah Watershed Management Commission and Elm Creek Watershed Management Commission.  
<http://www.hennepin.us/>

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### 3.3. Three Rivers Park District

Three Rivers Park District is an independent, special park district established by the State Legislature in 1957. As a special park district, Three Rivers Park District is charged with the responsibilities of acquisition, development and maintenance of large park reserves, regional parks and regional trails for the benefit and use of the citizens of suburban Hennepin County, Scott County, the metropolitan areas, and the State of Minnesota.

The Three Rivers Park District is also responsible for managing the Park District's water resources in cooperation with the surrounding communities and watershed management organizations in a way that is environmentally responsible and that will maintain lake water quality at or above the levels experienced in 1989. Within the City of Medina, the Park District manages the Baker Park Reserve.

### 3.4. Watershed Management Organizations (WMO)

The City of Medina is divided into multiple drainage basins that flow to three separately managed watersheds. Figure 2 shows the three watershed management organizations with jurisdiction in the City. These agencies each have authority for review and approval of this local surface water management plan.

#### *3.4.1. Pioneer-Sarah Creek Watershed Management Commission (PSCWMC)*

PSCWMC was formed in 1978 and covers portions of Greenfield, Independence, Loretto, Maple Plain, Medina and Minnetrista. PSCWMC administration is provided by the Hennepin County Department of Environment and Energy. PSCWMC covers approximately 7.5 square miles in Medina. PSCWMC adopted their Third Generation Watershed Management Plan on May 21, 2015. The plan update included revisions to their Rules and Standards. Refer to the PSCWMC for specific requirements. <http://www.pioneersarahcreek.org/>

The Commission requires a plan review to be completed by the local permitting authority for development or redevelopment if any part of the development is within a 100-year floodplain or upland flood storage area and/or the project changes the timing, storage, or carrying capacity of any tributaries of the 100-year floodplain. PSCWMC thresholds require local permitting through Medina for the following project descriptions:

- Any land development or site development that disturbs more than 1 acre
- Linear projects that result in a net increase in impervious surfaces of one acre or more.

When a project plan transcends municipal boundaries, a Commission review is required. Additionally, PSCWMC requires Medina to review permit plans involving the alteration of waterways, culvert or bridge installations or replacements in waterways. This would be in addition to any state or federal permits that might pertain to these activities.

#### *3.4.2. Elm Creek Watershed Management Commission (ECWMC)*

ECWMC was formed in 1973 and covers portions of Champlin, Corcoran, Dayton, Maple Grove, Medina and Plymouth. ECWMC administration is provided by Hennepin County. ECWMC covers approximately 26.3 square miles in Medina. ECWMC adopted their Third Generation Watershed Management Plan on October 14, 2015. Medina has two years from that date to update their SWMP.

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The Third Generation Plan can be accessed from their website. <http://www.elmcreekwatershed.org>

ECWMC did not update their rules and standards with the Third Generation Plan. The Commission requires a plan review to be completed by the local permitting authority for development or redevelopment if any part of the development is within a 100-year floodplain or upland flood storage area and/or the project changes the timing, storage, or carrying capacity of any tributaries of the 100-year floodplain. ECWMC thresholds require local permitting through Medina for the following project descriptions:

- Any land development or site development that disturbs more than 1 acre
- Linear projects that result in a net increase in impervious surfaces of one acre or more.

When a project plan transcends municipal boundaries a Commission review is required. Additionally, ECWMC requires Medina to review permit plans involving the alteration of waterways, culvert or bridge installations or replacements in waterways. This would be in addition to any state or federal permits that might pertain to these activities.

### *3.4.3. Minnehaha Creek Watershed District (MCWD)*

MCWD was formed in 1967 and covers portions of numerous cities and townships in Hennepin and Carver counties. These cities and townships include: Chanhassen, Deephaven, Excelsior, Golden Valley, Greenwood, Hopkins, Independence, Laketown Township, Long Lake, Maple Plain, Medina, Minneapolis, Minnetonka, Minnetonka Beach, Minnetrista, Mound, Orono, Plymouth, Richfield, St. Bonifacius, St. Louis Park, Shorewood, Spring Park, Tonka Bay, Watertown Township, Wayzata, and Victoria. MCWD covers approximately 10.1 square miles in Medina.

MCWD is currently in the process of updating its Comprehensive Water Resources Management Plan that was completed in 2007. The goals of the MCWD updates are to encourage collaboration among municipalities and the District in how they approach stormwater management.

Medina expects that MCWD will continue to implement its rules within Medina's jurisdiction according to the thresholds identified within the rules.

The following tables provide a summary of their current stormwater management practices that are required based on the type of development that is occurring. Their website should be referenced for specific requirements. <http://www.minnehahacreek.org/>

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Table 2: Stormwater management requirements for new development

Site Size	Impervious Surface	Requirements
< 1 acre	N/A	None
≥ 1 acre	< 20% of site	None
	≥ 20% of site	Phosphorus Control, Rate Control, and Volume Control

Table 3: Stormwater management requirements for redevelopment resulting in a decrease or no change in impervious surface

Site Size	Site Disturbance	Impervious Surface Reduction	Requirements
≤ 1 acre	N/A	10% reduction in impervious surface	None
		0 - 9% reduction in impervious surface	Incorporate BMPs
> 1 acre - ≤ 5 acres	< 40% site disturbance	10% reduction in impervious surface	None
		0 - 9% reduction in impervious surface	Incorporate BMPs
	≥ 40% site disturbance	10% reduction in impervious surface	None
		0 - 9% reduction in impervious surface	Volume control required for site's impervious surface
> 5 acres	< 40% site disturbance	10% reduction in impervious surface	None
		0 - 9% reduction in impervious surface	Incorporate BMPs
	≥ 40% site disturbance	N/A	Volume control required for site's impervious surface



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Table 4: Stormwater management requirements for redevelopment resulting in an increase in impervious surface

Site Size	Site Disturbance	Impervious Surface Increase	Requirements	Treatment Scope
≤ 1 acre	N/A	N/A	Incorporate BMPs	N/A
> 1 acre	< 40% site disturbance	< 50% increase in impervious surface	Phosphorus Control, Rate Control, and Volume Control	Additional impervious surface
		≥ 50% increase in impervious surface		Entire site's impervious surface
	≥ 40% site disturbance	N/A	Phosphorus Control, Rate Control, and Volume Control	Entire site's impervious surface

Table 5: Stormwater management requirements for linear transportation projects

Project Type	Impervious Surface Increase	Requirements	Treatment Scope
New Linear Transportation Project	< 10,000 square feet	None	N/A
	≥ 10,000 square feet	Phosphorus Control, Rate Control, and Volume Control	New impervious surface
Linear Reconstruction Project	< 10,000 square feet	None	N/A
	≥ 10,000 square feet and < 1 acre	Phosphorus Control and Rate Control	Additional impervious surface
	≥ 1 acre	Phosphorus Control, Rate Control, and Volume Control	Additional impervious surface

### 3.5. Metropolitan Council

Established by the Minnesota Legislature in 1967, the Metropolitan Council is the regional planning organization for the Twin Cities, seven-county area. The Council manages public transit, housing programs, wastewater collection and treatment, regional parks and regional water resources. Council members are appointed by the Minnesota Governor.

The Metropolitan Council reviews municipal comprehensive plans, including this local surface water management plan. The Council updated the Water Resources Management Policy Plan in 2015, establishing the expectations to be met in local plans. As part of the updated Minnesota Rules Chapter

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8410 adopted July of 2015, all local water management plans must be updated prior to December 31, 2018. The Council's goals focus on water quality standards and pollution control, "to reduce the effects of nonpoint source pollution on the region's wetlands, lakes, streams and rivers."

### 3.6. State Board of Soil and Water Resources (BWSR)

BWSR works through local government agencies to implement Minnesota's water and soil conservation policies. The BWSR is the administrative agency for soil and water conservation districts, watershed districts, watershed management organizations and county water managers. BWSR is responsible for implementation of the Metropolitan Surface Water Management Act and the Wetland Conservation Act. Staff members are located in eight field offices throughout the state.

First established in 1937 as the State Soil Conservation Committee, the agency became part of the University of Minnesota in the 1950's, transferred to the Minnesota Department of Natural Resources in 1971, then transferred to the Department of Agriculture in 1982. In 1987 the State Legislature established the current Board of Water and Soil Resources. The Board consists of 17 members, appointed by the governor to four-year terms. Multiple state and local agencies are represented on the Board.

In 1992, BWSR adopted rules (8410), establishing the required content for local surface water management plans. These rules were updated July 2015.

### 3.7. Minnesota Pollution Control Agency (MPCA)

The MPCA is the state's lead environmental protection agency. Created by the State Legislature in 1967, the MPCA is responsible for monitoring environmental quality and enforcing environmental regulations to protect the land, air and water. The MPCA regulates Medina's management of wastewater, stormwater and solid waste.

The MPCA is the permitting authority in Minnesota for the National Pollutant Discharge Elimination System (NPDES), the federal program administered by the Environmental Protection Agency to address polluted stormwater runoff. Medina's most recent application for NPDES coverage was submitted in June 2006. To obtain coverage, the City was required to develop a Stormwater Pollution Prevention Program (SWPPP) to address the following six minimum control measures:

1. Public Education
2. Public Involvement
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-construction Runoff Control
6. Pollution Prevention in Municipal Operations

A copy of Medina's SWPPP is included in Appendix B.

Medina currently has eleven impaired water bodies within its jurisdiction as well as five outside of municipal boundaries. A full list of the impaired waters and their TMDL status can be found in Section 2 Table 2.4. The City will be evaluating the TMDL requirements and updating their NPDES SWPPP to include the applicable implementation activities. Additionally, as part of its permit application, Medina must conduct an impaired waters review. This review considers whether modifications to Medina's SWPPP are warranted to begin working toward waste load reductions for these waters.

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In response to these multiple regulatory activities, the MPCA developed the Minnesota Stormwater Manual, providing stormwater management tools and guidance. The Manual presents a unified statewide approach to stormwater practices. In order to address the constant influx of information pertaining to stormwater management, the Minnesota Stormwater Manual was updated to an electronic wiki page in 2013. This format allows the content to be updated continually and easily maintained. The link to the Minnesota Stormwater Manual can be found here:

[https://stormwater.pca.state.mn.us/index.php?title=Main\\_Page](https://stormwater.pca.state.mn.us/index.php?title=Main_Page)

### 3.8. Minnesota Department of Natural Resources (MnDNR)

Originally created in 1931 as the Department of Conservation, the MnDNR has regulatory authority over the natural resources of the state. MnDNR divisions specialize in waters, forestry, fish and wildlife, parks and recreation, land and minerals, and related services. The Division of Waters administers programs in lake management, shoreland management, dam safety, floodplain management, wild and scenic rivers, the Public Waters Inventory (PWI), and permitting of development activity within public waters.

### 3.9. Minnesota Department of Health (MDH)

The MDH manages programs to protect the public health, including implementation of the Safe Drinking Water Act. The MDH has regulatory authority for monitoring water supply facilities such as water wells, surface water intakes, water treatment, and water distribution systems. The MDH also is responsible for the development and implementation of the wellhead protection program.

### 3.10. Minnesota Environmental Quality Board (EQB)

The EQB is comprised of five citizen members and the heads of ten state agencies that play an important role in Minnesota's environment and development. The EQB develops policy, creates long-range plans and reviews proposed projects that may significantly influence Minnesota's environment.

### 3.11. Minnesota Department of Transportation (Mn/DOT)

Within the City, Mn/DOT administers state highway systems. Mn/DOT approval is required for any construction activity within state right-of-ways. Mn/DOT also administers a substantial amount of funding for transportation projects completed in the City. Anticipated activities of Mn/DOT are periodically published in their State Transportation Improvement Plan (STIP).

### 3.12. U.S. Environmental Protection Agency (EPA)

The EPA develops and enforces the regulations that implement environmental laws enacted by Congress; however the MPCA bears responsibility for implementing many of the resulting programs within Minnesota. The NPDES program and the Impaired Waters List are both the result of the Clean Water Act, administered by the EPA.

### 3.13. U.S Army Corps of Engineers (USACE)

Under Section 404 of the Clean Water Act, including subsequent modifications, the EPA and the USACE regulate the placement of fill into all wetlands of the U.S. In 1993, there was a modification of the



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definition of "discharge of dredged material" to include incidental discharges associated with excavation. This modification meant that any excavation done within a wetland required the applicant to go through Section 404 permitting procedures. In 1998, however, this decision was modified so that excavation in wetlands is now regulated by the USACE only when it is associated with a fill action.

### 3.14. Federal Emergency Management Agency (FEMA)

FEMA manages federal disaster mitigation and relief programs, including the National Flood Insurance Program (NFIP). This program includes floodplain management and flood hazard mapping. FEMA published the initial Flood Insurance Rate Map (FIRM) for Medina in 1980. The effective FIRM was updated for Hennepin County, including Medina, in 2016.

### 3.15. Natural Resource Conservation Service (NRCS)

The Natural Resources Conservation Service (NRCS) is a division of the U.S. Department of Agriculture. Formerly named the Soil Conservation Service (SCS), the NRCS provides technical advice and engineering design services to local conservation districts across the nation. The Soil Survey of Hennepin County, Minnesota was published by the Soil Conservation Service in 1974. The SCS also developed hydrologic calculation methods that are widely used in water resources design.

### 3.16. U.S. Geological Survey

The USGS provides mapping and scientific study of the nation's landscape and natural resources. USGS maps provide the basis for many local resource management efforts.

### 3.17. Minnesota Geological Survey (MNGS)

MNGS maps the geologic resources of the state of Minnesota as well as maintains the database of all wells drilled in Minnesota

### 3.18. U.S. Fish and Wildlife Service

The USFWS works to conserve and protect the nation's fish, wildlife, plants and habitat. The USFWS developed the National Wetlands Inventory (NWI) beginning in 1974, to support federal, state and local wetland management work.

### 3.19. NPDES Permitting Process

The MPCA has designated the City of Medina as an NPDES Phase II MS4 community (MN Rules 7090). The permit application outlined Medina's Stormwater Pollution Prevention Plan (SWPPP) to address six minimum control measures:

- Public education
- Public involvement
- Illicit discharge detection and elimination
- Construction site runoff control
- Post-construction runoff control
- Pollution prevention in municipal operations

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The City's SWPPP contains several Best Management Practices within each of the listed control measures. These were identified using a self-evaluation and input process with City staff.

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

Along with the SWPPP, Medina is subjected to the NPDES permit requirement on prohibited discharges due to Wolsfeld Woods being designated as a MnDNR scientific and natural area. Under the NPDES permit requirements, the City of Medina is required to submit with permit application a list of ORVWs with prohibited discharge, map the drainage areas, estimate the existing impervious coverage and proposed impervious coverage based on zoning and comprehensive plans, assess how the SWPPP will adequately eliminate new and expanded discharges, and suggest modifications to SWPPP that will adequately eliminate new and expanded discharges.

As a requirement of the TMDL the City will be evaluating all TMDL requirements and updating their NPDES SWPPP to include the applicable implementation activities.

### 3.20. Comparison of Regulatory Standards

Developing property within Medina is subject to review and approval from three watershed management organizations covering the City (Figure 2). Each watershed organization has established rules or standards governing stormwater management and protection of natural resources. Currently these rules vary in content between agencies, and may be more or less restrictive than City standards. When standards diverge, Medina emphasizes that the stricter standards apply. The City of Medina's Stormwater Design Manual and Engineering Guidelines can be found in Appendix F.

The Pioneer-Sarah and Elm Creek Watershed Management Commissions have developed standards based on the goals and policies in their watershed management plan. These standards overlap Medina's in some respect and cover ground not covered by Medina in other respects. Ultimately, it is not the goal of Medina's Local Surface Water Management Plan that watershed and Medina regulatory programs be identical. Rather it is the goal of this plan that the regulatory programs be compatible and that it be understood that if one entity's regulations are silent on a subject the others may not be and that project proposers should take care to ensure that all overlying standards are considered.

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## 4. ASSESSMENT OF ISSUES

### 4.1. Stormwater Management System Assessment

Previous sections of this Local Surface Water Management Plan (LSWMP) provide background on the physical and regulatory forces shaping surface water management in Medina. This section describes problems and challenges of specific waters, neighborhoods or programs identified by the City, watershed districts and others. Minnesota Statutes and Rules and Metropolitan Council guidance documents require "issues and corrective actions" or "problems and corrective actions" as elements of Local Surface Water Management Plans. The intent of this section is to serve the same purpose as this issue and identification requirement, but to also provide a broader assessment of the challenges facing Medina. The assessment includes stormwater management issues, current and future, identified by the City, the three watersheds with jurisdiction within the City, and other state and federal agencies.

### 4.2. Total Maximum Daily Loads (TMDLs)

A Total Maximum Daily Load (TMDL) is the maximum amount of a pollutant that is allowed to discharge to an impaired water body. The process of developing this standard is commonly known as the TMDL process and involves the following phases:

- Assessment and listing as an impaired water (MPCA 303(d) list)
- TMDL study
- Implementation plan development and implementation
- Monitoring of the effectiveness of implementation efforts

Table 2.4 in Section 2 identifies seventeen impaired waterbodies either within the City of Medina or in adjacent communities receiving discharge from Medina. Currently, four TMDL studies have been approved that designates wasteload allocations to the City. Pioneer-Sarah Creek Watershed is currently in the process of approving a TMDL study that lists TMDLs for Ardmore Lake, Peter Lake, Half Moon Lake, and Spurzem Lake. A link to each TMDL study is listed below. Table 4.1 lists Medina's allowed wasteload allocations and required yearly load reductions. A detailed description of the relevant corrective actions for the TMDL requirements is found in Section 4.3.

- [Lake Independence TMDL Study](#)
- [Lake Sarah TMDL Study](#)
- [Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Study](#)
- [Elm Creek Watershed Management Commission TMDL](#)
- [Pioneer-Sarah Creek Watershed TMDL Study \(DRAFT\)](#)

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**Table 4.1 Wasteload Allocations for Medina**

<b>Impaired Waterbody</b>	<b>Relevant TMDL Report</b>	<b>Wasteload Phosphorus Allocation (lbs/year)</b>	<b>Required Load Reduction (lbs/year)</b>	<b>Related Corrective Action in Section 4.3</b>
Lake Independence	Lake Independence TMDL	231.0	284.0	1,2,3,6
Lake Sarah	Lake Sarah TMDL	92.9	249.0	6,16
Holy Name Lake	Upper Minnehaha Creek Watershed TMDL	1.0	26.0	6,9
Long Lake	Upper Minnehaha Creek Watershed TMDL	113.0	103.0	6,7,9,10,11
Jennings Bay	Upper Minnehaha Creek Watershed TMDL	140.0	398.0	6,9
Mooney Lake	Upper Minnehaha Creek Watershed TMDL	1.0	7.0	6,9
Wolsfeld Lake	Upper Minnehaha Creek Watershed TMDL	16.0	76.0	6,9,10,11,13,14
School Lake	Upper Minnehaha Creek Watershed TMDL	7.0	32.0	6,12,9
Rice Lake-Main Basin	Elm Creek Watershed TMDL	202.7	1068.3	6
Peter Lake	Pioneer-Sarah Creek Watershed TMDL (draft)	9.6	0.0	6
Spurzem Lake	Pioneer-Sarah Creek Watershed TMDL (draft)	12.2	92.5	6,8
Lake Ardmore	Pioneer-Sarah Creek Watershed TMDL (draft)	1.3	15.2	1,2,3,6

The TMDL study for lakes with mercury impairments was part of a larger, statewide study and aims at reducing the mercury level produced from human induced input by 14% in the state and by 86% at the federal level.

The Upper Minnehaha Creek TMDL study also requires the City of Medina to address the E.coli impairment for Painter Creek. ECWMC is in the process of developing a manure management ordinance, which the City will adopt to aid in limiting runoff from animal farms. The City will continually educate residents on manure management as well as general pet waste. As the City develops and new BMPs are constructed, bacteria from stormwater runoff will also be removed.

Regarding the City's role in future TMDLs and TMDL Implementation Plans, the City recognizes that the responsibility for completion and implementation of the TMDL studies lies with the primary stakeholders contributing to the impairment. The City intends to cooperate with the MPCA and the watersheds in the development of the TMDL studies, with the understanding that the MPCA generally takes the lead on these studies with the watersheds providing data, technical support, and communication and coordination with the cities.

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It is the intention of the City to fully implement the items and actions identified in existing and future TMDL Implementation Plans and designate adequate funding for those efforts. Section 4.3 addresses these TMDL issues by providing corrective actions for the City.

### 4.3. Summary of Issues and Corrective Actions

An assessment of existing and potential water resource issues have been identified based on current information available to the City and include those listed in the Watershed Management Plans of the three WMOs with jurisdiction in the City. Possible corrective actions have been identified and are listed in the Implementation Plan (Section 7). Locations for each corrective action are labeled and prioritized in Figure 16.

The City of Medina considers Low Impact Development (LID) techniques an integral component to addressing current and preventing future water resource issues within the City. The City promotes the use of LID to obtain pollutant and volume reductions of stormwater. This technology strategically places BMPs nearer the point where runoff is generated and utilizes vegetation, soils, and biologic treatment in an effort to replicate natural hydrologic process on an urban landscape.

The numbering of the corrective actions for each issue are labeled to correspond with the numbering in Figure 16. The City has identified 11 high priority projects and eight additional potential improvements. Higher priority ranking was given to projects that have a low cost to water quality benefit ratio, are on publicly owned property, or are adjacent to upcoming street reconstruction projects.

#### A. Issue: Poor water quality in Lake Ardmore and Lake Independence.

- 1) Corrective Action: Hennepin County completed the Ardmore Subwatershed Stormwater Retrofit Analysis in March 2016. The study identifies three potential wetland restoration projects within the Ardmore subwatershed. The highest scoring wetland restoration water quality project is the Lake Ardmore wetland restoration west of County Road 19 and north of Maple Street as shown on Figure 16.

The goal of these projects is to closely approximate the original wetland's natural condition, resulting in multiple environmental benefits, but primarily to store additional water and assimilate nutrients. This wetland receives runoff from 472 acres and the proposed improvements would result in approximately 48 pounds of total phosphorus (TP) reduction per year. The existing wetland is ditched and the elevation is controlled by an existing culvert under Maple Street. The proposed improvement would consist of modifying the outlet to provide extended detention and restore the ditched wetland.

The estimated cost for the project is \$386,000 including maintenance costs for a 20-year period. This equates to a cost per pound of TP removed of \$402. The primary cost is the easement acquisition, estimated at \$2,500 per acre for wetland and \$30,000 per acre for cropland. The project would also require reconstruction of a portion of Maple Street (included in the cost estimate). A potential option to reduce the cost of this stormwater retrofit would be to time it with a future street reconstruction project.

The two primary benefits of this project are the low cost per pound of TP removal and the opportunity to restore the function and value of the existing wetland complex.

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- 2) Corrective Action: The Ardmore Area Subwatershed Stormwater Retrofit Analysis also identified Lake Independence shoreline restoration. The project is located on several parcels owned by the City of Medina (therefore no easement acquisition is required which streamlines the process). Under existing conditions, visual observations indicate that shoreline erosion is occurring near Lakeshore Park on either side of the boat ramp. The erosion is approximately 160 feet long and is estimated to contribute 2 lbs/yr of phosphorus to Lake Independence.

This phosphorus load could be eliminated by stopping the erosion by restoring the shoreline. Additionally, this project would provide an opportunity for stormwater education in a high visibility location adjacent to Lake Independence. The restoration includes armoring (typically riprap) along the shoreline to protect against wave action. Native vegetation (pollinator friendly species) can be established above the shoreline armoring.

The estimated cost per pound of TP removed is \$1,100. The primary benefits of this project are its location on existing City owned property and visibility as a stormwater education measure.

- 3) Corrective Action: Fern Street gully restoration identified in the Ardmore Area Subwatershed Stormwater Retrofit Analysis. The gully north of Fern Street receives concentrated flow via a storm sewer pipe. This project includes restoration to stabilize the side slopes and bottom to reduce the erosion that is occurring. A significant sediment load is contributed to gullies as the erosion sluffs the side slopes and stormwater runoff transports the sediment load downstream to Lake Independence.

Field measurements showed that the gully is approximately 120 feet long, five feet wide and four feet deep. The approximate footprint that the erosion occurs in is 600 square feet. The BWSR Pollution Reduction Estimator worksheet was used to determine the benefit in phosphorus load reduction from stabilization of the Fern Street gully. In total, it is estimated that 1,390 cubic feet or 50 tons of sediment has been eroded to date. Gully stabilization would significantly reduce the TSS load and could reduce the TP load by 100%.

The estimated cost per pound of TP removed is \$277 for this project. An additional benefit of this project is it is upstream of an existing wetland and would remove sediment load that is discharged into this wetland prior to Lake Independence.

It should be clearly noted that the costs for each of these projects are based on 2017 dollars, include 20-year maintenance periods and do include easement acquisition costs.

- B. Issue: Minimize flooding throughout the City. FEMA recently updated the Flood Insurance Rate Maps for Medina. However, the majority of the mapped waterbodies are Zone A, which indicates that a Base Flood Elevation is not established. This poses a challenge for determining property and building elevations for development adjacent to the Zone A waterbodies. In response to this, the City has identified the following corrective actions.

- 4) Corrective Action: Hydrologic/hydraulic studies to establish Base Flood Elevations (BFE)

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for FEMA mapped waterbodies in PSWMC and ECWMC. (MCWD has BFEs established)

- 5) Corrective Action: The following locations were identified in the previous SWMP and by City Staff as concerns for roadway flooding.
  - a. Evaluate options to address flooding on the NE quadrant of Medina Road and Tamarack Drive.
  - b. Corrective Action: Evaluate options to address flooding on Tamarack Road south of CSAH 24.
  - c. Corrective Action: Evaluate options to address flooding on Willow Drive south of CSAH 24.

C. Issue: Reduce reliance on potable water for irrigation

- 6) Corrective Action: Expand education program for benefits of water reuse for irrigation throughout the City. The City currently has information available on its website regarding the Stormwater Irrigation Ordinance. Additional information on the value of utilizing stormwater runoff for irrigation and the permitting and other associated requirements could be included to augment what is already provided.
- 7) Corrective Action: Education and cooperation with Spring Hill Golf Course.
- 8) Corrective Action: Education and cooperation with Baker Golf Course.

D. Issue: Elevated external and internal phosphorus loads throughout the Long Lake Creek Subwatershed waterbodies.

- 9) Corrective Action: City-wide education program to address manure management.
- 10) Corrective Action: Implement projects and studies to address load sources identified in the Long Lake Creek Subwatershed Plan, Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration Strategy Report, and the Upper Minnehaha Lakes Final TMDL. This includes partnering with Long Lake for internal load management through carp removal. The Upper Minnehaha Lakes Final TMDL Report identifies internal loading from rough fish as a potential source of phosphorus with unknown impact on 3 of the 5 lakes in the Long Lake Creek Subwatershed. Recent studies completed by the Minnesota Aquatic Invasive Species Research Center show that it is possible to quantify the carp population and develop integrated pest management (IPM) strategies to sustainably manage those populations and mitigate their effects.

Corrective Action: Continue to maintain and foster regional partnerships between Long Lake, Orono, MCWD, and the Long Lake Waters Association to implement projects to improve water quality within the Long Lake Creek subwatershed. Carp assessment and management has been identified as a priority among these agencies. The City of Medina will look for additional opportunities to partner with MCWD on any future wetland restorations or pond retrofit projects.



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- 11) Corrective Action: The City has identified top priorities for partnership opportunities with MCWD to address issues in the Long Lake Creek Subwatershed. Some of these include:
- a. Potential opportunity to improve stormwater management of Tamarack Road when it is reconstructed in 2018-2019.
  - b. Opportunity to collaborate to improve Wolsfeld Woods due to an increase in public interest in the property.
  - c. Opportunity to repair/abate erosion on streambanks near Meadow Woods Trail.
  - d. Identification of grant sources for improved manure management.
- 12) Corrective Action: Partner with MCWD on School Lake internal load management. The Upper Minnehaha Lakes Final TMDL Report identifies an implementation item for School Lake to complete a fish survey and evaluate the need for management activities. The City will also identify the need for additional internal load management such as alum treatment.
- E. Issue: Painter Creek is listed as impaired for E.coli. A TMDL was complete as part of the Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Study.
- 13) Corrective Action: Partner with MCWD to undertake any wetland and/or streambank restoration projects along the reaches of Painter's Creek within the City of Medina. The draft 2017 MCWD Watershed Management Plan does not currently identify any planned restoration areas located within Medina. The City will also look to provide education and outreach regarding pet waste management and will establish a manure management ordinance for large farming operations located throughout the City.
- F. Issue: Local erosion that contributes excess sediment to degraded waterbodies.
- 14) Corrective Action: Cooperate with DNR, MCWD to assess local erosion in Wolsfeld Woods that may contribute to lake sediment loads. The Long Lake Creek subwatershed Plan indicated concerns with gullies and channel erosion upstream of Wolsfeld Woods. The City of Medina will work with the DNR and MCWD to specifically identify these locations and work to restore the potential sources of erosion. Additional field inspection is required prior to determining a cost and water quality benefit associated with this action.
- 15) Corrective Action: Existing developable land use within Elm Creek Watershed is primarily used for agriculture. As development occurs, TSS and TP loads will be reduced through the construction of BMPs. Table 4.2 demonstrates the existing untreated TSS and TP load of agricultural land versus future developed commercial and single family residential land use. BMPs will be constructed as development occurs, which will reduce the overall offsite loading and help Medina reduce local erosion and help in meeting phosphorus reduction requirements for Elm Creek. A standard wet basin was used to estimate sediment removals per acre of developed land.



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**Table 4.2 Yearly Load Reduction for Assumed Development**

Land Use	TSS Load/Acre	TP Load /Acre	TSS Load Removed by Pond (~84%)	TP Load Removed by Pond (~50%)	Future TSS Load/Acre	Future TP Load/Acre
Agriculture (existing)	367.0	1.11	---	---	---	---
Commercial	1119.0	1.39	940.0	0.70	179.0	0.69
Single Family Residential	312.0	0.95	262.1	0.48	49.9	0.47

Source: MPCA Estimator Worksheet, [https://stormwater.pca.state.mn.us/index.php/Guidance\\_and\\_examples\\_for\\_using\\_the\\_MPCA\\_Estimator](https://stormwater.pca.state.mn.us/index.php/Guidance_and_examples_for_using_the_MPCA_Estimator)

- 16) Corrective Action: Partner with ECWMC on creek restoration near Hamel Road in Rainwater Park. The City of Medina has a proposed trail project within Rainwater Park. Creek restoration for a project of Elm Creek within the Rainwater Park limits could be eliminated in conjunction with the trail project. The City of Medina will coordinate with ECWMC to evaluate potential erosion issues in Elm Creek in this reach and projects to reduce erosion and to provide a stabilized riparian habitat.

The estimated cost for this project is \$530,000, assuming stabilization of approximately 1,000 lineal feet of channel. The estimated load reduction is 50 tons of TSS/year. Additional field verification will be needed to verify the extent of streambank restoration needed and resultant water quality benefit.

G. Issue: Conservation of wetlands and uplands throughout the City.

- 17) Corrective Action: Gully restoration in partnership with Three Rivers Park District.
- 18) Corrective Action: Take the Loretto sewer ponds offline and connect to the MCES system. This project was identified in the City of Medina's previous plan and has not been implemented yet.
- 19) Corrective Action: Tomahawk Trail wetland restoration.

H. Issue: Agricultural runoff contribution to lake and stream TMDLs

- 20) Corrective Action: The City will coordinate with MCWD, PSCWMC and ECWMC to develop a manure management ordinance
- 21) Corrective Action: As the City develops, agricultural land use will change to rural residential. Table 4.2 shows the removal of sediment based on the land use change and construction of BMPs.

#### 4.4. Minnehaha Creek Watershed District (MCWD)

The 2007 District Watershed Management Plan focused on phosphorus load reductions required of the City through various implementation activities. Other areas of concern include local flooding,

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landlocked basins, flow velocity, erosion, and land conservation. Minnehaha Creek Watershed District divided their watershed plan into several subwatershed plans, two of which pertain to Medina: Painter Creek Subwatershed Plan and Long Lake Subwatershed Plan.

The 2007 Plan also identified several key conservation areas located in Medina. These conservation areas are basically comprised of high quality wetlands. These key areas are located around School Lake and the channel that drains southeast to Wolsfeld Lake. Wolsfeld Lake contains significant high-quality natural wetland and upland areas. The area to the northwest and southwest of Holy Name Lake contains a number of moderate to high-quality wetlands. In general, Medina will consider conservation, preservation, and wetland restoration when development proposals arise within the areas identified by the watershed. More specifically, Medina will implement its buffer requirements and promote low impact development techniques if development occurs in these key conservation areas.

Wolsfeld Woods, a Scientific and Natural Area (SNA), is located within Medina's boundaries. As an SNA, Wolsfeld Woods and Wolsfeld Lake are considered an Outstanding Resource Value Water by the State of Minnesota. This means there is a statutory prohibition on new and expanded discharges to the SNA. As stated previously, Medina's proposed management program meets the statutory requirement of no new and expanded discharge to Wolsfeld Woods.

The District is currently in the process of updating its Watershed Management Plan. This Plan is expected to be approved by the end of 2017. The focus on the 2017 Plan is less on the regulatory aspects and more on collaboration and cooperation between the cities and the District. The District's goal is to better align water resource priorities with the future land uses designated by the cities. The approved Watershed Management Plan in 2017 will supersede the 2007 plan.

### *4.4.1. Phosphorus Reduction Strategy*

As required by the Minnehaha Creek Watershed District's 2007 Watershed Management Plan, Medina is required to reduce phosphorous loads in its discharge to Painters Creek and Long Lake Creek. Medina's phosphorus reduction strategy consists of the following components:

- Report on phosphorous reduction achieved on projects
- Incorporate stormwater improvements into the CIP
- Target suitable wetland restoration sites
- Stabilize eroding stream/ditch sections
- Street sweeping on City streets
- Implement the post-construction stormwater management ordinance
- Identify opportunities to install phosphorus-reducing BMPs as part of City street reconstruction projects
- Work with developers to construct opportunity-driven stormwater management BMPs as new or redevelopment occurs

Specific phosphorus reduction loads are discussed in Section 4.3.

### **4.5. Elm Creek Watershed Management Commission (EMWMC)**

The [2015 Elm Creek Watershed Management Commission \(ECWMC\) Third Generation Management Plan](#) has identified the following priorities:

- Providing cost share to Cities to implement projects to achieve WRAPS goals

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- Use WRAPS results to establish priority areas and complete subwatershed assessments to determine BMPs
- Develop a model manure management ordinance
- Complete a pilot project for targeted fertilizer application
- Continue to participate in education and outreach activities.

Each of these priorities impacts the City of Medina. Specifically, the Third Generation Plan requires developments that meet the thresholds to comply with the ECWMC Rules and Standards regarding water quality, rate control and volume management. The City of Medina has included policies for rate control and volume management within this SWMP that are as stringent or more stringent than ECWMC.

The ECWMC requires that Medina be responsible for maintenance of stormwater ponds constructed as a part of new development. Medina already fulfills this obligation by implementing their MS4 Stormwater Pollution Prevention Program (SWPPP). This is also reflected as a policy in Section 6 of this plan.

The Elm Creek Watershed TMDL and WRAPS Reports were prepared as part of a “watershed approach” to address the waterbodies still listed as impaired and their corresponding TMDLs. This report looks to support local working groups and jointly develop protection and restoration strategies to be implemented throughout the watershed.

### 4.6. Pioneer-Sarah Creek Watershed Management Commission (PSCWMC)

The Pioneer-Sarah Creek Watershed Management Commission Third Generation Plan was approved in 2015 and provides an inventory and assessment of water and natural resources, and identifies several key issues. These include water quality, rate control, flooding, impacts of water quality on fish and wildlife, erosion control, and public education. Many issues identified are specific to the City of Medina. This plan identifies goals and policies targeting these issues and establishes implementation actions that may require revisions to their regulatory program or coordination with the watershed to complete Capital Improvement Projects. Medina has prioritized implementation of corrective action based on financial resources available.

Overall the main concern in the City of Medina is in regards to water quality due to impairments to Lake Independence, Spurzem Lake, and Lake Katrina, which are all impaired for excess nutrients. Lake Independence is the only lake with an approved TMDL. Spurzem Lake TMDL study is underway as part of the PSCWMC TMDL report. The report is currently in draft form and expected to be approved by mid-2017. There are two waterbodies outside the jurisdiction of the City located within the Pioneer Sarah Creek Watershed Management Commission (PSCWMC) boundaries that receive discharge from the City: Lake Sarah and Lake Rebecca. These are also impaired for excess nutrients.

The Lake Sarah TMDL has been complete and waste load allocations developed. Medina has worked with Three Rivers Park District Staff (technical lead on the TMDL) and the City of Loretto to identify a water quality improvement in response to the TMDL. Other components of Medina's program to address impairments of Lake Rebecca and Lake Sarah are included in the implementation plan of Section 7.

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### 4.7. Wetland Management Standards

In 2008, Medina adopted its own rules for wetland buffers and setbacks, which was based on the FAW. MCWD was selected as a reference for standards, as it has more stringent requirements than the other watershed districts (Elm Creek Watershed District and Pioneer-Sarah Watershed Management Organization).

#### a. Water Quantity/Quality

The wetland's sensitivity to stormwater input is dependent on the wetland community type and the quality of its plant community. Some wetlands (e.g., sedge meadows with *Carex* species) are sensitive to disturbance and will show signs of degradation unless water quality, bounce and duration are maintained at pre-existing conditions post-construction. On the other hand, there are other wetlands (e.g., floodplain forests) which are better adapted to handle the fluctuating water levels and influx of sediment often associated with stormwater. Table 4.3 illustrates the Stormwater Susceptibility ratings for different plant community types based on MnRAM 3.0. Wetland protection requirements have been developed to maintain the character of the wetland, and are listed in Table 4.4. BMPs can be used to accomplish many of these pretreatment requirements.

Table 4.3 – Susceptibility of Wetlands to Degradation by Stormwater Impacts<sup>1</sup>

Exceptionally Susceptible Wetland Types: <sup>1</sup>	Highly Susceptible Wetland Types: <sup>2</sup>	Moderately Susceptible Wetland Types: <sup>3</sup>	Least Susceptible Wetland Types: <sup>4</sup>
Sedge Meadows	Shrub-carrs <sup>a</sup>	Floodplain Forests <sup>a</sup>	Gravel Pits
Open Bogs	Alder Thickets <sup>b</sup>	Fresh (Wet) Meadows <sup>b</sup>	Cultivated Hydric Soils
Coniferous Bogs	Fresh (Wet) Meadows <sup>c,e</sup>	Shallow Marshes <sup>c</sup>	Dredged Material/ Fill Material Disposal Sites
Calcareous Fens	Shallow Marshes <sup>c,d</sup>	Deep Marshes <sup>c</sup>	
Low Prairies	Deep Marshes <sup>d,c</sup>		
Lowland Hardwood Swamps			
Seasonally Flooded Wetlands			

<sup>1</sup> Special consideration must be given to avoid altering these wetland types. Inundation must be avoided.

Water chemistry changes due to alteration by stormwater impacts can also cause adverse impacts.

Note: All scientific and natural areas and pristine wetland should be considered in this category regardless of wetland type.

<sup>2</sup> a., b., c. Can tolerate inundation from 6 inches to 12 inches for short periods of time.

May be completely dry in drought or late summer conditions.

d. Can tolerate +12 inches inundation, but adversely impacted by sediment and/or nutrient loading and prolonged high water levels.

e. Some exceptions.

<sup>3</sup> a. Can tolerate annual inundation of 1 to 6 feet or more, possibly more than once/year.

b. Fresh meadows that are dominated by reed canary grass.

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*c. Shallow marshes dominated by reed canary grass, cattail, giant reed, or purple loosestrife.*

<sup>4</sup> *These wetlands are usually so degraded that input of urban storm water may not have adverse impacts.*

<sup>1</sup> **Adapted from:** *Storm-Water and Wetlands: Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Storm-Water and Snow-Melt Runoff on Wetlands, State of Minnesota Storm-Water Advisory Group, June 1997.*

Table 4.4 – Wetland Protection Standards

<b>Wetland Stormwater Susceptibility</b>	<b>Permitted Bounce Up to 100 Year Event</b>	<b>Inundation Period for 1 Year Event</b>	<b>Inundation Period for 10 and 100 Year Event</b>	<b>Phosphorus Load Requirements (lbs/yr)</b>
Highly Susceptible	Existing	Existing	Existing	No net increase
Moderately Susceptible	Existing + .5 feet	Existing + 1 day	Existing + 2 days	No net increase
Slightly Susceptible	Existing + 1.0 feet	Existing + 2 days	Existing + 14 days	No net increase
Least Susceptible	No Limit	Existing + 7 days	Existing + 21 days	No net increase

Stormwater susceptibility ratings were determined for each assessed wetland during the FAW. However, the FAW methodology does not accurately account for situations in which a susceptible wetland is dominated by invasive species such as reed canary grass. In these cases, the wetland has already been degraded and a lower protection standard may be appropriate, based on a review of the wetland inventory data for a particular site.

For reviewing purposes, wetlands which are listed as highly or exceptionally sensitive to stormwater impacts and which are also listed as M3 for management class may indicate a susceptible type. Further review of the wetland data will be necessary in these cases to use appropriate protection standards. The quality of a wetland can also be impacted by the phosphorous load flowing into the wetland. The FAW identifies that no net increase of phosphorus loading is allowed into the wetlands. The City has also adopted a more stringent policy where if the existing land cover is natural it is acceptable to maintain existing loading rates, however where the land cover is altered for redevelopment and/or expansion projects, a 20% reduction of phosphorous loading rate will be required. A more stringent percent phosphorous reduction is being developed for new development.

### **b. Wetland Buffers**

The City acknowledges that a buffer of undisturbed vegetation around a wetland or stream can provide a variety of benefits. The buffer can consist of trees, shrubs, grasses, wildflowers, or a combination of plant forms. Buffers reduce the impacts of surrounding land uses on wetland functions by stabilizing soil to prevent erosion; filtering solids, nutrients, and other harmful substances; and moderating water level fluctuations during storms. Buffers also provide essential habitat for feeding, roosting, breeding

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and rearing of young birds and animals; and cover for safety, movement and thermal protection for many species of birds and animals. Buffers can reduce problems related to human activities by blocking noise and glare from lights, and reducing disturbance. Even a 10-20 foot buffer (depending on the slope steepness) of tall vegetation can provide some water filtering benefits, but wider buffers provide additional water quality and habitat benefits.

Buffers can be planned to tie important upland habitats to wetlands, or connect wetlands and other waters. Since many animal species require both wetland and upland habitats as part of their life cycles, and also require opportunities to move to escape predators or find food and cover, buffers should be planned to maximize these connections. Buffers will be most effective if the landowners around a wetland make a continuous buffer, and connect desirable wetland and upland habitats.

Specific requirements for wetland buffer widths, standards, triggers, and acceptable uses within the buffer area can be found in the City's Wetlands Conservation ordinance, Section 828.43. Wetland buffers are based on the wetland management class as determined by the FAW, and may be subject to city discretion based on a review of the wetland inventory data for a specific wetland and are also summarized in the table below.

Table 4.5 – Wetland Buffer Standards

Wetland Classification	Upland Buffer Zone Average Width	Minimum Upland Buffer Zone Width	Buffer Setback (Principal Structure)	Buffer Setback (Accessory Structure)
Preserve (at least partly within or adjacent to a MnDNR mapped area)	50 feet	30 feet	15 feet	5 feet
All Other Preserve	35 feet	25 feet	15 feet	5 feet
Manage 1	30 feet	20 feet	15 feet	5 feet
Manage 2	25 feet	20 feet	15 feet	5 feet
Manage 3	20 feet	15 feet	15 feet	5 feet

Stream buffers are established at a 20 foot minimum on all streams identified on the MnDNR Protected Waters Map and a 50 foot requirement is set for all land adjacent to Elm Creek as required by the ECWMC.

### c. Wetland Restoration/Enhancement Opportunities

Wetland restoration/enhancement sites were identified during the FAW. Wetlands that have hydrologic restoration proposed may qualify as wetland banking sites if restored.

Wetland banking is a type of mitigation, or replacement for wetland losses, allowed under State and Federal rules. Wetland banking allows the appropriate amount and type of wetland acreage to be purchased from an account holder who has a “bank” of functioning wetlands. These wetlands may have been restored from previously drained or filled wetlands, or created where wetlands did not previously exist. Wetland banking is contrasted with project-specific replacement where the project sponsor creates or restores a wetland specifically to replace a wetland that is to be drained or filled. Project specific replacement is usually done on-site, while wetland banks are typically located in another place in the community or watershed.

Site-specific replacement should be encouraged when a wetland restoration or creation is possible on-site. When site-specific replacements are not ecologically appropriate, then wetland banks located within the City and County should be the next priority. The funding for the wetland restoration sites can

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come from a variety of sources, which include:

- BWSR Banking Money for Road Construction Projects;
- Minnesota Department of Natural Resources, Conservation Partners and Community Environmental Partnerships grants;
- Minnesota Department of Natural Resources Greenway grants; and
- Soil and Water Conservation District grants.

### 4.8. Official Controls

The City of Medina has numerous official controls (Table 3.1) used to regulate stormwater management, erosion and sediment control, shoreland, floodplain and wetlands. These ordinances will be reviewed and revised following the approval of this SWMP. Any conflicts that arise will be addressed to meet the City's goals of protecting water quality and reducing an increase in stormwater runoff volume. The Medina Stormwater Design Guide is adopted by reference into the City ordinances under stormwater management and will be updated at that time as well.



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## 5. GOALS AND POLICIES

### 5.1. Summary

The primary goal of Medina's SWMP is to provide a framework for effective surface water management and to bring the City into statutory compliance. This includes guiding redevelopment activities and identifying and implementing retrofits to the existing system. These retrofits consist of both projects and programs. Additionally, the plan provides clear guidance on how Medina intends to manage surface water in terms of both quantity and quality.

The goals and policies described in this section are intended to incorporate the foundation of several regional, state, and federally mandated programs. They are not meant to replace or alter the regional, state and federally mandated programs, rules and regulations, but to serve as an enhancement and provide some general policy guidelines. The goals address the management strategies of each watershed management commission, Pioneer-Sarah Creek, Minnehaha Creek and Elm Creek, and are consistent with the objectives set forth in the State Wetland Conservation Act (WCA) and the Federal Nationwide Urban Runoff Program (NURP) Cooperation, collaboration, and partnering results in projects that are less likely to conflict with the goals of the affected entities, are better able to meet long-term goals, and are generally more cost-effective.

In addition to the goals and policies contained in this section, the City will annually review and update its Storm Water Pollution Prevention Plan (SWPPP) to effectively manage its stormwater system and be in conformance with the NPDES MS4 Program. Refer to Appendix B for the most recent version of the City SWPPP.

This section outlines the goals and policies specific to surface water management in Medina. Goals and policies are grouped by their relationship to the key issues listed below:

- Section 5.2 - Land Development, Redevelopment, and City Projects
- Section 5.3 - Water Resource Management
- Section 5.4 - Management of Floodplains, Shorelands, and Natural Areas
- Section 5.5 - Citywide Program Elements
- Section 5.6 - Support of Other Agencies

### 5.2. Land Development, Redevelopment, and City Projects

#### *Overall Goal*

Manage land disturbance and increased impervious surfaces to prevent flooding and adverse impacts to water resources.

#### *Overall Policies*

1. Medina will pursue a non-degradation policy in regard to runoff volume, runoff rate, and nutrient loading from development projects. Low Impact Development (LID) techniques are Medina's preferred method of controlling runoff volume and nutrient loading. Medina considers LID techniques as complementary to pipes, ponds, and wetlands for its flood control system.



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2. Medina will consider redevelopment and linear projects as an opportunity to retrofit non-degradation to previously developed areas and infrastructure.
3. Medina will amend or modify its ordinances and/or engineer standards to facilitate stormwater quantity and quality performance measures identified in its Local Surface Water Management Plan.
4. Medina will consider water quality retrofits on existing City properties as a means of providing treatment to currently developed areas without treatment.
5. Medina will reference the following documents as guidance for Best Management Practices in the City: The Minnesota Pollution Control Agency's Protecting Water Quality in Urban Areas and its Minnesota Stormwater Manual, and the Metropolitan Council's Minnesota Urban Small Sites BMP Manual.

### ***5.2.1.Runoff Volume Management***

*Goal: Maintain existing runoff volumes so that runoff from development does not increase volume loading to wetlands, lakes and streams.*

Policy: Any site that requires an NPDES construction site permit will be required to implement permanent volume management such that existing runoff volumes are maintained. Sites that do not require an NPDES construction site permit shall maintain existing runoff volumes to the extent practical.

Policy: Medina's preferred water quality strategy is to reduce the volume of its runoff through infiltration or reuse projects. If volume control is not feasible due to site conditions, the City will establish alternatives to achieve relevant volume control goals. Volume control calculations will be consistent with Medina's Stormwater Design Manual.

Policy: Redevelopment and linear projects will implement runoff volume management practices for net new impervious surfaces. Redevelopment and linear projects will consider whether additional runoff volume management practices might feasibly be incorporated for existing impervious surfaces also.

### ***5.2.2.Runoff Rate***

*Goal: Control the rate of stormwater runoff from development to reduce downstream flooding and erosion and protect water resources.*

Policy: Future peak rates of discharge from new development and redevelopment will not exceed existing peak rates of discharge for the 1-yr or 2-yr, 10-yr and 100-yr 24-hour storm events using Atlas 14 rainfall values. MSE-3 distribution shall be used.

Policy: New storm sewer systems shall be designed using the following guidelines:

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New lateral storm sewer systems shall be designed to accommodate discharge rates for the 10-yr critical storm event using Atlas 14 rainfall values. Trunk storm sewer should be designed as a minimum to carry 100-year pond discharge in addition to the 10-year design flow. New storm sewer systems shall be designed to match the inside top elevation of adjacent pipes. The maximum velocity shall not exceed 10 feet per second, except when entering a pond, where the maximum velocity shall be limited to 6 feet per second.

Policy: New storm sewers and open channels shall be designed using the Rational Method or other technical method approved by the City. Runoff Coefficient “C” shall be in accordance with the guidelines provided in the Stormwater Design Manual.

Policy: The City will base all drainage system analyses and designs on proposed full development land use patterns.

Policy: Where development occurs upstream of a known flood-prone area, the City may seek additional rate control as a means to mitigate this flooding.

Policy: When off-site regional ponding is available and this off-site ponding accomplishes the rate control requirement, then the rate control requirement can be waived for a particular site.

### ***5.2.3.Flood Prevention***

*Goal: Provide adequate storage and conveyance of runoff to protect the public safety and minimize property damage.*

Policy: Building low floor elevations within the City of Medina shall be required to be at least 2 feet above the emergency overflow elevation. In areas where this separation is not or cannot be provided, additional analysis is required showing that the 100-year back-to-back storm event does not affect adjacent homes.

Policy: Flood storage for those landlocked depressions with no outlet present must accommodate the volume generated by back-to-back 100-yr, 24-hr storm events or the 100-yr, 10-day snowmelt event, whichever generates the higher calculated HWL.

Policy: The City will encourage, to the extent practicable, implementation of Low Impact Development techniques and mitigation of stormwater runoff volume within development and redevelopment areas draining to landlocked depressions.

Policy: The City shall require that rate control structures and stormwater drainage ways are included in a drainage or utility easement.

Policy: The City will require compensatory storage for any filling in the 1% (100-year) floodplain at a 1:1 ratio.

Policy: Medina will amend or modify its Floodplain Management Ordinance to incorporate the policies identified in its Local Surface Water Management Plan.<sup>6</sup>

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### ***5.2.4.Nutrient and Sediment Loading***

*Goal: Reduce the nutrient and sediment loads over current conditions.*

Policy: Medina's minimum standard is water quality treatment that meets the requirements of the NPDES construction site permit. Under no circumstances shall overall treatment fall below the requirements of this permit.

Policy: Any site that requires a NPDES construction site permit will be required to reduce phosphorus loadings over current conditions. The water quality control standard shall be considered satisfied if the volume control standards has been satisfied, as defined in the City's Stormwater Design Manual. If volume control is infeasible due to site constraints, a 20% reduction in phosphorus loading over existing conditions will be required for redevelopment projects. In cases where existing land cover is natural, the maintenance of existing loading rates is acceptable if the minimum requirements identified in the policy above are met.

Policy: Medina will institute a standard practice of evaluating all development, redevelopment, and linear projects for opportunities to retrofit water quality treatment to areas without significant existing treatment.

Policy: Guidelines for the design of water quality ponds and infiltration/filtration practices will follow the requirements listed in the City's Stormwater Design Manual.

Policy: The City will require outlet skimming in all water quality ponds. Skimming shall occur for up to the 10-year, 24-hour event. The City shall not allow the use of submerged pipes to provide skimming.

Policy: The City will require the use of its standard outlet structure (Appendix G) for new water quality ponds.

### ***5.2.5.Erosion and Sediment Control***

*Goal: Prevent sediment from construction sites from entering the City's surface water resources.*

Policy: The City will enforce the Construction Site Storm Water Runoff Control Ordinance as outlined in Chapter 8 of the City Code; Section 828 Performance Standards and Enforcement.

Policy: Erosion control must meet the requirements outlined in the Minnesota Pollution Control Agency's NPDES General Permit to Discharge Stormwater from Construction Sites and the following criteria. A copy of the most recent requirements can be found at [www.mPCA.mn.us](http://www.mPCA.mn.us).

Policy: The City will periodically review its Construction Site Storm Water Runoff Control Ordinance to maintain conformance with the NPDES construction permit, the City's MS4 permit, guidance from Metropolitan Council and the requirements of the watershed management organizations.

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### **5.3. Water Resource Management**

#### *Overall Goal*

Protect the City's wetlands, lakes, streams and groundwater to preserve the functions and values of these resources for future generations.

#### *Overall Policies*

1. The City will protect water resources through implementation of the Wetland Conservation Act, groundwater protection rules and TMDL studies.
2. The City will look to retrofit rate control, water quality treatment, and runoff volume reduction upstream of existing water bodies, as these opportunities arise. Medina considers Low Impact Development techniques as the preferred means of retrofitting water quality treatment and runoff volume reduction.

#### **5.3.1. Wetland Management**

*Goal:* Protect and preserve wetlands to maintain or improve their function and value.

*Policy:* The City will continue to administer WCA responsibilities within the City to ensure no net loss of wetland functions and values.

*Policy:* The City will administer their WCA responsibilities using technically trained staff. At a minimum the trained staff will be certified by the Minnesota Wetland Delineator Certification Program and/or a comparable program.

*Policy:* The City will work collaboratively with the relevant WMO in the application of City and WMO policies and performance standards for wetlands.

*Policy:* The City will implement the Wetland Protection Ordinance, City Code 828.43, which incorporates the results of the City's Wetland Inventory and Assessment.

*Policy:* The City will require that, prior to development activities or public projects, a wetland delineation must be completed, including a field delineation and report detailing the findings of the delineation.

*Policy:* The City requires through its wetland ordinance that future development proposals include natural buffer zones around wetlands and streams. Buffer areas should not be mowed or fertilized, except that harvesting of vegetation may be performed to reduce nutrient inputs.

*Policy:* The City requires that runoff be pre-treated prior to discharge to wetlands. Wetlands may not be considered as treatment areas for the purposes of meeting Medina's stormwater management standards. Direct roof runoff that is discharged to a wetland without pretreatment will be reviewed by the City.

#### **5.3.2. Lake Management**

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*Goal: Manage lakes to improve water quality and protect resource values.*

Policy: The City will begin implementing the TMDL Implementation Plans listed in Section 2. Through its annual reporting, the City will report progress toward meeting this phosphorus load reduction.

Policy: The City will cooperate with the Three Rivers Park District, Pioneer-Sarah Creek Watershed, Elm Creek Watershed, and Minnehaha Creek Watershed to identify possible activities to improve water quality in impaired waterbodies.

### ***5.3.3.Stream Management***

*Goal: Improve water quality, provide wildlife habitat and protect the resource value of streams.*

Policy: The City will work with the ECWMC to facilitate implementation of the outcomes of the Elm Creek Channel Study.

Policy: The City will cooperate with the PSCWMC and the ECWMC to remove deadfall from creeks within the City.

Policy: The City will require a 50 foot buffer for land disturbance projects along Elm Creek.

### ***5.3.4.TMDL Implementation***

*Goal: Address target pollutants identified in TMDL studies to improve the quality of impaired waters.*

Policy: The City will implement the pollutant reduction strategies identified in the SWPPP.

Policy: The City will incorporate completed TMDL studies and relevant implementation projects.

Policy: The City will use the findings of the TMDL studies to guide development review.

Policy: The City will consider Low Impact Development techniques as the primary means of meeting load reductions identified in TMDL implementation plans.

### ***5.3.5.Groundwater Recharge and Protection***

*Goal: Protect groundwater resources and groundwater dependent resources.*

Policy: The City will cooperate with Hennepin County, MDH, and other state and federal agencies to identify areas of groundwater resources critical to protect.

Policy: The City will use the guidance developed in the Minnesota Stormwater Manual for locating infiltration BMPs in vulnerable Wellhead Protection Areas.

## SECTION 5

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### **5.4. Management of Floodplains, Shorelands, and Natural Areas**

#### *Overall Goal*

Manage the City's floodplains, shorelands and natural areas to preserve the functions and values of these resources for future generations.

#### *Overall Policy*

The City will manage these areas through implementation of local zoning codes and agency regulations.

#### **5.4.1.Floodplain Management**

*Goal: Control development in flood prone areas to protect the public safety and minimize property damage.*

**Policy:** The City will regulate land development within the Floodplain District to ensure that floodplain capacity and flood elevations are not adversely impacted by development, and that new structures are protected from damage.

**Policy:** The City will update the Floodplain Management Ordinance, City Code 826.74 as required by FEMA and the MnDNR, or as needed, to ensure adequate protection for structures and eligibility for flood insurance programs.

#### **5.4.2.Shoreland Management**

*Goal: Conserve and protect the scenic, historical and cultural resources of the waterbodies within the City and maintain a high standard of environmental quality.*

**Policy:** The City will regulate land development within the Shoreland Overlay District to minimize impacts as specified in the City Code 827.01.

#### **5.4.3.Natural Area Management**

*Goal: Protect and enhance natural areas within the City to provide wildlife habitat and water resource benefits.*

**Policy:** The City will review land use and development decisions with the intent to preserve natural resources, connect environmental corridors and provide buffers for streams, wetlands and lakes. Existing MLCCS coverage and other data sources will guide decisions regarding natural area preservation. Figure 18 shows parcels owned by the City. These parcels will be reviewed to possibly enhance natural areas and provide water resource benefits.

**Policy:** The City will support programs to maintain and restore the resource value of natural areas.

**Policy:** The City will continue to implement its Open Space Plan and will coordinate with the

## SECTION 5

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Parks Department on future development.

Policy: The City will cooperate with the MCWD to implement conservation practices for those areas identified in the MCWD CWRMP as Key Conservation Areas.

Policy: The City will coordinate conservation efforts with other agencies, such as watersheds, Hennepin County, Three Rivers Park and non-governmental bodies, like the Minnesota Land Trust, Embrace Open Space and Pheasants Forever.

Policy: The City will require permanently conserved land to be held in an easement by an outside agency, such as the Minnesota Land Trust, a watershed district or similar entities.

### **5.5. City Wide Program Elements**

#### *Overall Goal*

Manage water resources and drainage systems on a citywide scale.

#### *Overall Policies*

1. The city wide surface water management program will include monitoring and maintenance of drainage systems, targeted pollution prevention, public education, system reconstruction projects and equitable collection of supporting funds.
2. The City will actively implement the NPDES Stormwater Pollution Prevention Plan as stated in the MS4 permit.
3. The City will work with the Watershed having jurisdiction and applicable LGU to resolve any intercommunity drainage issues that may arise.

#### **5.5.1. Pollution Prevention**

*Goal: Detect and address urban pollutants discharged to storm sewers.*

Policy: The City will address pollutant sources through enforcement of codes and public education.

Policy: The City will develop and maintain an effective spill response plan.

Policy: The City will continue to develop and update their storm sewer system on an annual basis.

Policy: The City will complete employee training in the operation, maintenance and inspection of stormwater facilities, as included in the SWPPP.

Policy: The City will monitor storm sewer outfalls for pollutants as outlined in the City's NPDES permit.

#### **5.5.2. Monitoring and Maintenance**



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*Goal: Maintain the function and effectiveness of stormwater management structures through monitoring and maintenance.*

Policy: The City will continue to conduct annual street sweeping of City owned streets. Rural road sections will be swept at least once annually and the urban road sections will be swept at least three times annually.

Policy: The City will inspect and monitor the construction and installation of all new stormwater facilities and require that such facilities be surveyed to create as-built drawings.

*Goal: Ensure the long term operation and maintenance of stormwater management BMPs.*

Policy: The City will require that all ponds constructed as part of a common plan of development be placed on outlots.

Policy: The City will require that all ponds be returned to their original design capacity prior to acceptance by the City and that an as-built design be submitted to verify that the pond meets the original design capacity.

Policy: The City will require developers to provide a minimum one-year guarantee that stormwater management facilities are properly installed, maintained and functioning.

Policy: The City will require that an operation and maintenance plan for the proposed stormwater management BMPs be submitted for all development and redevelopment projects.

### **5.5.3.Public Education**

*Goal: Inform and educate residents about stormwater pollution, the effects of urban runoff and the need to protect natural resources.*

Policy: The City will implement a public education and outreach program as identified in the City's NPDES permit.

Policy: The City will develop and maintain a public education program for landowners to promote reduction of nutrient, sediment, and bacteria loading to water bodies. The City will encourage residents and landowners to practice environmental friendly lawn care and to encourage the use of native plantings or natural landscapes, where practical.

Policy: The City will coordinate public education work with the local WMOs.

Policy: The City will promote citizen and volunteer efforts to protect, restore and enhance local water and natural resources.

Policy: The City will use available opportunities through its public meetings, website, City newsletter, Comprehensive Plan, or interpretive elements at parks and open space sites to inform its residents about the value of local water resources, the effects of stormwater runoff, and opportunities for stewardship of water and natural resources.

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### **5.5.4. Funding**

*Goal: Secure adequate funding to support implementation of the surface water management plan.*

Policy: The City will cost effectively manage the plan to balance surface water goals with available resources.

Policy: The City will seek grant funds or other resources to assist with special projects or implementation of plan goals.

Policy: The City will utilize the Stormwater Utility Fund to pay for stormwater management projects and implementation activities.

### **5.6. Support of Other Agencies**

*Overall Goal:*

*Coordinate local surface water management with the work of watershed management organizations and state agencies.*

*Overall Policy:*

The City will cooperate and collaborate with the local water management organizations in their efforts to maintain and improve water quality in the city.

*Goal: Facilitate WMO review of development projects and enforcement of watershed standards.*

Policy: Medina will coordinate development review activities with the watershed organizations with jurisdictions overlapping that of the City.

*Goal: Cooperate with other organizations to complete and implement management plans and studies for water resources in Medina.*

Policy: The City will work with local watershed management organizations, Hennepin County, and others when appropriate and as resources are available to participate in resource management plans or studies that benefit water and natural resources.

Policy: The City will work with the local watershed management organizations to jointly implement the LSWMP.

*Goal: Cooperate with other organizations working to protect groundwater resources.*

Policy: The City will cooperate with the County and water management organizations to implement the recommendations of the Hennepin County Groundwater Plan, to protect groundwater quality by reducing the potential for transport of stormwater pollutants into the groundwater, and maintaining the functions of groundwater recharge areas.

Policy: The City will support well-sealing programs developed by Hennepin County and the Minnesota Department of Health.

# SECTION 6

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## 6. IMPLEMENTATION PROGRAM

### 6.1. Overview

Medina developed its implementation program to address issues identified earlier in this Local Surface Water Management Plan. This program reflects the needs and concerns of many stakeholders including the City Council, City Staff, citizens, and watershed management organizations. The program also considers Medina's ability to fund these items through its general levy, environmental fund, or stormwater utility. The implementation program consists of the following components:

- Capital Improvements (CIP)
- NPDES MS4 Permit Compliance (MS4)
- Operation and Maintenance (OM)
- Official Controls (OC)

Capital Improvements consist of “on-the-ground” projects intended to remedy issues identified as current problems. The capital projects focus on phosphorus reduction within the following regulated areas:

- Lake Independence Subwatershed (approved TMDL)
- Lake Sarah Subwatershed (approved TMDL)
- Upper Minnehaha Creek Watershed (approved TMDL)
- Elm Creek Watershed (approved TMDL and WRAPS)
- Pioneer-Sarah Creek Watershed (draft TMDL)
- Painters Creek Subwatershed (MCWD phosphorus reduction strategy)
- Long Lake Subwatershed (MCWD phosphorus reduction strategy)

NPDES MS4 Permit Compliance refers to activities necessary to meet Medina's obligations under its general permit coverage. These activities primarily include annual meetings, SWPPP updates, and SWPPP implementation.

Operation and Maintenance items consist primarily of the general maintenance of Medina's drainage system including ponds, storm sewer, and culverts. Operation and maintenance overlaps somewhat with Medina's MS4 obligations in that certain operation and maintenance activities are specified in the City's SWPPP.

Official Controls include ordinance and policy revisions intended to achieve water quality benefits. Each proposed implementation item has a specific driver, which are identified in the tabulated implementation program later in this section. The overarching goal of Medina's implementation

## SECTION 6

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program is quite simple: to improve the quality of its surface waters, its surface water discharge, and to achieve sustainable site development practices. However, there are some very specific regulatory drivers that refine this general goal. These are discussed below. The City Ordinances and Stormwater Design Guide will be assessed and updated as needed following this SWMP approval.

### 6.2. Current City Practices

Current City Practices are best summarized in the Medina Stormwater Pollution Prevention Program or SWPPP attached to this Local Surface Water Management Plan as an Appendix. These current practices provide water quality benefits through the operation of Medina's Public Works Department. Current practices are fully described in the SWPPP of Appendix B and are summarized here:

- Floor drain containment program
- Hazardous materials storage program
- Landscaping and lawn care practices
- Sanitary sewer maintenance and inspection program
- Municipal street maintenance program (street sweeping)
- Structural MS4 pollution control device inspection and maintenance program
- Street deicing program
- ESC standards during all municipal land disturbance projects
- Outfall and pond inspection program for all City owned MS4 systems
- Storm drain system cleaning
- Stockpile, storage and material handling program
- Municipal employee training program

As with any proposed changes to City practices, those identified above will be constrained by funding – particularly the funding of the stormwater utility. Medina allocates stormwater utility funds to water quality improvements on capital projects as well, so the challenge for the City is finding the right balance between capital improvements and programmatic/training outlays. Nonetheless, improved housekeeping practices will improve the water quality of the City's surface water discharge in the following ways:

- Reduced chloride in runoff from spring snowmelt.
- Less sediment in waterways due to increase street sweeping and incorporation ESC standards into their municipal programs. Street sweeping will remove approximately 2 lbs/year of phosphorus draining to the surface waters.
- Maintenance of stormwater facilities results in maintaining their designed removal efficiencies.
- Less trash and debris in ditches reduces bank erosion and sediment discharge. A reduction in bank erosion and sediment discharge will reduce phosphorus anywhere from 18-30 lbs/year.
- More staff trained in spill response means less likelihood of chemical spills into surface waters.
- Training in fertilizer and pesticide application means a reduction in phosphorus and other chemicals in Medina's runoff.

## SECTION 6

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- The Wellhead Protection Plan will inform the City on the proper use and location of infiltration BMPs.

Each of these practices will be reviewed regularly to identify necessary improvements and how each are benefiting water resources in the City.

### 6.3. 10-Year Implementation Plan Priorities

Table 6.1 presents Medina's Implementation Program. Medina's program from the issues identified within this LSWMP's current assessment section. More importantly, the Implementation Program aligns with Medina's goals and policies as presented in Section 6. Table 6.1 presents implementation items in each of the four functional areas of Capital Improvements (CIP), NPDES MS4 (MS4), Operation and Maintenance (OM), and Official Controls (OC). The implementation program incorporates Medina's Storm Water Pollution Prevention Plan (SWPPP) through direct reference of items that have a financial impact. Medina will update the implementation program in conjunction with its annual NPDES MS4 public meeting.

### 6.4. Financial Considerations

The City will use funds generated from its Stormwater Utility as the primary funding mechanism for its implementation program including; maintenance, repairs, capital projects, studies, etc. Medina's current stormwater utility fee structure provides approximately \$206,216 per year. If funds from this utility fee do not cover necessary costs, the City will consider adjusting the Stormwater Utility Fee to cover the costs associated with the implementation program. The City will continue to review the stormwater utility fee annually and adjust based on the stormwater related needs of the City and other available funding mechanisms. The City will also take advantage of grant or loan programs to offset project costs where appropriate and cost-effective. Below is a list of various sources of revenue that the City will attempt to utilize:

- Grant monies possibly secured from various agencies. This could include MCWD, Hennepin County, Mn/DOT, the MPCA, the MnDNR, Legislative-Citizen Commission on Minnesota Resources (LCCMR), the Board of Water and Soil Resources (BWSR), and others.
- Special assessments for local improvements performed under authority of Minnesota Statutes Chapter 429.
- Revenue generated by Watershed Management Special Tax Districts provided for under Minnesota Statutes Chapter 473.882.
- Project funds could be obtained from watershed district levies as provided for in Minnesota Statutes Chapter 103D.905 for those projects being completed by or in cooperation with MCWD or PSCWMC.
- Developer funds.
- Other sources potentially including tax increment financing, tax abatement, state aid, and others.

## SECTION VI

TABLE 6.1

SURFACE WATER MANAGEMENT IMPLEMENTATION PLAN																				
No.	Project Description	15 Year Total Cost Estimate <sup>1,2</sup>	Watershed District <sup>4</sup>	Possible Funding Sources <sup>3</sup>	Proposed Cost By Year <sup>1</sup>															Comments
					2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
1**	<u>Ardmore Lake wetland restoration-</u> Wetland restoration project according to the Ardmore Area Subwatershed Assessment	\$96,500	Pioneer-Sarah	Stormwater Utility						\$96,500										
2**	<u>Lake Independence shoreline restoration-</u> Restore shoreline erosion along Lake Independence.	\$17,500	Pioneer-Sarah	Stormwater Utility/Special Assessment			\$17,500													
3**	<u>Fern street gully restoration-</u> Stabilizing the gully to prevent sediment discharge.	\$18,850	Pioneer-Sarah	Stormwater Utility			\$18,850													
4	<u>Long Lake Creek Subwatershed Common Carp Study-Phase 1-</u>	\$52,000	Minnehaha Creek	Hennepin County/MCWD/ Grants			\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500						
5**	<u>Gully restoration in partnership with Three Rivers Park District-</u>	\$25,000	Pioneer-Sarah	Stormwater Utility		\$25,000														
6**	<u>Take the Loretto sewer ponds offline and connect to the MCES system-</u>	\$5,000	Pioneer-Sarah	Stormwater Utility			\$5,000													
7**	Hydrologic/hydraulic studies to establish Base Flood Elevations (BFE) for FEMA mapped waterbodies in PSCWMC and ECWMC. (MCWD has BFEs established)	\$50,000	Pioneer-Sarah, Elm Creek	Stormwater Utility	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000											
8**	<u>Expand education program for benefits of water reuse for irrigation throughout the City-</u>	\$15,000	All	Stormwater Utility	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	
9	<u>Tomahawk Trail wetland restoration-</u>	\$87,500	Pioneer-Sarah	Stormwater Utility									\$43,750	\$43,750						

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No.	Project Description	15 Year Total Cost Estimate <sup>1,3</sup>	Watershed District <sup>4</sup>	Possible Funding Sources <sup>2</sup>	Proposed Cost By Year <sup>1</sup>															Comments
					2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
SWPPP (FROM OLD SWPPP)																				
10	Annual NPDES Permit _____ and SWPP Updates	\$58,500	N/A	SWU	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900	\$3,900	
11	Informational tasks, newsletter, website, administrative, etc.	\$165,000	N/A	SWU	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	
12	Inspections of illicit discharges, ponds, storm sewer and culverts	\$187,500	All	SWU	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	
13	Yard waste disposal site (fuel and labor)	\$180,000	All	SWU	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	
14	Goose prevention education and removal	\$15,000	All	SWU	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	
15	Pioneer-Sarah Creek membership dues _____ (TMDL related)	\$150,000	N/A	SWU	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	
16	Horse and manure management education	\$15,000	All	SWU	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	
CIP																				
17	Rain garden implementation program	\$150,000	All	Stormwater Utility, Grants, Environmental Fund	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	



SECTION VI

No.	Project Description	15 Year Total Cost Estimate <sup>1,3</sup>	Watershed District <sup>4</sup>	Possible Funding Sources <sup>2</sup>	Proposed Cost By Year <sup>1</sup>																
					2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Comments	
Monitor and Study																					
18**	Evaluate options to address flooding on the NE quadrant of Medina Road and Tamarack Drive.	\$15,000	Elm Creek	Stormwater Utility					\$15,000												
19**	Evaluate options to address flooding on Tamarack Road south of CSAH 24.	\$15,000	Minnehaha Creek	Stormwater Utility							\$15,000										
20**	Evaluate options to address flooding on Willow Drive south of CSAH 24.	\$15,000	Minnehaha Creek	Stormwater Utility									\$15,000								
21	Partner with MCWD on School Lake internal load management	\$97,500	Minnehaha Creek	Stormwater Utility	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500	\$6,500		
22**	Cooperate with DNR, MCWD to assess local erosion in Wolfseid Woods that may contribute to lake sediment loads.	\$20,000	Minnehaha Creek	Stormwater Utility										\$20,000							
	TOTAL	\$1,450,850			\$78,900	\$103,900	\$126,750	\$85,400	\$100,400	\$171,900	\$90,400	\$75,400	\$134,150	\$139,150	\$68,900	\$68,900	\$68,900	\$68,900	\$68,900		
<sup>1</sup> Cost estimates are preliminary and subject to review and revision as engineer's reports are completed and more information becomes available. Table reflects 2016 costs and does not account for inflation. Costs generally include labor, equipment, materials, and all other costs necessary to complete each activity. Some of the costs outlined above may be included in other operational costs budgeted by the City. <sup>2</sup> Funding for stormwater program activities projected to come from following sources - Surface Water Management Fund, Developers Agreements, Grant Funds, General Operating Fund, or Special Assessments. <sup>3</sup> Staff time is not included in the cost shown. <sup>4</sup> Relevant TMDLs for each project is listed in Section 4, Table 4.1. **Denotes high priority projects to address TMDL requirements																					

# SECTION 7

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## 7. ADMINISTRATION

### 7.1. Review and Adoption Process

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

‘After consideration but before adoption by the governing body, each local government unit shall submit its water management plan to the watershed management organization[s] for review for consistency with the watershed plan adopted pursuant to section 103B.231. The organization[s] shall have 60 days to complete its review.’

‘Concurrently with its submission of its local water management plan to the watershed management organization, each local government unit shall submit its water management plan to the Metropolitan Council for review and comment. The council shall have 45 days to review and comment upon the local plan. The council’s 45-day review period shall run concurrently with the 60-day review period by the watershed management organization. The Metropolitan Council shall submit its comments to the watershed management organization and shall send a copy of its comments to the local government unit.’

‘After approval of the local plan by the watershed management organization[s], the local government unit shall adopt and implement its plan within 120 days, and shall amend its official controls accordingly within 180 days.’

### 7.2. Collaboration with Watershed Entities

#### 7.2.1. General

Once Minnehaha Creek Watershed, Pioneer-Sarah Creek Watershed, and Elm Creek Watershed have reviewed and approved this Local Surface Water Management Plan, Medina will meet with the watersheds to come to an understanding regarding implementation of the plan. Before and after approval of this plan, Medina will continue close coordination with all three watershed organizations in the review of projects with their respective jurisdictions.

The City will annually report to MCWD, PSCWMC, and ECWMC activities it has undertaken in the previous year in implementing its plan and in progress toward meeting water quantity, water quality, and ecological integrity goals. The City will also report progress in areas covered under relevant TMDL implementation plans with each entity.

#### 7.2.2. Minnehaha Creek Watershed Coordination Plan

The MCWD requests that local government units establish a coordination plan that the LGU and MCWD can implement at a staff level to achieve common goals. Some of these goals include maintaining awareness of needs and opportunities between Medina and MCWD and implementing programs and projects that meet the needs of all partners, align financially, and are a part of the overall watershed planning effort. Improving coordination between land use planning at the City and watershed planning at MCWD will result in better projects to meet agency goals and a more efficient use of public funds. Coordination and collaboration between entities is key to constructing cost effective BMPs to manage water quality concerns and preserve the City’s natural resources in the future.

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The following is a summary of the coordination plan, which will be adjusted and expanded as deemed appropriate by the City and MCWD during project implementation:

- Annual meeting – Staff members will meet during the summer to review NPDES MS4 reports and activity from the previous year. Staff will also discuss draft Capital Improvement Plans for each entity for the upcoming year. It is anticipated that the City Administrator, Public Works Director and City Planner will be the primary contacts for the annual meeting.
- Land Use Planning – City Planning staff will continue to route requests for land use approvals including, but not limited to, subdivisions and site plan reviews to MCWD staff for comment. Coordination will occur in the beginning stages of the project during the concept plan review.
- Regulatory activities – Planning staff will require documentation of appropriate MCWD construction and land alteration permits for those projects located within District boundaries as a condition to City approval. Approved MCWD permits will be stored with other project documentation for future reference. Staff will consider additional coordination for erosion control inspection and enforcement and discuss opportunities at future annual meetings.
- Wetland Conservation Act enforcement – The City is the LGU for Wetland Conservation Act (WCA) applications and will continue to involve MCWD staff on Technical Evaluation Panels. Alison Harwood with WSB and Associates is currently the City’s wetland scientist responsible for coordinating WCA enforcement. Applications are submitted to the Planning Department.
- Funding – The City seeks support from MCWD in terms of grant funding for water quality projects. The City requests that MCWD staff continue to provide information about upcoming grants and other funding opportunities.
- Data Sharing – City staff members will coordinate with MCWD staff to share any new or relevant data on an annual basis to ensure consistency. This data could be related to any newly completed studies, water quality monitoring, BMP performance monitoring, etc.
- Public Improvement Projects – City staff members will provide yearly updates on plans for public improvement projects. This will be coordinated as part of the annual meeting while discussing the draft Capital Improvement Plan. Maintenance activities for stormwater infrastructure will be provided to MCWD as part of the MS4 recording process and City inspection reports.

### 7.3. Plan Amendments and Future Updates

The City may need to revise this Plan to keep it current. Any significant amendments that are made to the plan must be submitted to the MCWD, PSCWMC, and ECWMC for review and approval before adoption by the City. The City anticipates updating the Implementation Plan annually. These changes will be submitted to the WDs and WMOs for their record, but not for review and approval. The City may amend this plan at any time in response to a petition by a resident or business. Written petitions for plan amendments must be submitted to the City Administrator. The petition must state the reason for the requested amendment, and provide supporting information for the City to consider the request. The City may reject the petition, delay action on the petition until the next full plan revision, or accept the petition as an urgent issue that requires immediate amendment of the plan. The City of Medina may also revise/amend the plan in response to City-identified needs. This Plan is intended to be in effect for 10

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years (implementation program outlines cost/activities for 15 years) per state statute. The Plan will be updated at that time, to the extent necessary.

## **APPENDIX A**

### Figures

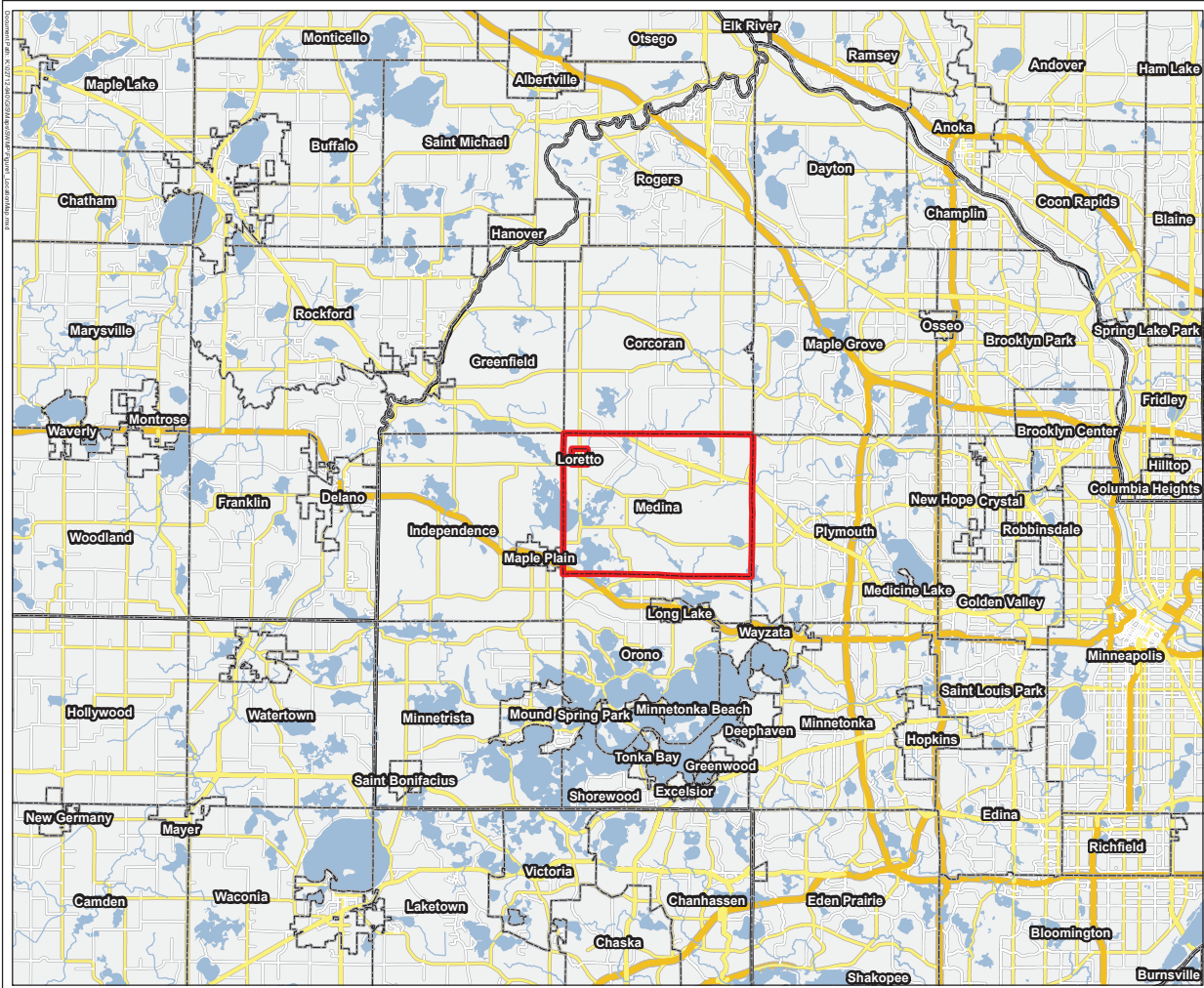
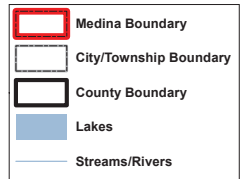
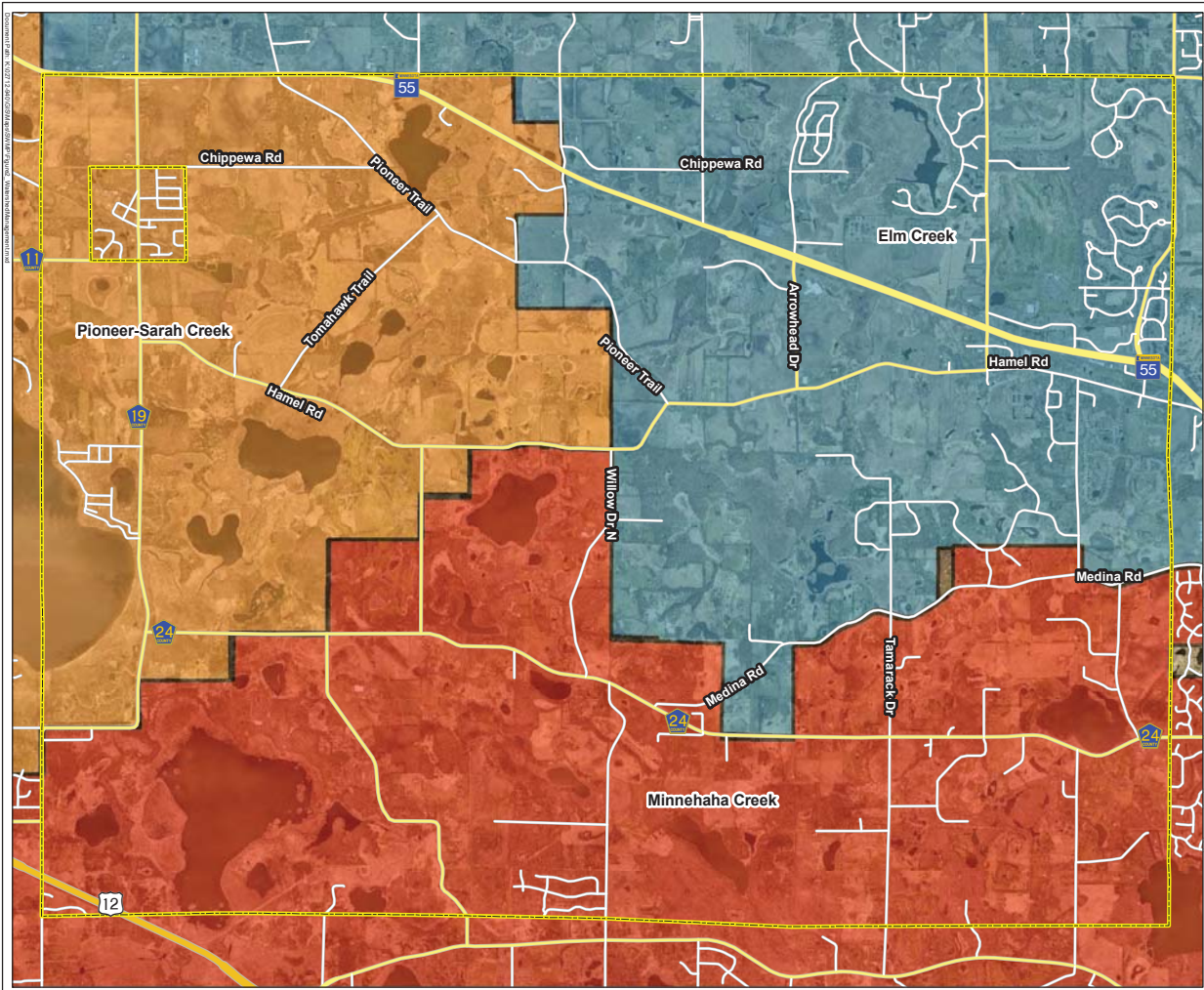


Figure 1: Location Map

**Medina's Surface  
Water Management Plan  
Medina, MN**







**Figure 2- Watershed Management Organization having Jurisdiction within the City of Medina**

**Medina's Surface Water Management Plan  
Medina, MN**

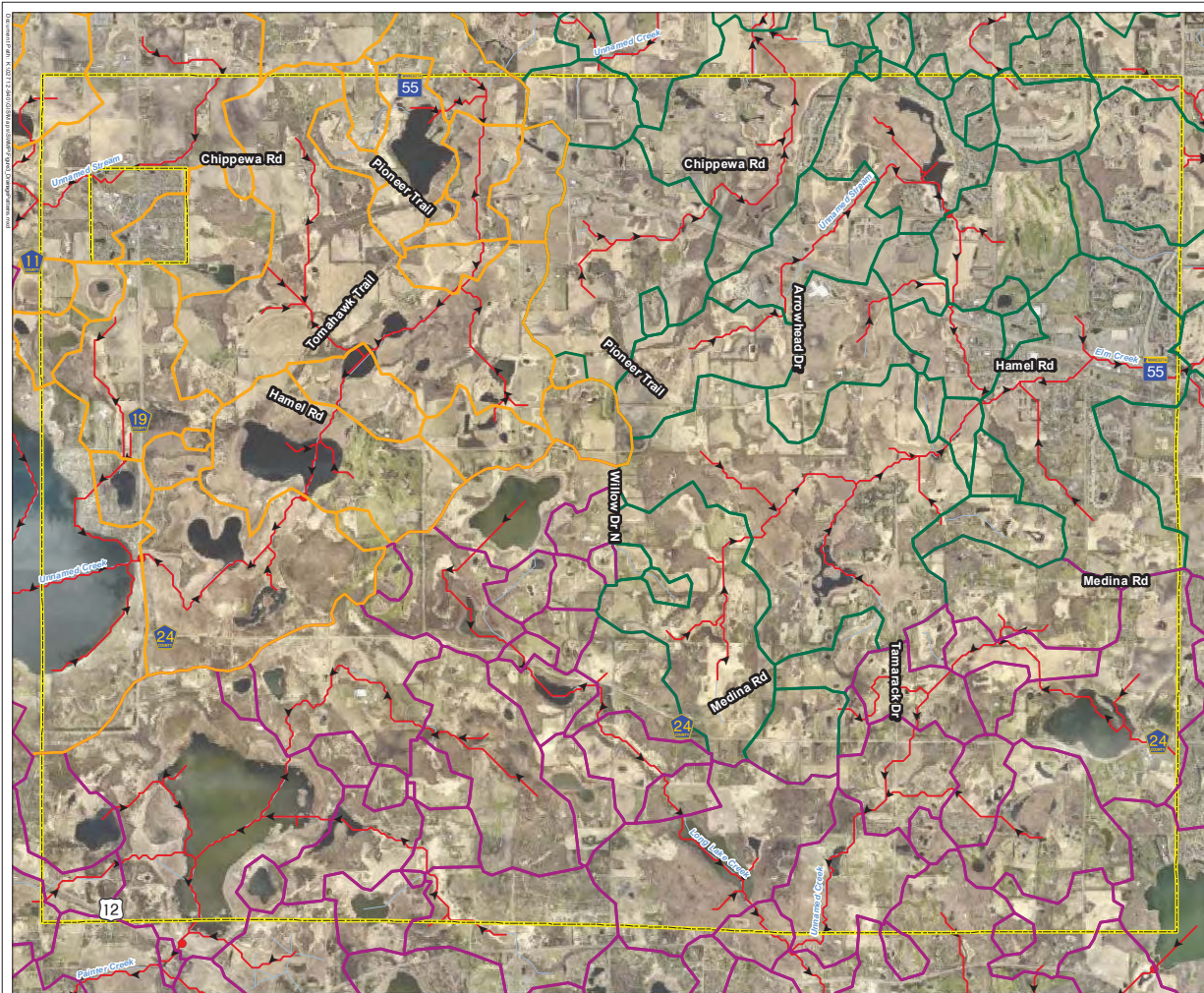
- Medina Boundary
- Watershed Management Organizations
  - ELM CREEK
  - MINNEHAHA CREEK
  - PIONEER-SARAH CREEK



0 2,650 Feet

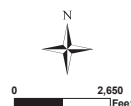
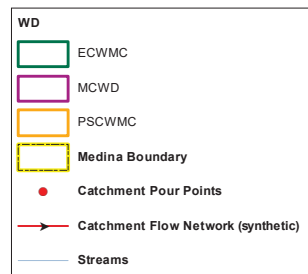






**Figure 3- Medina's Drainage Patterns**

**Medina's Surface Water Management Plan  
Medina, MN**





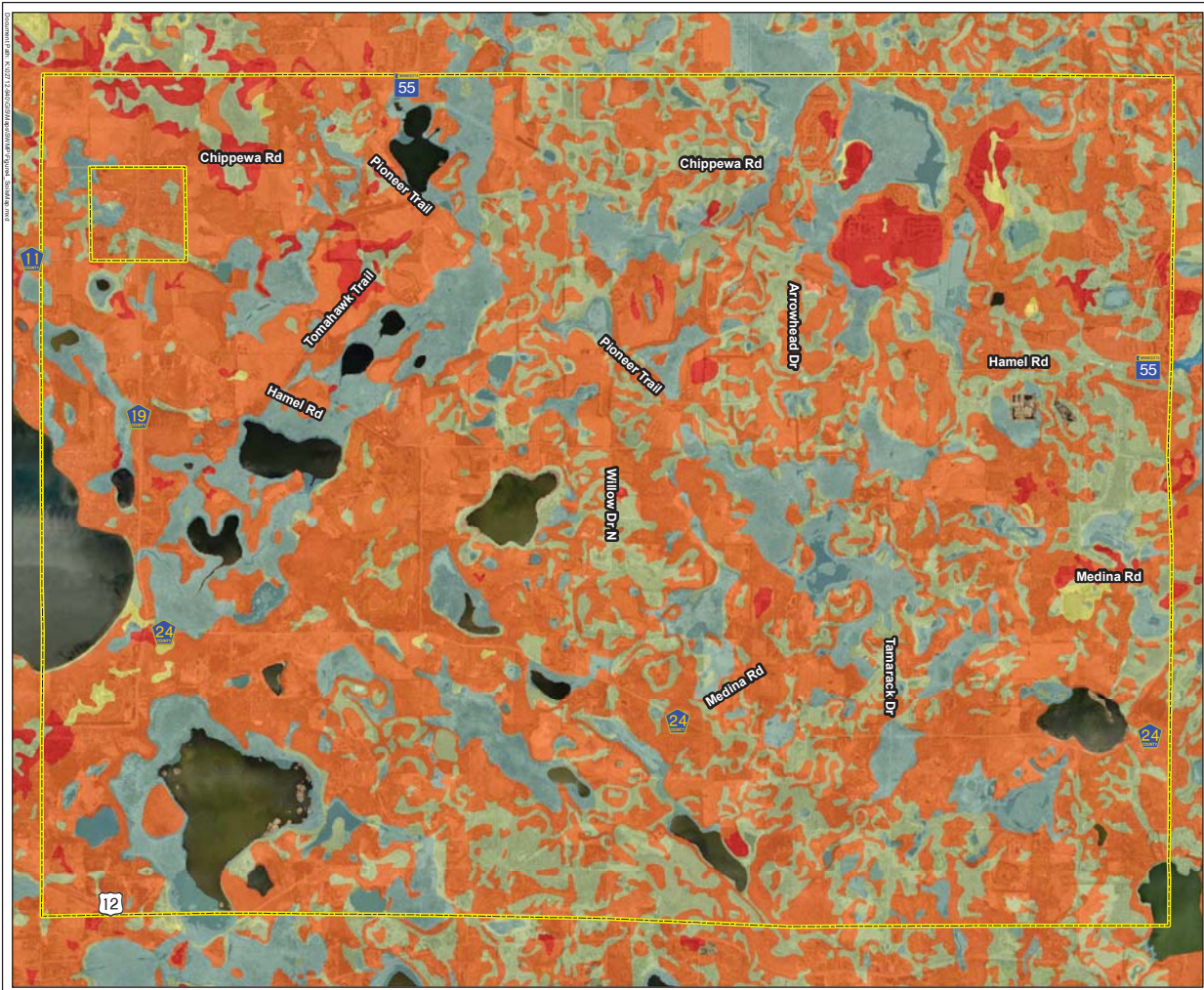


Figure 4- Medina's Soil Types

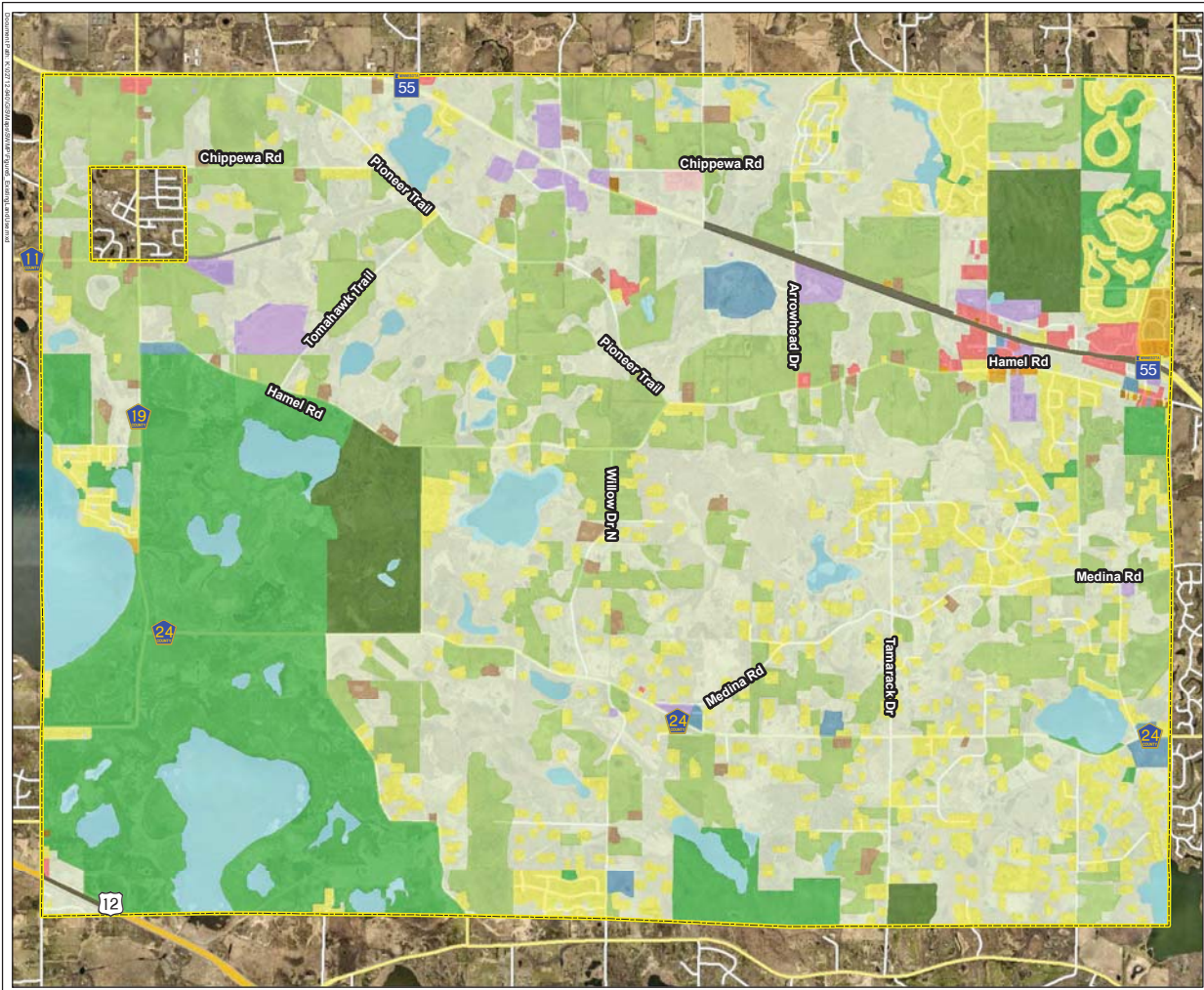
Medina's Surface Water Management Plan  
Medina, MN

Medina Boundary

Soils Hydric Group

	A
	A/D
	B
	B/D
	C
	C/D
	D





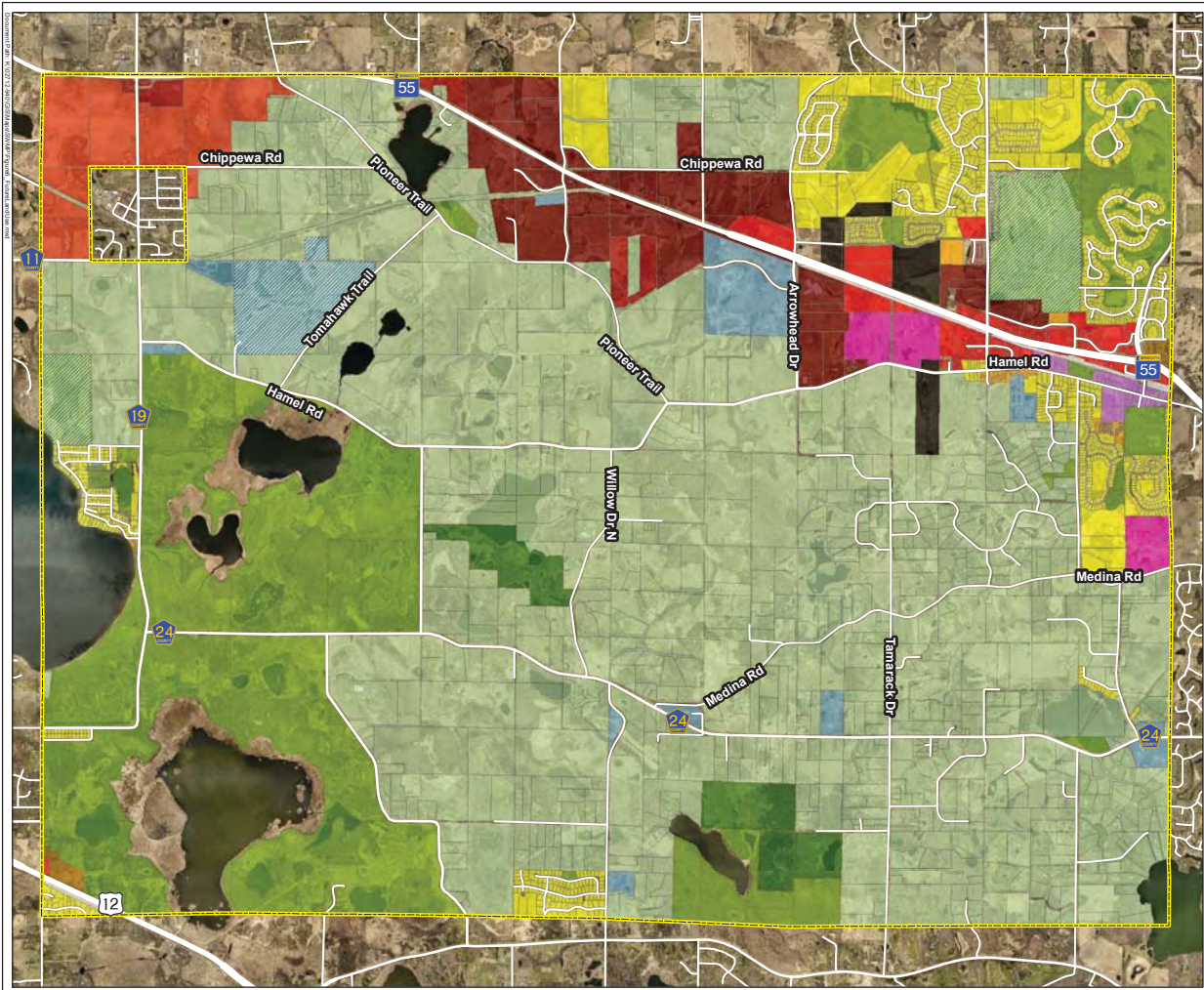
**Figure 5- Medina's Existing Land Use**

**Medina's Surface Water Management Plan  
Medina, MN**

Medina Boundary	Office
2010 Existing Land Use	Open Water
Agricultural	Park, Recreational, or Preserve
Farmstead	Railway
Golf Course	Retail and Other Commercial
Industrial and Utility	Single Family Attached
Institutional	Single Family Detached
Major Highway	Undeveloped
Mixed Use Residential	
Multifamily	







**Figure 6- Medina's Future Land Use**

**Medina's Surface Water Management Plan  
Medina, MN**

- |                            |                                  |
|----------------------------|----------------------------------|
| Medina Boundary            | Institutional                    |
| 2040 Future Land Use       | Multiple                         |
| Agricultural               | Private Recreation               |
| Future Development Area    | Parks, Recreation and Open Space |
| Low Density Residential    | Rural Commercial                 |
| Medium Density Residential | Rural Residential                |
| High Density Residential   | Uptown Hamel                     |
| Mixed Residential          | Closed Sanitary Landfill         |
| Commercial                 | Right-of-Way                     |
| Business                   |                                  |

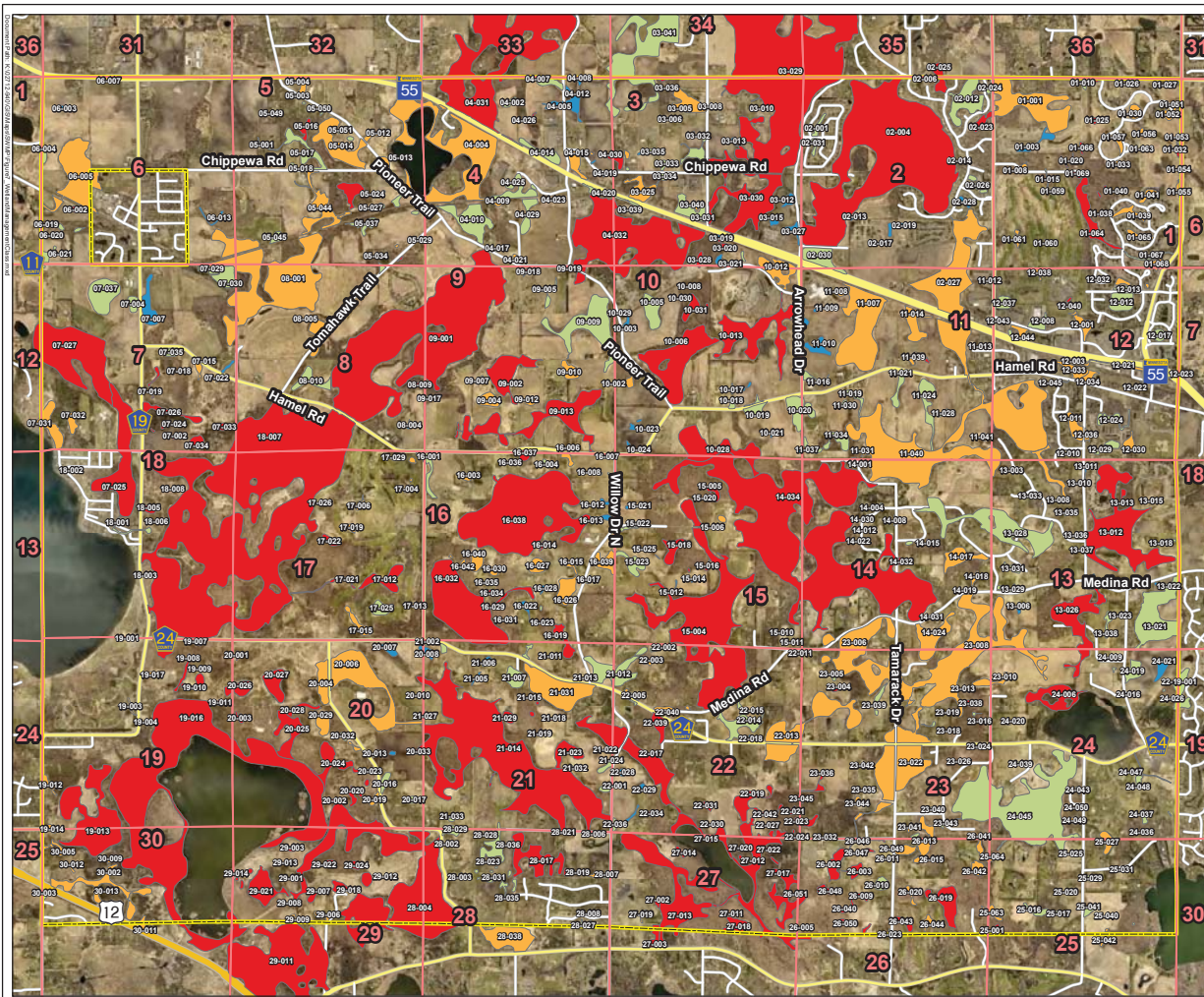
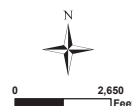
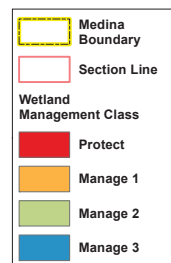






Figure 7- Medina's  
Wetland Management Class

Medina's Surface  
Water Management Plan  
Medina, MN

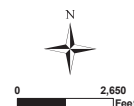
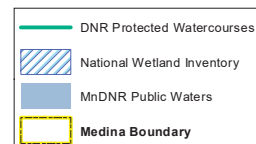


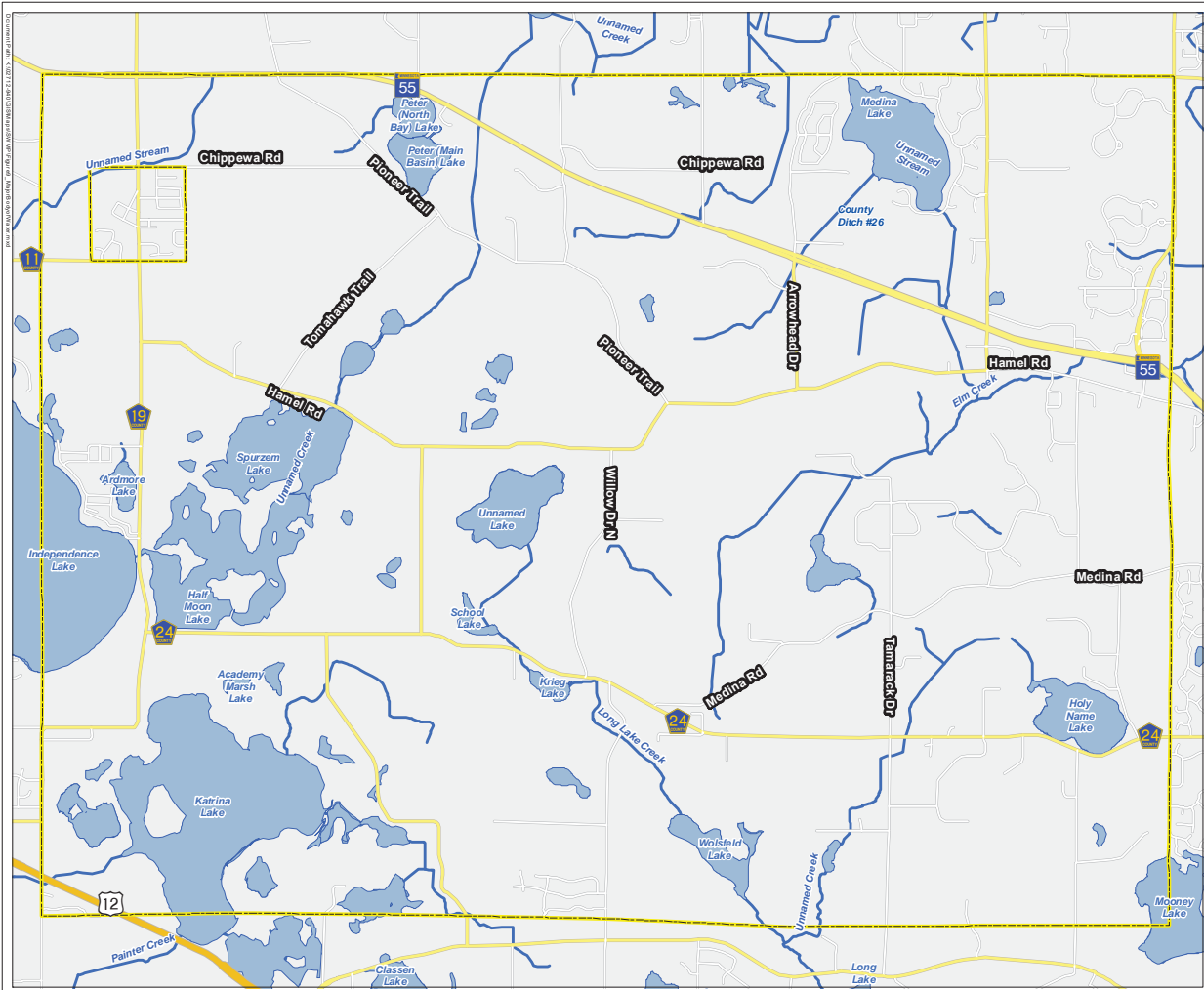




**Figure 8- Medina's  
MnDNR Public Water &  
Wetlands Map**

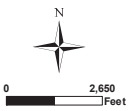
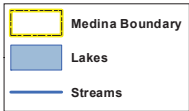
**Medina's Surface  
Water Management Plan  
Medina, MN**





**Figure 9- Medina's Major Bodies of Water**

**Medina's Surface Water Management Plan  
Medina, MN**



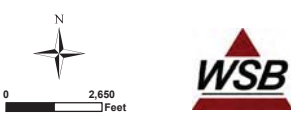




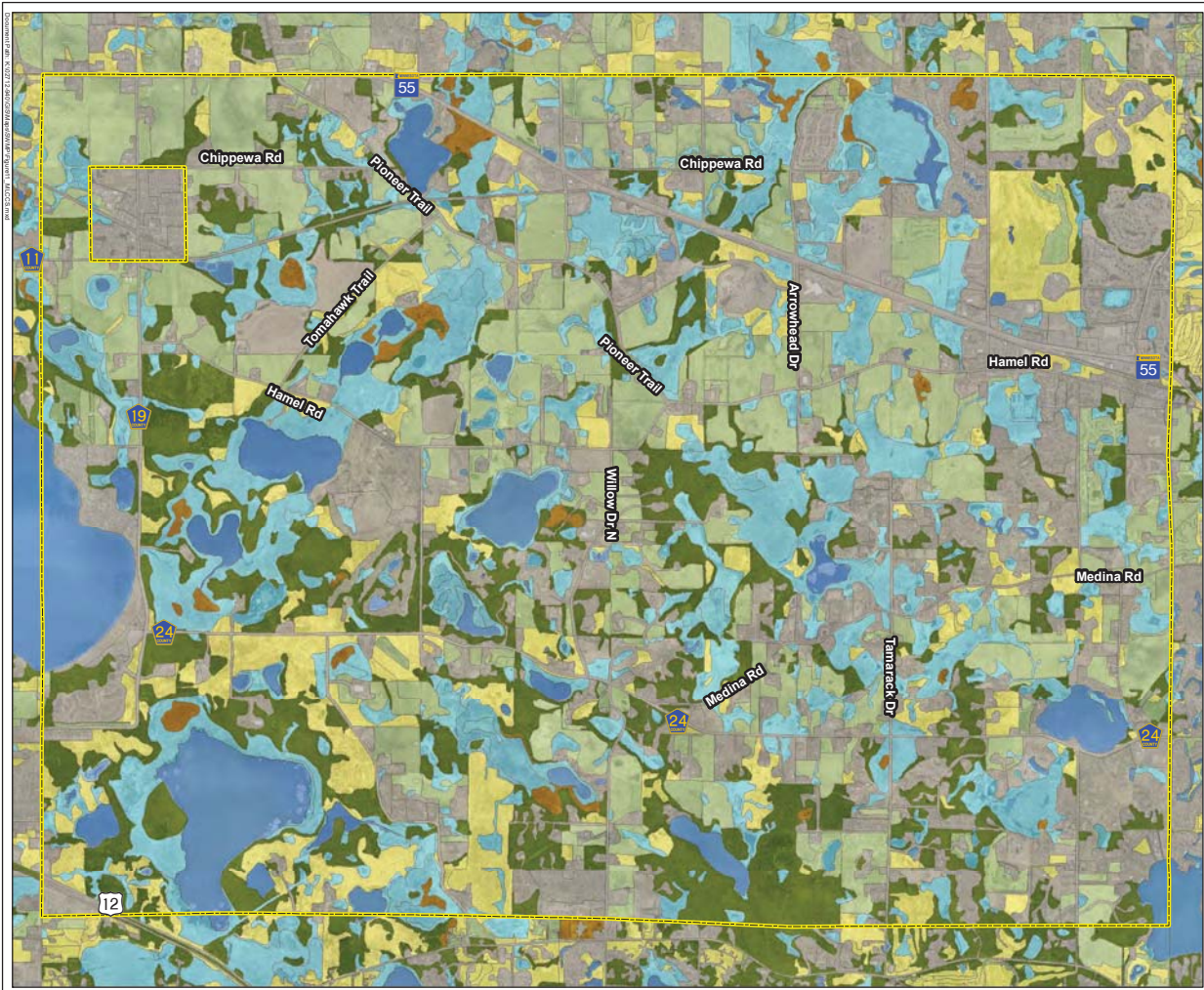
**Figure 10- Medina's Groundwater Appropriation Locations Map**

**Medina's Surface Water Management Plan  
Medina, MN**

- |                                |                         |
|--------------------------------|-------------------------|
|                                | Medina Boundary         |
|                                | City Wells              |
| <b>Appropriation Locations</b> |                         |
| <b>Category</b>                |                         |
|                                | Major Crop Irrigation   |
|                                | Non-Crop Irrigation     |
|                                | Special Categories      |
|                                | Temporary               |
|                                | Water Level Maintenance |
|                                | Waterworks              |







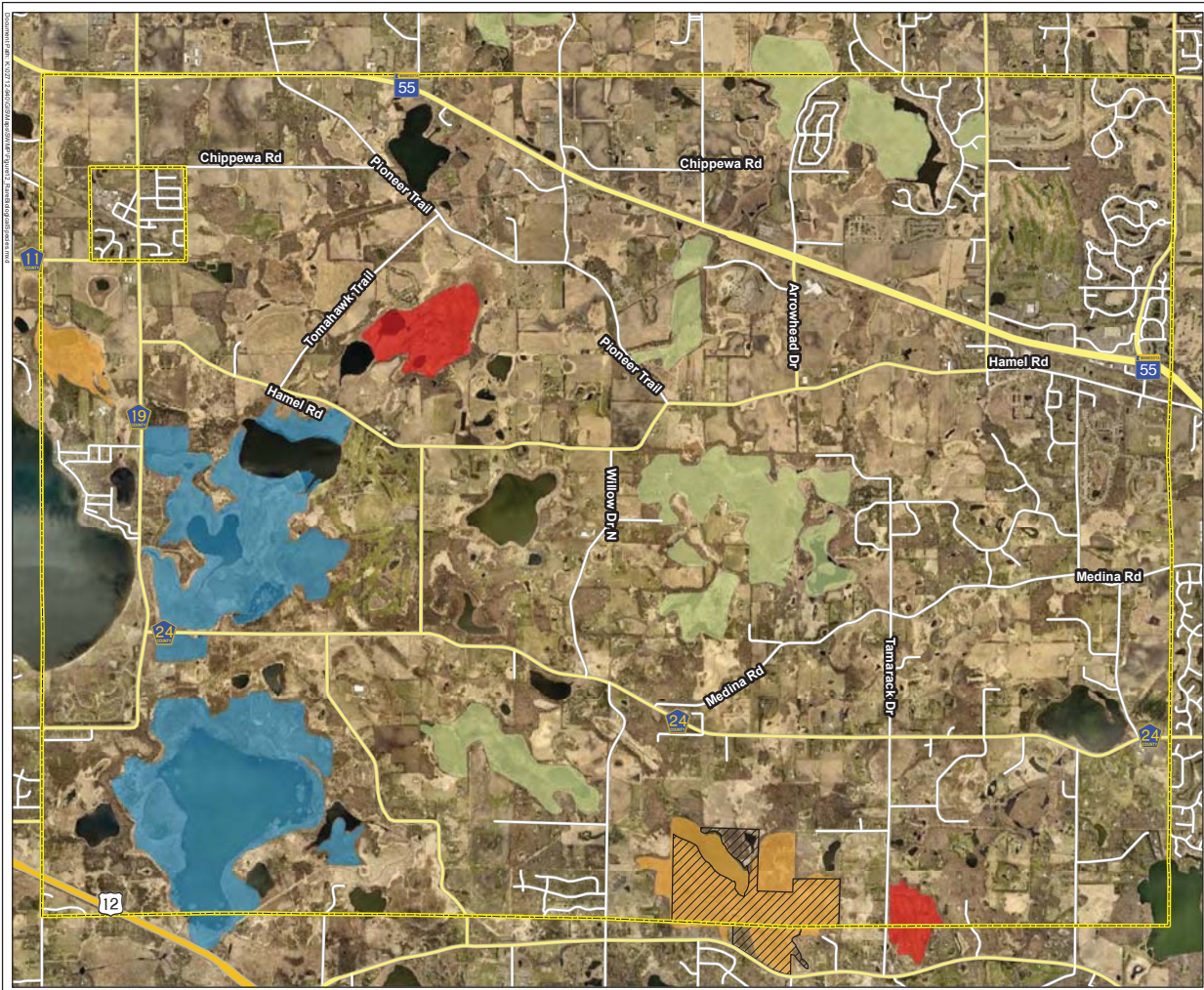
**Figure 11- Medina's MLCCS Coverage Map**

**Medina's Surface Water Management Plan  
Medina, MN**

Medina Boundary	Herbaceous
Developed Area	Shrubland
Planted/Cultivated	Wetlands
Forest	Water



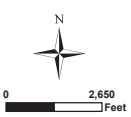




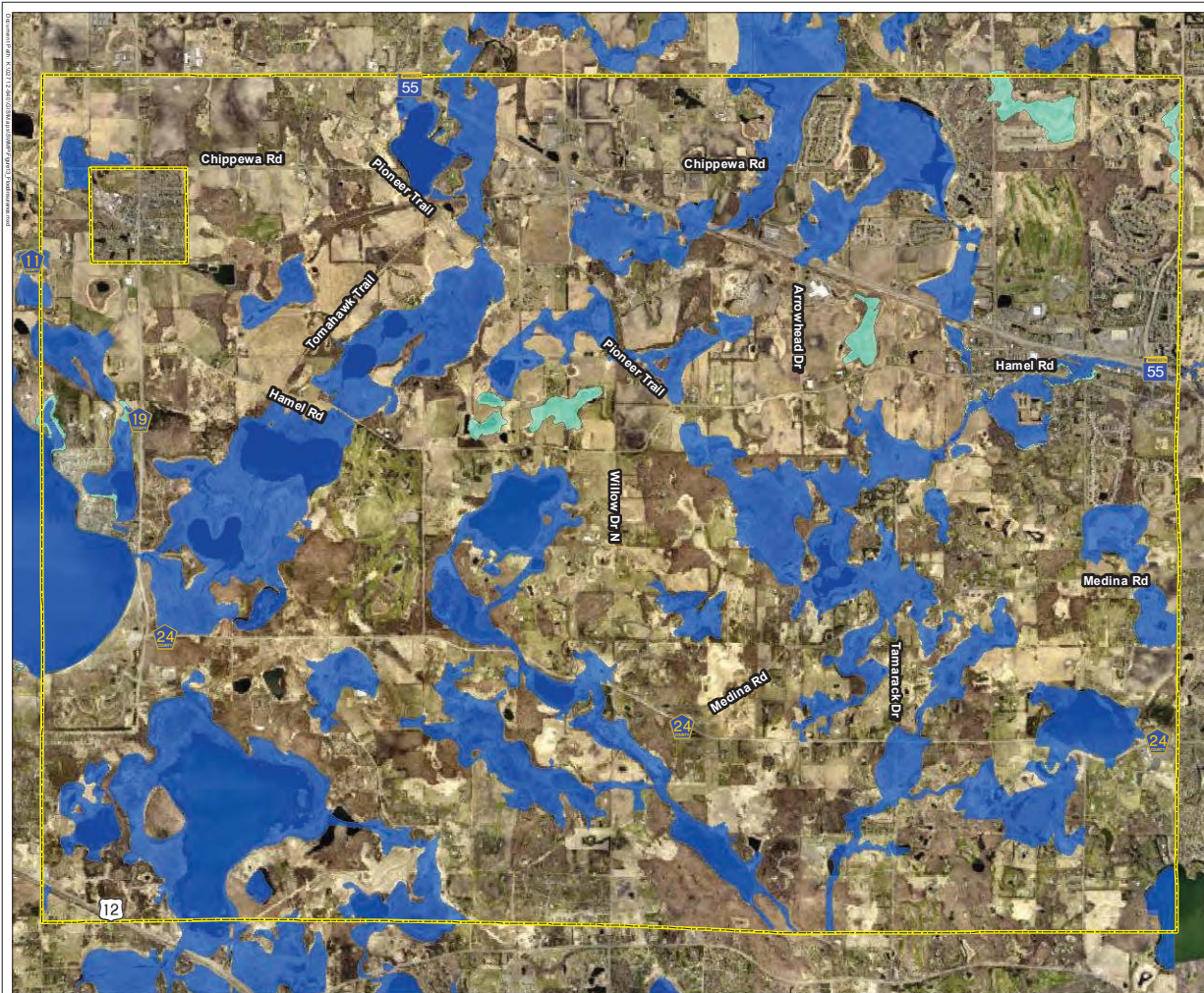
**Figure 12- Medina's  
MnDNR Rare  
Biological Species**

**Medina's Surface  
Water Management Plan  
Medina, MN**

	Medina Boundary
	Scientific and Natural Area
<b>Biodiversity Significance</b>	
	Outstanding
	High
	Moderate
	Below

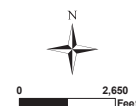
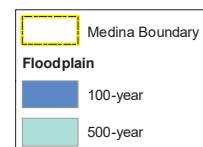






**Figure 13- FEMA  
Floodplain**

**Medina's Surface  
Water Management Plan  
Medina, MN**

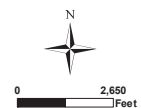
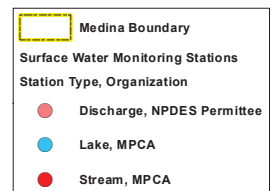






**Figure 14- Medina's  
Water Quality  
Monitoring Map**

**Medina's Surface  
Water Management Plan  
Medina, MN**

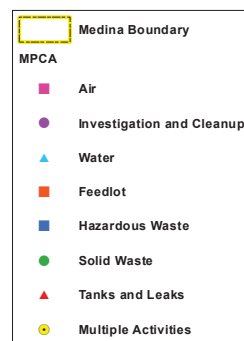




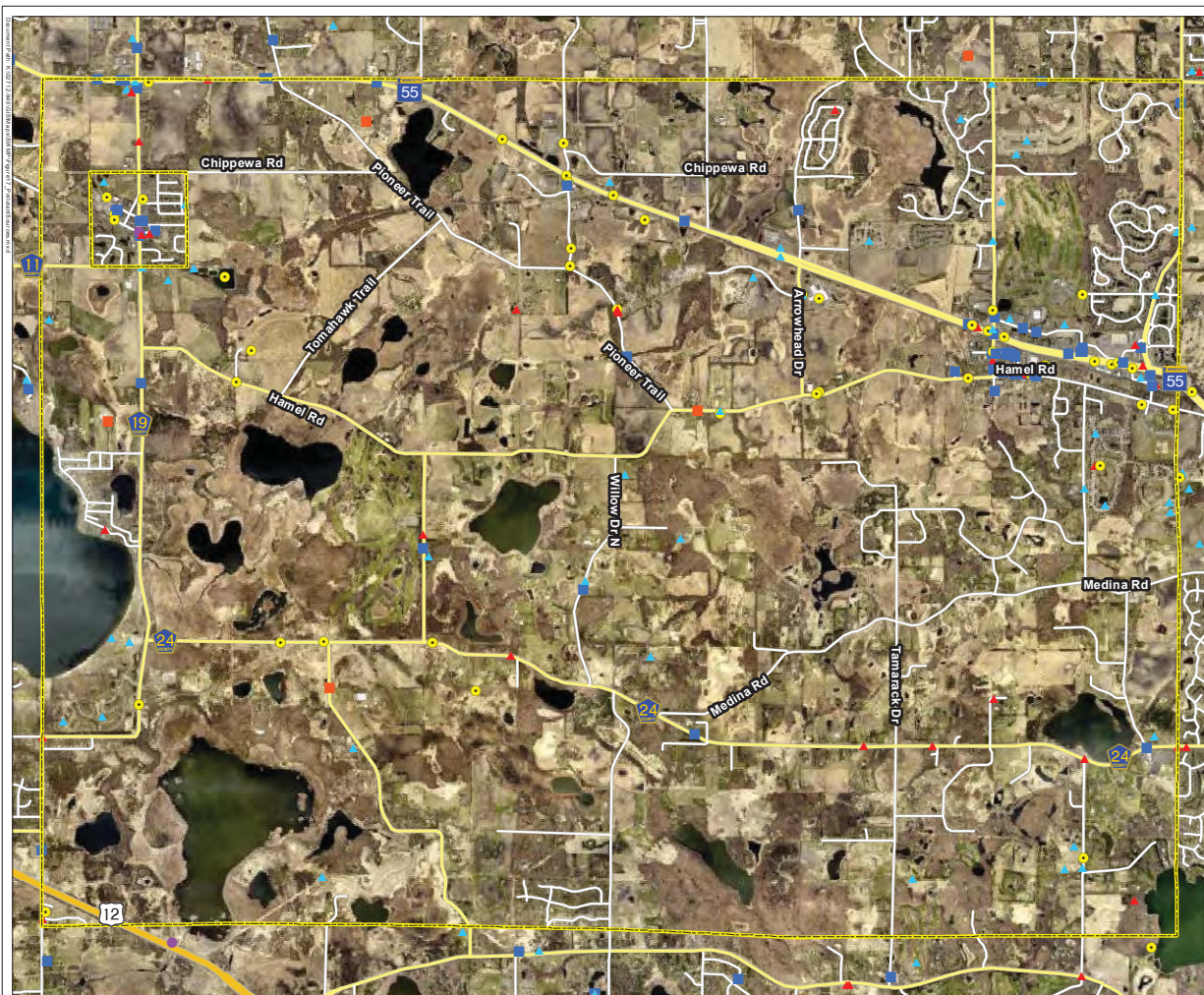


**Figure 15- Medina's  
Pollutant Sources**

**Medina's Surface  
Water Management Plan  
Medina, MN**



0 2,650 Feet







**MEDINA**

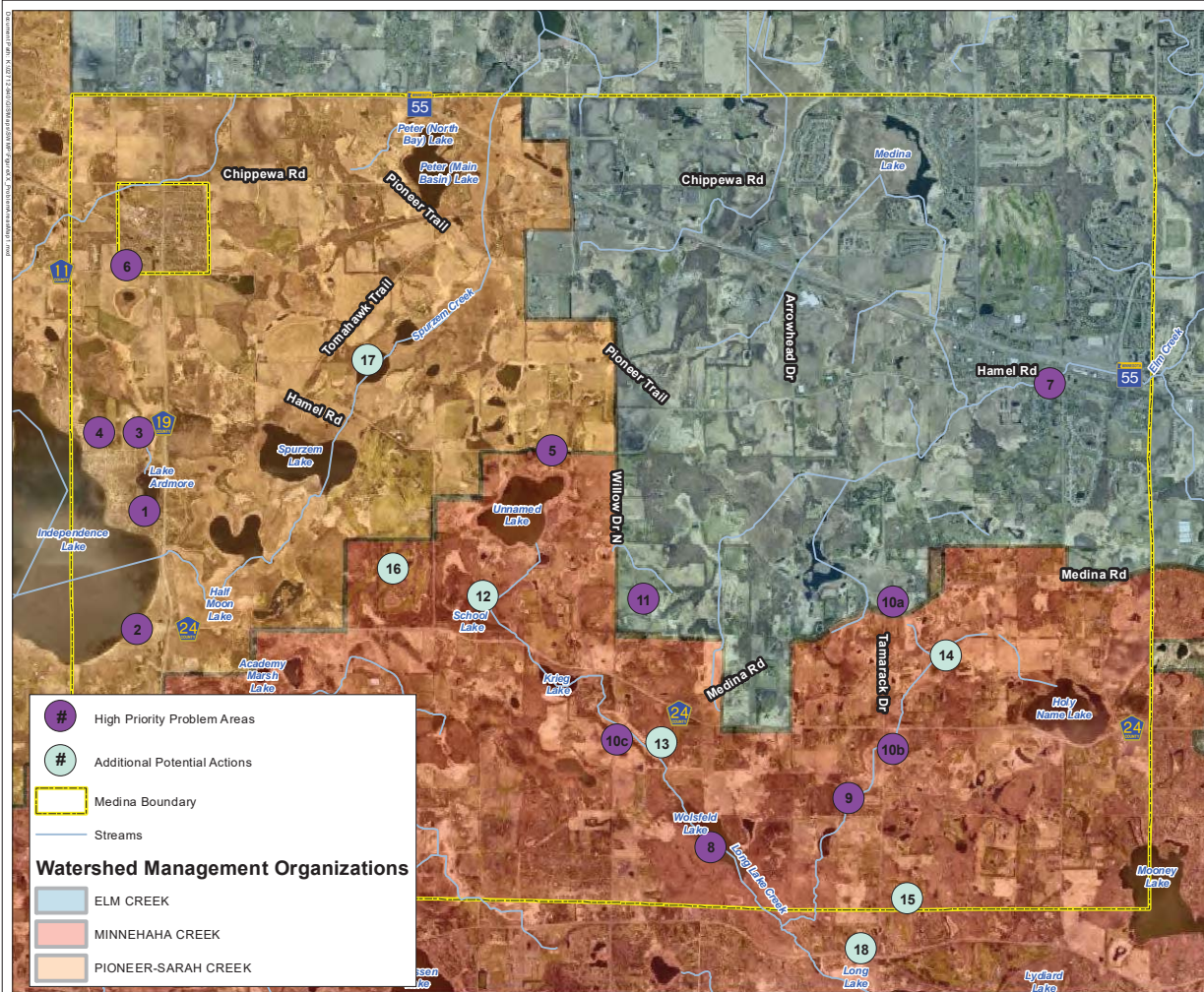
**Figure 16- Medina's Problem Areas Map**

**Medina's Surface Water Management Plan  
Medina, MN**

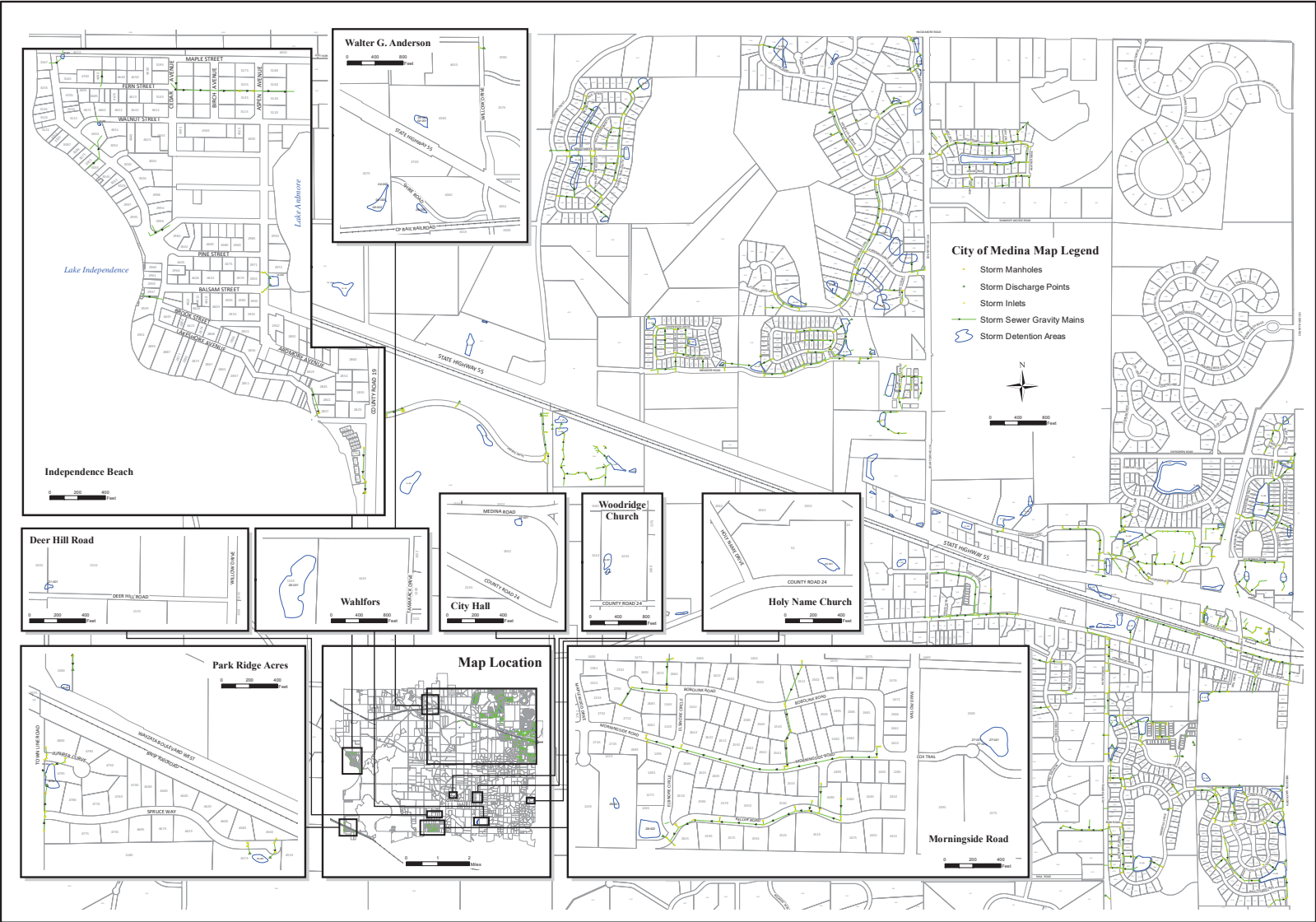
- High Priority**
- 1) Lake Ardmore wetland restoration north of Maple Street
  - 2) Lake Independence shoreline restoration as identified in the Ardmore Subwatershed Plan
  - 3) Fern Street gully restoration
  - 4) Gully restoration in TRPD
  - 5) Hydrologic/hydraulic studies to establish Base Flood Elevations (BFE) for FEMA mapped waterbodies in PSCWMC and ECWMC. (MCWD has BFEs established)
  - 6) Take the Loretto sewer ponds offline and connect to the MCES system
  - 7) Partner with ECWMC on creek restoration near Hamel Road in Rainwater Park
  - 8) Cooperate with DNR, MCWD to assess local erosion in Wolsfeld Woods that may contribute to lake sediment loads
  - 9) Partner with MCWD to inspect and restore areas of erosion in Long Lake Creek
  - 10) Evaluate options to address flooding:
    - a. on the NE quadrant of Medina Road and Tamarack Drive
    - b. Tamarack Road south of CSAH24
    - c. Willow Drive south of CSAH 24
  - 11) Expand education program for benefits of water reuse for irrigation (City-wide)
- Additional Potential Actions**
- 12) Partner with MCWD on School Lake internal load management
  - 13) Partner with MCWD to inspect and restore open channel to Wolsfeld Lake.
  - 14) Evaluate wetland restoration along Long Lake Creek
  - 15) Education and cooperation with Spring Hill Golf Course
  - 16) Education and cooperation with Baker Golf Course
  - 17) Tomahawk Trail wetland restoration
  - 18) Long Lake internal load management through carp removal



0 2,650 Feet



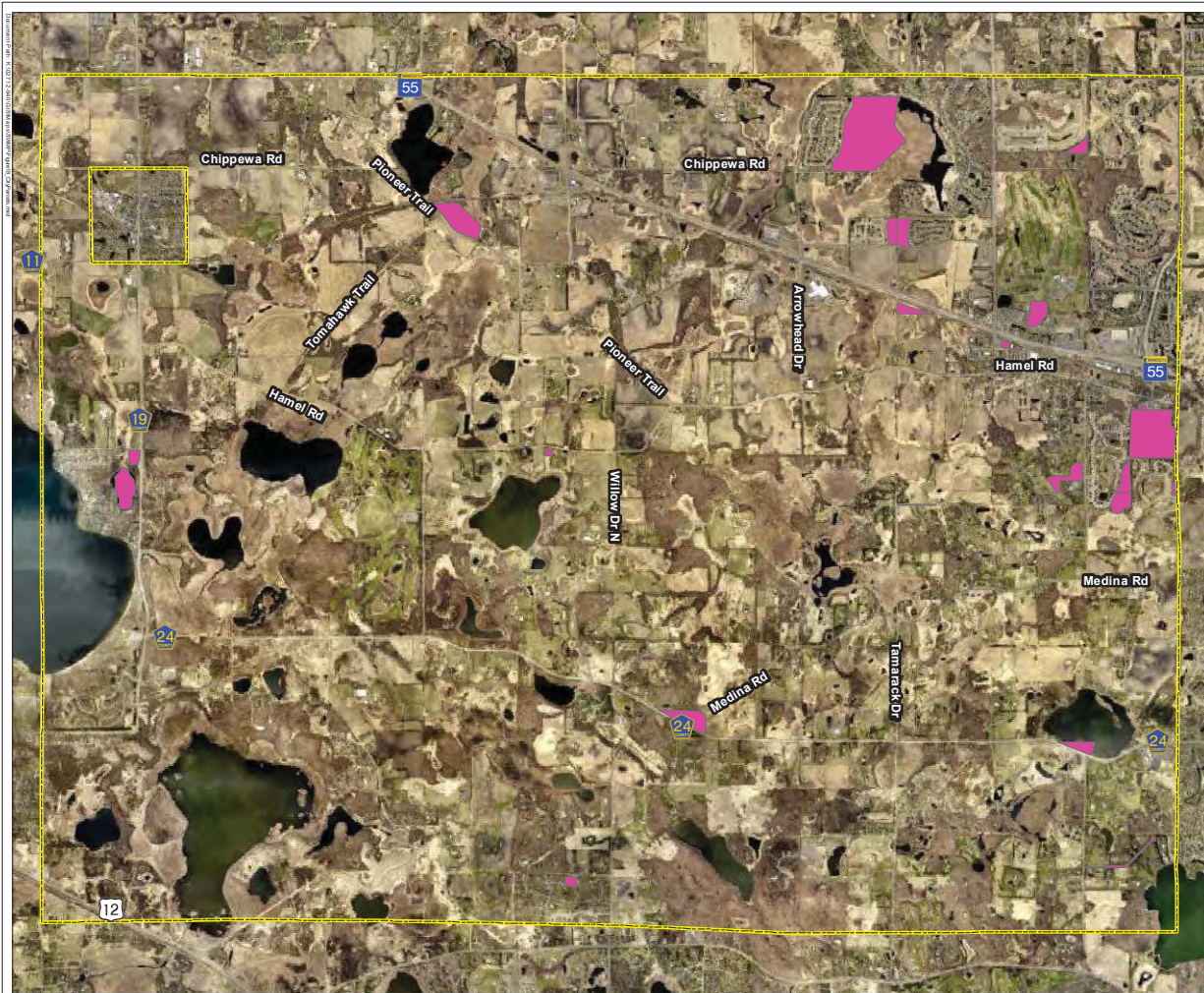




**Figure 17- Medina's Stormwater System**

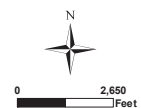
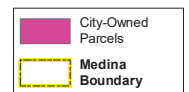
**Medina's Surface Water Management Plan  
Medina, MN**





**Figure 18- Medina's City-Owned Parcels**

**Medina's Surface Water Management Plan  
Medina, MN**



## **APPENDIX B**

MS4 SWPPP Application for Reauthorization and BMP Sheets

1,486 pages available upon request