Water Resources Policy Plan

MAY, 2015

METROPOLITAN COUNCIL

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2040 WATER RESOURCES POLICY PLAN
SUSTAINING THE REGION'S WATERS, SUSTAINING THE REGION

The Twin Cities metropolitan area enjoys a wealth of water resources, including 950 lakes and three major river systems – the Mississippi, Minnesota and St. Croix. They provide valuable habitat, support natural ecosystems, and offer a wide variety of recreation opportunities. In addition to their natural features, our rivers serve as important waterways for transporting agricultural products and industrial goods.

The region's extensive wetlands support our diverse plant and animal species, and filter pollutants from urban and agricultural runoff before it affects the soil and groundwater. A prolific groundwater system, in combination with surface water from the Mississippi River, supports our drinking water needs. Abundant, high-quality water plays a major role in advancing the region's economic prosperity, growth, and livability, and our region's infrastructure for water supply, stormwater and wastewater is crucial for managing this essential resource.

The overall theme of this Policy Plan is to move further toward integrating planning for wastewater, water supply, and surface water management. The challenges of water supply, water quality issues, and environmental stewardship need strategies that look at the whole water picture and consider how efforts in one area could benefit the others. For example, an integrated approach would move beyond treating wastewater only to meet regulatory compliance, to viewing wastewater as a resource available for reuse as a non-potable water supply, thus reducing demand on current potable water sources.

The Council will continue to provide high quality, affordable wastewater collection and treatment services to support economic growth and development in ways that protect our valued water and land resources.

The Role of the Council in Water Resources

A wide range of governmental organizations are responsible for planning, monitoring and managing water resources in the region – from the federal to the local level. The extensive list of water resource partners includes the U.S. Environmental Protection Agency, the Board of Water and Soil Resources, the Minnesota Pollution Control Agency, the Minnesota Departments of Health, Agriculture and Natural Resources, local governments, watershed and conservation organizations, municipal water suppliers, and the Metropolitan Council. All serve unique and important roles and, together, make possible a broad front of cooperative, coordinated planning and action on behalf of water resources in the region.

The Metropolitan Council has roles and responsibilities that provide a unique regional perspective for planning and management, all aimed at protecting our region's valuable water resources. Through its world-class wastewater treatment system and surface water planning activities, the Council works to ensure there is adequate water quality to support economic development, the tourism industry, drinking water needs, and the quality of life for all residents of the region. The Council provides wastewater services to municipal and industrial customers in the region at highly competitive rates, fostering a favorable economic environment for growth and development. In addition, the Council promotes sustainable water resources through its planning and technical assistance for surface water and water supply.

The Council has prepared this Policy Plan under state law (Minn. Stat. 473.145) directing it to prepare a metropolitan development guide that includes a plan for the region's wastewater collection and treatment system, along with supporting policies, goals, standards, and maps. The Policy Plan is also prepared in response to Minn. Stat. 473.157 requiring the Council to adopt a water resources plan and federal requirements (33 U.S. Code § 1288) for a regional management plan to address pollution from point sources (such as treatment plant discharges) and nonpoint sources (such as stormwater runoff). When adopted by the Council, this Policy Plan will replace the current plan adopted in May 2005 and amended in 2006 and 2010.

Wastewater Collection and Treatment. The Metropolitan Council owns and operates the regional wastewater collection and treatment system for the urbanized portion of the metro area (over 90% of the metropolitan area population). The Council operates and maintains approximately 610 miles of regional sewers that collect flows from over 5,000 miles of sewers owned by 108 communities and treats approximately 250 million gallons of wastewater daily at eight regional treatment plants.

Water Quality Management Plans and Programs. The Council is designated as the areawide waste treatment management agency under Section 208 of the federal Clean Water Act (U.S. Code §1288). As part of this designation, the Council is responsible for ensuring that waste treatment management policies, programs, and facilities are implemented in the metro area to provide wastewater treatment and urban stormwater management to protect water quality in the region. In addition, the Council in cooperation and consultation with our many partners, fills gaps in monitoring and assessment of the water quality of area lakes, rivers and streams. The Council works closely with communities and watershed organizations as they prepare their local water plans and watershed management plans, providing technical assistance related to surface water management and water quality issues and conditions in the region.

Regional Water Supply Plan. Responding to state legislation (Minn. Stat. 473.1565), the Twin Cities metro area Master Water Supply Plan, was adopted by the Council in 2010 and serves as the framework for achieving a water supply that meets the needs of current and future generations. The Council's role in water supply planning includes developing the regional Master Water Supply Plan, maintaining a regional database of technical information related to water supply issues and concerns, providing assistance to communities in the development of their local water supply plans, and identifying approaches for emerging water supply issues.

Thrive MSP 2040

From its frontier origins, the Twin Cities metropolitan area has grown, prospered, and emerged as one of the major metro areas in the nation. It's renowned for its high quality of life, strong economy and many assets:

- A diverse and resilient economy
- Vibrant arts, music and theatre communities, and professional sports teams
- Rich cultural diversity
- Abundant parks, recreational trails, conserved open space, fertile agricultural lands, and natural resources
- Hundreds of lakes and three great rivers

- A tradition of shared civic action

Today, the metro area is a thriving region of nearly three million people living in 186 communities across the seven counties of Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington. The region has emerged as a great place to live, work and do business.

As we plan for our next 25 years, key challenges lay ahead – constrained fiscal resources, demands stemming from demographic shifts, emerging environmental challenges, and the increasing necessity of regional economic cooperation.

To meet these challenges, the Metropolitan Council is responsible, under state law, for preparing a comprehensive development guide for the seven-county Twin Cities metropolitan area. The Council's *Thrive MSP 2040*, adopted in May 2014, provides a framework for a shared vision for the future of the region over the next 25 years. *Thrive* establishes the policy foundation used by the Council to develop its regional systems and policy plans, as well as development policies and implementation strategies. Taken together, these constitute the comprehensive development guide that directs the orderly and economical development of the region. State statute specifies four metropolitan systems plans − for regional transportation, aviation, wastewater, and regional parks.

In addition to these statutory metropolitan systems plans, the Council has developed a housing policy plan. The *Housing Policy Plan* provides an expanded policy framework that the Council will use in reviewing the housing plan and housing implementation programs of comprehensive plans that local governments prepare under state law.

The Council will work with our partners to plan for:

- Sustainable and plentiful high quality water resources that provide a firm foundation for the region's future economic growth and prosperity, livability and high quality of life.
- A growing economy that creates and provides jobs for the citizens of the region.
- A good transportation system that fairly and equitably links citizens with job opportunities and affordable housing.
- Natural and water resources that provide for recreational opportunities and that support a high quality of life.

Thrive Outcomes

Thrive's regional vision includes five desired outcomes: stewardship, prosperity, equity, livability, and sustainability. These outcomes provide policy direction for this *2040 Water Resources Policy Plan*.

Stewardship. Stewardship advances the Council's longstanding mission of orderly and economical development by responsibly managing the region's natural and financial resources, and making strategic investments in our region's future.

Prosperity. Prosperity is fostered by investing in infrastructure and amenities that make our region competitive in attracting and retaining successful businesses, a talented workforce, and strong economic opportunities.

Equity. Equity means connecting all residents to opportunity and creates viable housing, transportation, and recreation options for people of all races, ethnicities, incomes, and abilities so that all communities share the opportunities and challenges of growth and change.

Livability. Livability focuses on the quality of our residents' lives and experiences in the region, and how places and infrastructure create and enhance the quality of life that makes our region a great place to live.

Sustainability. Sustainability seeks to protect our regional vitality for generations to come by preserving our capacity to maintain and support our region's well-being and productivity over the long term.

Thrive Principles

Thrive identifies the principles of integration, collaboration, and accountability to carry out the Council's work. The three principles reflect the Council's efforts to integrate policy areas, support local governments and regional partners, and promote and implement the *Thrive* regional vision.

Integration. Integration is the intentional combining of related activities to achieve more effective results, using multiple policy tools to address complex regional challenges and opportunities.

Collaboration. Collaboration recognizes that shared efforts advance our region most effectively toward shared outcomes. Addressing the region's issues requires collaboration because no single entity has the capacity or authority to do the work alone.

Accountability. For the Council, accountability includes a commitment to monitor and evaluate the effectiveness of our policies and practices toward achieving shared outcomes and a willingness to adjust course to improve performance.

Response of the 2040 Water Resources Policy Plan to Thrive's Policy Direction

Prosperity and Livability

Water resources have strategic importance in achieving economic growth, competitiveness, and high quality of life. The Council's regional strategy balances the demands of growth with protection and management of our lakes, rivers, streams, wetlands and groundwater.

The Council recognizes the need to coordinate decisions about water supply, surface water management, wastewater collection and treatment, land use, transportation, housing, and natural resources. Regional transportation and wastewater systems investments and services help shape growth patterns. Unplanned growth can put a strain on natural areas, availability and quality of groundwater, the cost of services and other resources. Maximizing the benefits of readily available wastewater treatment, water supply and stormwater infrastructure plays a key role in supporting the competitive position of the region.

Accordingly, this Policy Plan includes policies and implementation strategies on growth that focus our wastewater system expansion on supporting the orderly and economic redevelopment in the urban area and urban centers, and development in the suburban, suburban edge, and emerging suburban edge. It also includes policies and implementation strategies that promote

the livability of the region through access to adequate water supplies for drinking water and promoting the protection and restoration of our water resources for recreational use.

Equity

An important consideration of this Policy Plan is its impact on all populations in the region, including low-income populations, communities of color, persons with disabilities, and persons with limited English proficiency. Equity connects all residents to opportunity and creates viable housing and transportation options for people of all races, ethnicities, incomes and abilities so that all communities share the opportunities and challenges of growth and change. For our region to reach its full economic potential, all of our residents must be able to access opportunity that leads to success, prosperity, and a high quality of life.

This Policy Plan supports regional balance with policies and implementation strategies that provide for uniform rates in the region for all of our wastewater customers. The Council provides equal access to the affordable wastewater systems for customers within the metropolitan urban service area, and uniformly maintains all parts of the regional wastewater system infrastructure.

Outreach to underrepresented communities is essential as the Council develops plans and implements future projects and other activities. This Policy Plan was prepared under the Council's Public Participation Plan and has built on the extensive outreach and engagement completed for *Thrive MSP 2040,* including targeted community engagement with historically underrepresented communities. This Policy Plan commits the Council to expanding on and fostering public engagement in its system planning and in project development.

Sustainability and Stewardship

Sustainability of our water resources is a high-priority issue as our region continues to grow and we put more demands on them. Compounding the situation, we find ourselves having to adapt to the effects of high-frequency and intense storms intermixed with periods of drought. Ensuring sustainable water resources requires a regional strategy that addresses a variety of needs and issues. The region's water resources must be managed and protected to meet our household, business and industrial needs; support aquatic habitat and wildlife; and provide aesthetic and recreational opportunities for all current residents and future generations.

Sustainable water resources means having adequate high-quality groundwater and surface water resources to support the region's growing water supply needs and the region's unique and intricate ecosystems. And it means managing our resources in a way that ensures availability of our water resources for current and future generations.

The Minnesota State Legislature has defined sustainability as it relates to water supply:

> *"Water is sustainable when the use does not harm ecosystems, degrade water quality or compromise the ability of future generations to meet their own needs."*

The Council is committed to collaborating with our partners, including federal, state, local and regional agencies and organizations, to promote the long-term sustainability of the region's water resources for surface and groundwater quality and quantity and wastewater collection and treatment. To promote sufficient and high-quality ground and surface water, the Council will:

- Promote water sustainability through the *Water Resources Policy Plan*, the wastewater system plan, the Master Water Supply Plan and through the review of local water supply plans, surface water management plans, and comprehensive sewer plans.

- Practice a high level of environmental sustainability in our wastewater treatment system operations, leading by example in the sustainability of our operations in the following areas:
  - Energy conservation and renewable energy generation
  - Emissions reductions
  - Water conservation
  - Green design features
  - Solid waste conservation and recycling
- Collaborate with our partners to save dollars, share expertise and accomplish more.
  - Lead the Council's team to address climate change on a community level and environmental sustainability in all the Council's operations
  - Work with external partners on climate change and sustainability to learn from each other, develop and lead regionwide sustainability strategies
- Promote the wise use of water at the community level through optimizing surface water and groundwater use, conservation, reuse, and aquifer recharge.
- Collaborate with partners, including providing technical assistance to local governments about wastewater, water supply and surface water management.
- Plan for the long-term reliability, resiliency, security and cost-effectiveness of the region's water supplies.
- Incorporate water sustainability considerations in all areas of Council policy and actions, including overall development patterns, water management, transportation, housing, and regional parks.
- Identify subregional and local water sustainability solutions that balance regional needs and local objectives.

Regional Growth Forecasts

The pressures on the region's water resources will increase as our population and economy grow. During the last four decades, the region grew by over 975,000 people. Between 2010 and 2040 it is projected that the region will grow by over 824,000 residents and 391,400 households.

	1970	2000	2010	2040	2010-2040 Projected Increase
Population	1,874,600	2,642,062	2,849,567	3,675,660	824,093
Households	573,600	1,021,456	1,117,749	1,510,090	391,421
Jobs	779,000	1,606,263	1,543,872	2,102,090	550,508

Community Designations

Thrive forecasts show that, over the next 25 years, growth and redevelopment will occur throughout the region, but with variations from area to area. The seven-county region contains a

wide range of communities, from agricultural townships to densely developed downtown neighborhoods. Recognizing that one size does not fit all, the Council uses community designations to group communities with similar characteristics in order to implement regional policy at the local level through comprehensive plans (See Figure 1). Community designations fall within two main categories, the Metropolitan Urban Service Area and the Rural Service Area.

Metropolitan Urban Service Area

The Metropolitan Urban Service Area constitutes about half of the land in the region, but accounts for more than 90% of the region's population. The Council supports the Metropolitan Urban Service Area through investments such as regional wastewater services, regional highways, transit service, the Regional Parks System, and programs that support redevelopment. The Metropolitan Urban Service Area is divided into five community designations:

- Urban Center
- Urban
- Suburban
- Suburban Edge
- Emerging Suburban Edge

Urban Center communities include the largest, most centrally located and most economically diverse cities of the region. Urban centers are located in the metropolitan urban service area (MUSA) and have a minimum average net density of 20 units/acre.

Urban communities are adjacent to the Urban Center communities and have seen considerable development and growth along highways. Urban areas are in the MUSA and have a minimum average net density of 10 units/acre.

Suburban communities saw their primary era of development during the 1980s and early 1990s. Suburban communities also include places that were once resort destinations along Lake Minnetonka and White Bear Lake and along the St. Croix River. Suburban communities are in the MUSA and have a minimum average net density of 5 units/acre.

The ***Suburban Edge*** includes communities that have experienced significant residential growth beginning in the 1990s and continuing to the 2010s. At least 40% of the land in these communities is developed, but significant amounts of land remain for future development. Suburban Edge communities are in the MUSA and have a minimum average net density of 3-5 units/acre.

The ***Emerging Suburban Edge*** includes cities, townships and portions of both that are in early stages of transitioning into urbanized levels of development. In the majority of these communities, less than 40% of the land has been developed. Parts of Emerging Suburban Edge communities are in the MUSA and all have a minimum average net density of 3-5 units/acre.

Rural Service Area

About half of the land in the Twin Cities region is located in the Rural Service Area. This area includes a range of land uses, including cultivated farmland, vineyards, hobby farms, gravel mines, woodlands, small towns, scattered and clustered housing, open spaces, and significant expanses of the region's natural resources. Aside from the Regional Parks System, investments

in regional service and infrastructure are limited in the Rural Service Area. The Rural Service Area is divided into four community designations:

- Rural Center
- Rural Residential
- Diversified Rural
- Agricultural

The metropolitan system plans and policy plans seek to carefully integrate regional land use, housing, transportation, wastewater, water supply, surface water management, natural resources, and parks policies to achieve regional goals in each area and avoid working at cross-purposes. In this Policy Plan, the forecasts are used in the planning and capital improvement program processes to assess regional needs for wastewater treatment and water supply needs of the region in order to serve growth in a timely, efficient and cost effective manner.

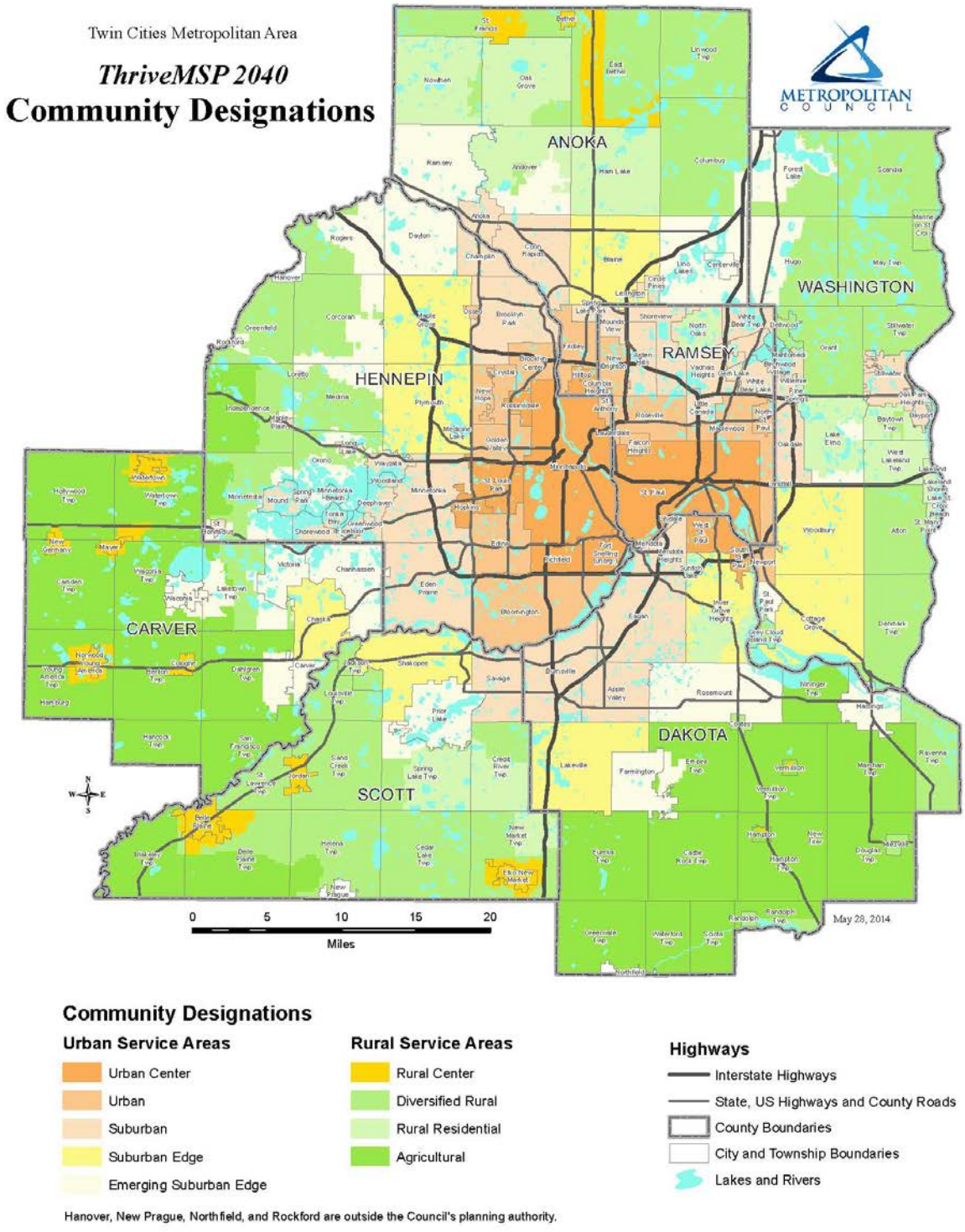
Rural Centers are local commercial, employment, and residential activity centers serving rural areas in the region. These small towns are surrounded by agricultural lands and serve as centers of commerce to those surrounding farm lands. The density is 3-5 units/acre.

Diversified Rural communities are home to a variety of farm and nonfarm land uses including very large-lot residential, clustered housing, hobby farms, and agricultural uses. Located adjacent to the Emerging Edge Suburban communities, the Diversified Rural designation protects rural land for rural lifestyles today with the potential of becoming urbanized after 2040. Maximum allowable density is 4 units/40 acres.

Rural Residential communities have residential patterns characterized by large lots and do not have plans to provide urban infrastructure. Maximum allowable density is 1 unit per-2.5 acres.

Agricultural communities encompass areas with prime agricultural soils that are planned and zoned for long-term agriculture. Maximum allowable density is 1 unit/40 acres.

Figure 1. Thrive MSP 2040 Community Designations



Local Comprehensive Plans

The policy direction from *Thrive MSP 2040* and the Council's system plans and policy plans – including this *2040 Water Resources Policy Plan* – assist communities in developing their comprehensive plans. Under state law, each county, city and township in the metro area is required to review and if necessary amend its local comprehensive plan every 10 years to ensure that the local plan – and local fiscal devices and official controls - are consistent with the Council's metropolitan system plans (MN Statute 473.864). Following adoption of the *2040 Water Resources Policy Plan* and the issuance of system statements, local communities have three years to amend their local comprehensive plans.

Local comprehensive plans are reviewed by the Council based on three primary criteria.

- Conformance with metropolitan system plans
- Consistency with Council policies
- Compatibility with adjacent and affected governmental units

When a plan meets these criteria, the Council authorizes it to be put into effect. If a plan does not meet the review standards, the Council can require the jurisdiction to modify its plan to reflect the Council's system plans.

Conformance: Conformance is achieved if the local plan:

- Accurately reflects the metropolitan system plans
- Integrates public facilities plans
- Addresses land use policies, plans for forecasted growth, meets density standards and maximizes the efficiency and effectiveness of the regional system.

Consistency: Consistency is achieved if the local plan:

- Addresses the community role for land use policies contained in *Thrive*
- Addresses the linkage of local land uses and the metropolitan wastewater disposal system
- Includes an implementation plan describing public programs, fiscal devices, and other specific actions that implement the comprehensive plan and ensure conformance with regional system plans
- Addresses official controls and includes a capital improvement program (sewers, parks, transportation, and open space) that accommodates planned growth and development.

Compatibility: Compatibility with adjacent and affected governmental units is achieved if the local plan:

- Adequately documents that it has addressed the concern (s) of all adjacent and affected jurisdictions based on comments or concerns from these entities.

As local communities update their comprehensive plans, they are required to acknowledge and plan for wastewater facilities in order to conform to the *2040 Water Resources Policy Plan.*

An Integrated Strategy for Water Resources

The quality and quantity of water in the region's lakes, rivers and streams sustain the health of wildlife habitat and ecosystems while enhancing the quality of life for the region's residents. Individual lakes and streams are important to their host communities, providing opportunities for swimming, boating and fishing and enhancing the livability of the community. In addition, the region's lakes, streams, and wetlands together form a system that discharges into the region's major rivers (Mississippi, Minnesota and St. Croix), which provide drinking water for the urban core, recreational uses, and barge transportation that support the region's economy and quality of life.

Plentiful, high-quality water is essential to achieving regional outcomes of stewardship, prosperity, equity, livability, and sustainability. The Council is committed to working with partners to protect, conserve, and utilize the surface and groundwater resources in the region.

Achieving this goal requires that we consider how our activities in the individual areas of water supply, surface water management, and wastewater management and operations can support or reinforce each other. For example, the Council will:

- Continue to implement our inflow and infiltration mitigation program, which preserves clear water, protects public health, and avoids pollution of our surface water.
- Support reliable water supply solutions that promote the wise use of water at the community level through conservation, reuse, and aquifer recharge.
- Promote treating stormwater on-site to support surface water needs while also allowing it to infiltrate into the groundwater.
- Pursue opportunities for reusing treated wastewater for non-potable uses, thus reducing the demand on our potable water supplies.

Thrive MSP 2040 Water Sustainability Direction:

The region's water resources are sustainable, supported by a regional strategy that balances growth and protection to improve and maintain the quality and quantity of water in our lakes, rivers, streams, wetlands and groundwater.

The Council will work with state, local and regional partners to provide for sustainable water resources through effective water supply, surface water, and wastewater planning and management.

In response to this direction and input from our partners and stakeholders, the following water sustainability goal has been developed.

Water Sustainability Goal:

To protect, conserve and utilize the region's groundwater and surface water in ways that protect public health, support economical growth and development, maintain habitat and ecosystem health, and provide for recreational opportunities, which are essential to our region's quality of life.

Working toward Sustainability using the Watershed Management Approach

Focusing on the natural characteristics and functions of watersheds provides an essential tool for managing water resources. The watershed approach to water management is the concept of holistically managing our waters based on natural hydrologic boundaries in a defined geographic area. The Council's activities supporting watershed assessment and management provide value by targeting efforts to protect the region's natural environment, protect and improve recreational opportunities, offset impacts of wastewater treatment plant discharges, and protect drinking water supplies.

The Metropolitan Surface Water Management Act, enacted in 1982, established comprehensive surface water management in the metro area, creating watershed management organizations and watershed districts with planning and management authorities.

Currently, there are 33 watershed management organizations that are required to prepare and implement watershed management plans to protect surface water resources in the seven-county metropolitan area. The organizations include watershed districts, watershed management organizations and county joint-powers organizations. These organizations use a holistic view and approach to managing the water resources and issues in their defined geographic areas. The watershed management programs required under the Metropolitan Surface Water Management Act are intended 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
- 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.

As part of the Metropolitan Surface Water Management Act, all communities in the metro area are required to prepare local water plans, often referred to as local surface water management plans or comprehensive water management plans in response to the watershed plans that they are part of. Minnesota Statutes requires local water plans to:

- Describe existing and proposed physical environment and land use
- Define drainage areas and the volumes, rates, and paths of stormwater runoff
- Identify areas and elevations for stormwater storage adequate to meet performance standards established in the watershed plan
- Define water quality and water quality protection methods adequate to meet performance standards established in the watershed plan
- Identify regulated areas

- Set forth an implementation program, including a description of official controls and, as appropriate, a capital improvement program.

Local water plans also need to be consistent with the requirements of Minnesota Rules Chapter 8410 and Council policy. Minnesota Rules Chapter 8410 is currently being updated by the Board of Water and Soil Resources (BWSR). Refer to the BWSR website at *www.bwsr.state.mn.us* for the most up-to-date version of plan requirements.

Oversight of stormwater runoff from urbanized areas also happens at the state level. The municipal separate storm sewer systems or MS4 permit program is mandated by federal law and administered by the Minnesota Pollution Control Agency. The primary goal of the MS4 permit program is to improve water quality by reducing the pollutants in stormwater that discharge into our lakes, wetlands, streams, and rivers. All local public entities including watersheds organizations, cities and townships that own or operate municipal separate storm sewer systems such as curbs, ditches, culverts, stormwater ponds, and storm sewer pipes are required to get a permit that focuses on preventing and reducing the impacts of stormwater runoff on our lakes, wetlands, streams, and rivers. This is in addition to local water plans that need to be prepared as part of the watershed management structure in Minnesota.

More recently, the State of Minnesota adopted a watershed approach that includes how, when and where the organizations monitor, assess data, establish implementation strategies and implement water quality activities. The state is preparing watershed-based restoration and protection strategies for defined hydrologically based areas throughout the state of Minnesota based on the watershed approach.

In the 2014 Impaired Waters list, there are over 630 lake, river and stream reach impairments in the metro area. The metro area impaired lakes, rivers and streams contribute to impairments outside the region -- Lake Pepin just downstream of the metro area was added to the impaired waters list for excessive amounts of nutrients which impacts recreational use and further downstream the Gulf of Mexico, once a great fishing resource, is now impaired for nutrients which contribute to the dead zone .

The Council also has responsibilities for surface water planning and assessment in the region. The Council is in a unique position, through its water resources monitoring and assessment work, comprehensive planning and watershed management planning review, and local water plan and watershed management plan technical assistance and guidance efforts, to provide a regional perspective on water issues that transcend community or watershed boundaries in the metro area. The Council works closely with state agency and local partners in using the "watershed approach" to water management in the metro area.

Policy on Watershed Approach:

The Council will work with our partners to develop and implement a regional watershed-based approach that addresses both watershed restoration (improving impaired waters) and protection (maintaining water quality in unimpaired waters).

Implementation Strategies:

- Work with the watershed management structure in the metro area on issues that transcend watershed organization boundaries in order to prepare water management

plans that promote the protection and restoration of local and regional water resources (lakes, rivers, streams, wetlands and groundwater).

- Through the review and comment process for comprehensive plans, local water plans, and watershed management plans, make water resources management a critical part of land use decisions, planning protocols and procedures to ensure these plans are making progress toward achieving state and regional goals for protection and restoration of water resources.
- Provide technical and financial assistance to local governments and other partners on water issues and water management activities.
- Facilitate discussions on regional water issues that transcend community or watershed organization boundaries.
- Provide technical information to watershed organizations on practices to use and incorporate into their plans that protect water quality for our water supply sources.
- Support educational efforts and partnership opportunities with agricultural communities in the region and outstate on watershed issues.

Working toward Sustainability of our Water Supplies

A sustainable water supply is vital for future economic growth while ensuring quality of life for the citizens of the region. A sustainable water supply means managing our resources in a way that ensures its availability for current and future generations, including sufficient high-quality groundwater and surface water resources to support the region's growing needs and unique, and intricate ecosystems.

With over half of the state's population, the region's water sources support a wide range of demands. While State statute defines the highest priority use for water as domestic (household) water supply, other uses are also critical for the region's economical growth and development. Sustainable water supply management must consider water demand for agricultural irrigation, industrial processes, power production and other uses along with domestic needs.

Public water supply is the largest consumptive use of water in the region, and it is the fastest growing. About 30% of public water supply demand is met by surface water; 70% by groundwater. This represents a shift from when most development occurred in and near the central cities and residents relied mostly on surface water. Reliance on wells increased as development began to occur further from the urban core. By the 1980s, groundwater use surpassed surface water use.

Although public water supply is over three-fourths of the region's water supply, other private users also need significant amounts of water. For example, industry and agriculture can use large amounts of water locally. The top industrial uses are petroleum processing, agricultural processing and industrial process cooling water. Although annual agricultural water use is not as high as industrial water use, summer seasonal use is very large, particularly in areas with sandy soils such as Dakota County.

Managing water sustainably requires thinking and action that is broader than community or even watershed boundaries; aquifers extend many miles across the metro area and are shared by thousands of individual users. For example, the Prairie du Chien Jordan aquifer is shared by 89

communities in the metro area to supply municipal water demand (Figure 2). Other communities also rely on that aquifer to supply private water demand.

Aquifers across the metro area are not all connected, though. Groundwater does not flow all the way from Anoka County to Dakota County and vice versa. The region can be roughly divided into six aquifer areas or subregions that have relatively similar aquifer characteristics. Considering groundwater through this subregional aquifer approach can help organize water supply plan planning and research – including the location, scope and timing of different activities. The Council has supported the development of subregional work groups that have focused on water supply limitations in those areas. Source water management strategies have been and continue to be the focus of these work groups.

As the permitting agency for water withdrawals, the Department of Natural Resources is a key partner for the Council. The Council and DNR work closely on water supply issues, including the development of the regional Master Water Supply Plan. The purpose of the region's Master Water Supply Plan is to provide communities in the region with planning assistance for water supply in a way that:

- Recognizes local control and responsibility for owning, maintaining and operating water supply systems.
- Is developed in cooperation and consultation with municipal water suppliers.
- Is approved by the Commissioner of the Department of Natural Resources.
- Protects critical habitat and water resources over the long term.
- Meets regional needs for reliable, secure water supply.
- Highlights the benefits of integrated planning for stormwater, wastewater and water supply.
- Emphasizes and supports conservation and interjurisdicational cooperation.
- Provides clear guidance by identifying key challenges/issues/considerations in the region and available approaches without dictating solutions.

Policy on Sustainable Water Supplies:

The Council will work with our partners to develop plans that meet regional needs for a reliable water supply that protects public health, critical habitat and water resources over the long-term, while recognizing local control and responsibility for owning, operating, and maintaining water supply systems.

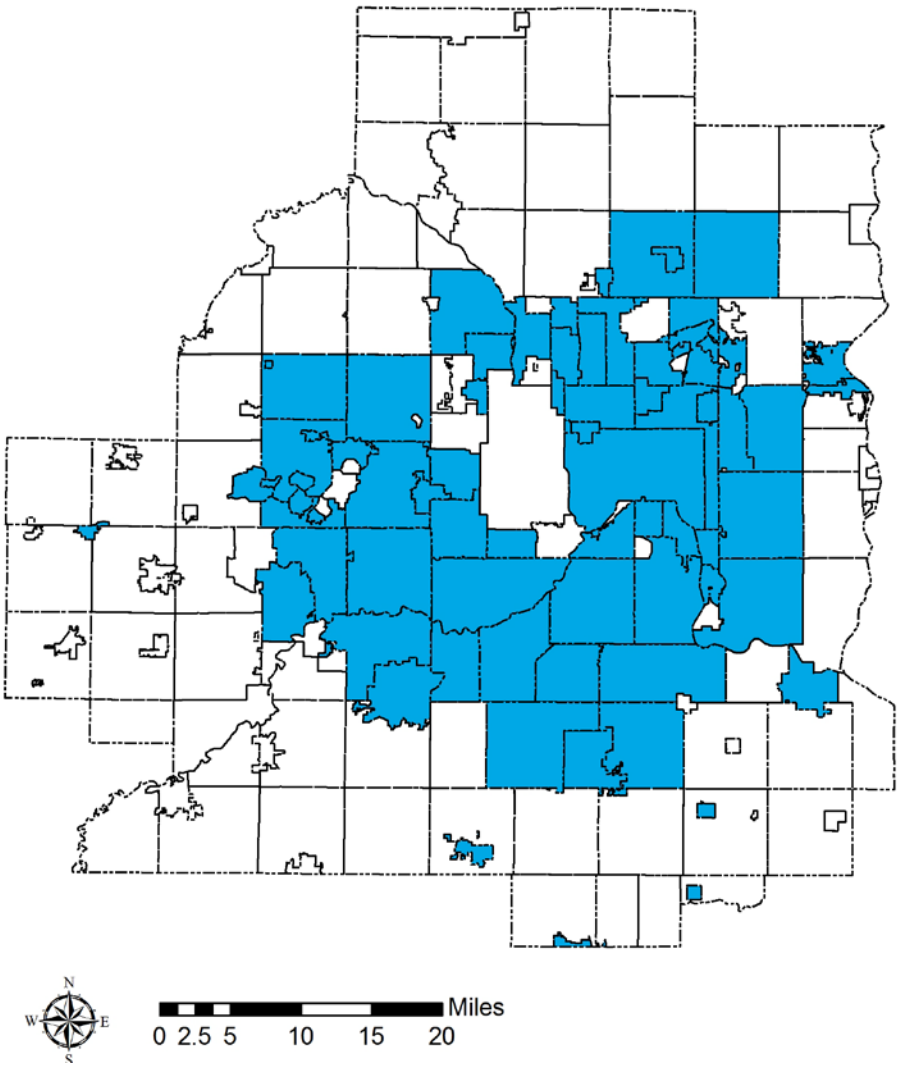
Implementation Strategies:

- Collaborate with state agencies, watershed organizations, and community water suppliers to update the regional Master Water Supply Plan.
- Support community efforts to improve water supply resiliency by cooperatively identifying economically and technically feasible water supply alternatives.
- Review and comment on local water supply plans as required by Minnesota Statutes.
- Review and comment on Groundwater Management Areas and water appropriation permits as requested by the DNR.
- Review and comment on wellhead protection and county groundwater plans as required by Minnesota Statutes.

- Facilitate discussions on water supply issues that transcend community boundaries, through subregional work groups and on an ad hoc basis as needed.

- Collaborate with partners to perform special studies as needed.

Figure 2. Communities with Municipal Water Supplies from the Prairie du Chien Jordan Aquifer



Assessment of Regional Water Resources

The region's water resources must be sustainable for current and future generations. Sustainable water resources means providing adequate sources of drinking water and other sources of water needed for industry and agriculture, promoting sustainable management and

operations of our wastewater treatment systems and providing for available and high quality water resources for fishing, swimming, and supporting our aquatic life and terrestrial habitat.

Thrive MSP 2040 includes accountability as its third principle to measure success in implementing our policies and strategies. Accountability requires a commitment to monitoring and evaluating the effectiveness of our programs and policies. In partnership with others in the region, we will assess and evaluate the quality of the region's water resources and work to maintain and improve these resources.

Some parts of the region expect to continue relying on groundwater as the main source of supply to meet future growth, while other areas lack ready access to productive aquifers to meet their water supply needs. Still others face the challenge of reconciling competing demands between using groundwater to supply their communities and protecting surface waters that rely on groundwater to maintain their integrity. Other concerns include aquifer contamination and the inevitability of occasional droughts. The region needs to evaluate all available water supply sources and, if feasible, minimize roadblocks to their use.

The Council plays a role in monitoring and assessing our surface water resources as well. In the metro area, the Council plays a huge role in collecting water quality and flow data needed to assess the condition of these valued resources in order to measure success in meeting our goal of water sustainability. The Council works closely with state agencies, communities, counties, watershed organizations, and others involved with monitoring water resources in the metro area to strategically design our program to fill gaps in monitoring and assessments needed related to the condition of our area lakes, rivers and streams. For example, in partnership with many others the Council monitors and assesses the condition of around 200 lakes a year and 21 stream sites. We work closely with state agencies on coordinating and filling gaps in monitoring and assessment activities for the major rivers. For that program, the Council monitors 22 river sites a year.

Achieving the goal of water sustainability in the region will require partnerships and actions from the many entities involved in water management, water supply and use, and implementation today. The Council is committed to providing monitoring and assessment information and other technical assistance. The Council is also committed to providing leadership in discussions, decisions and implementation actions needed for sustainable water. Together, we can build on the successes of the region to achieve our water sustainability goal.

Policy on Assessing and Protecting Regional Water Resources:

The Council will continue to assess the condition of the region's lakes, rivers, streams, and aquifers to evaluate impacts on regional water resources and measure success in achieving regional water goals.

Implementation Strategies:

- With our many partners, monitor the quality of regional lakes and rivers and quality and flow of regional streams.

- Work with our partners to fill gaps in assessments of lake, stream, river, and groundwater data.

- Assess and evaluate long-term water quality trends for the region's lakes, streams, and rivers and identify key issues to be addressed.

- Maintain a regional database that contains easily accessible water quality, quantity and other water related information collected as part of the Council's monitoring programs.

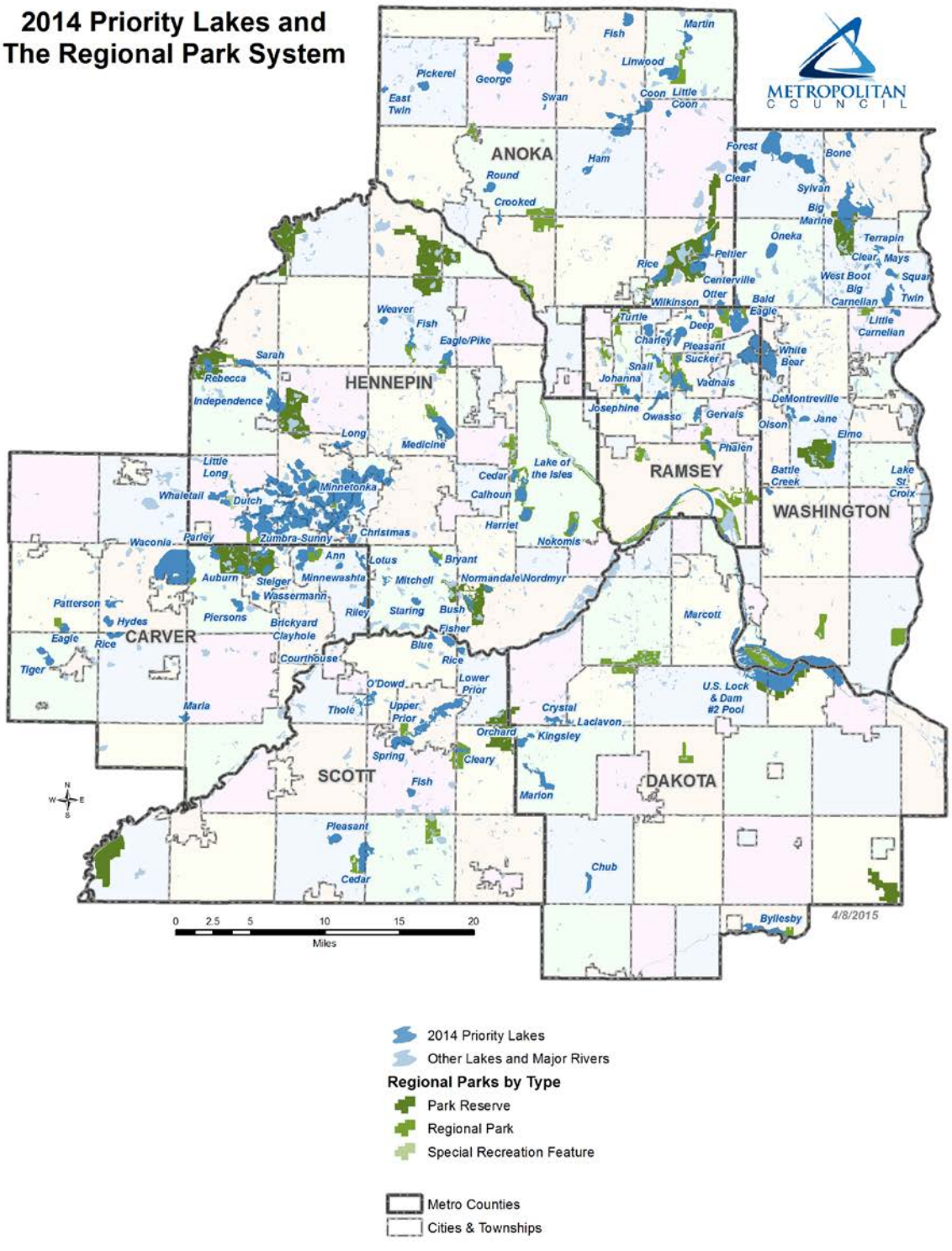
- In partnership with others, complete technical studies to understand regional and subregional long-term water supply availability and demand.

- Support community efforts to identify and evaluate the economic and technical feasibility of water supply approaches and best practices that increase water conservation, enhance groundwater recharge, and make the best use of groundwater, surface water, reclaimed wastewater, and stormwater.

- Convene stakeholders and collaborate with partners to identify water quality improvement implementation paths.

The Council's Citizen Assisted Monitoring Program (CAMP) was set up to allow us to monitor the 950 lakes in the metro area. Monitoring is done in partnership with others so that we can assess lake water quality over time. Given the large number of lakes in the area, the Council uses the data we collect from the CAMP program to create and update our Priority Lake List (Figure 3). The Priority Lake List helps us and our partners to focus our resources.

Figure 3. Priority Lakes and the Metropolitan Parks and Open Space System



Water Conservation and Reuse

Sustainable and plentiful high quality water resources provides a firm foundation for the region's future economic growth and prosperity, livability and high quality of life as long as we are good stewards and use our resources wisely. A growing economy that creates and provides jobs for the citizens of the region, a good transportation system that fairly and equitably links citizens with job opportunities and affordable housing, sustainable natural and water resources that provide for recreational opportunities and that support a high quality of life are all part of the region that the Council strives to foster and maintain.

The overall theme of this Policy Plan is to move toward more sustainable water systems through integration of our roles in wastewater, water supply, and surface water planning, management and operation. On a Council level, integration means leading by example and working across Council divisions to promote water sustainability. In MCES, integration means that the Council will continue to provide high quality, affordable wastewater collection and treatment services in support of new development and redevelopment in a manner that protects our valued water resources for the long-term.

For example, the Council will look toward ways to increase our water supply from groundwater resources through the reuse of wastewater in order to provide for recharge to our groundwater system, through our inflow and infiltration mitigation program which preserves clear water and avoids pollution of our surface water, by investigating the potential for water conservation or increasing use of surface water resources to offset demands being placed on the groundwater system, by promoting low impact development practices as a means for stormwater runoff management that has the added benefit of increasing recharge to our groundwater.

The source of nearly all water in the metro area's aquifers is from infiltrated precipitation. The amount of direct precipitation that is able to infiltrate from the land surface area and move below the root zone is the maximum amount of water available to recharge the underlying aquifers. This amount is dependent upon the rate and duration of precipitation, the soil type and land cover, land use, topography, and evapotranspiration (water evaporated from soil surfaces and transpired by plants into the atmosphere). The portion of infiltration that moves from the unsaturated sediment below the root zone into the underlying aquifers (saturated zone) is considered aquifer recharge.

Infiltration is similar, but considered different, than groundwater recharge. The most important distinction between infiltration and groundwater recharge is the time lag between infiltration of water past the root zone and recharge at the water table.

As part of the expansion of the Council's Empire Wastewater Treatment Plant in 2004-2007, the Council added a number of low impact development practices including a green (vegetated) roof on the reverse activated sludge building, two large stormwater infiltration basins within the plant area, a raingarden at the plant entrance, vegetated swales, a prairie plant garden, and five permeable paver parking areas to reduce the stormwater impacts on the site and ultimately to the Vermillion River, a DNR designated Trout stream.

Policy on Water Conservation and Reuse:

The Council will work with our partners to identify emerging issues and challenges for the region as we work together on solutions that include the use of water conservation, wastewater and

stormwater reuse, and low impact development practices in order to promote a more sustainable region.

Implementation Strategies:

- In partnership with others, research and promote low impact development, land use practices, agriculatural best practices, and cooperative water use practices that minimize impacts on aquifers and maximize groundwater recharge, where practical.
- Provide research and guidance on best management practices to use for effective surface water management.
- Install and monitor innovative nonpoint source pollution reduction practices at Council facilities and support economically feasible projects that demonstrate new technologies and their effectiveness.
- Promote and support water conservation measures, including education, outreach and tool development.
- Investigate reusing treated wastewater to supplement groundwater and surface water as sources of water to support regional growth, and when cost-effective, implement reuse.

Planning for Regional Growth

The Council is responsible for providing direction on the planning for and management of our water resources in support of the orderly and economical growth and development of the region while taking into consideration the interrelationships of land use, growth patterns, transportation, water resources protection, and other regional services. With a growing population, more business and industry, and a changing environment, the long-range outlook for clean water is challenging. Adequate access to high quality water supplies, proper treatment and disposal of stormwater, and sustainable wastewater treatment options all need to be considered as we plan for growth in the region.

Serving the Urban Area

The Council's wastewater system, built and modified to serve regional growth and development, currently provides wastewater collection and treatment services to over 2.5 million people in 108 communities. The current system consists of seven wastewater treatment plants (Metropolitan, Empire, Seneca, St. Croix Valley, Eagles Point, Blue Lake, and Hastings) and one wastewater reclamation facility (East Bethel).

The Council's updated wastewater system plan for the seven-county metro area includes a specific plan identifying how wastewater services will be provided to serve the region's projected 2040 growth, and a general plan to serve the region's growth well beyond 2040. Appendix F includes the long-term service area map for wastewater treatment plants owned and operated by the Council.

To ensure adequate wastewater treatment plant capacity and high quality water resources that support ecosystem health, water supply needs and recreational uses, it is critical that regional planning occur in partnership with the cities, townships, watershed organizations, state agencies and other interested parties.

Communities in the metro area are required to prepare comprehensive plans consistent with Council policy. The comprehensive plans have three chapters that take direction and guidance

from the *Water Resources Policy Plan*: the comprehensive sewer plan, the local surface water management plan, and the local water supply plan.

Policy on Serving the Urban Area:

The Council will plan for sustainable water resources that protect public health, provide recreational opportunities, maintain habitat and ecosystem health and ensure that supplies of potable water are sufficient for the orderly and economical development and redevelopment of the metro area long into the future. A community's comprehensive plan is expected to accommodate the forecasts and to meet the densities specified in the Council's *Thrive MSP 2040* plan.

A community's comprehensive plan must include:

- A water supply plan that is informed by the Twin Cities metro area Master Water Supply Plan and meets the Department of Natural Resources plan requirements.
- A local surface water management plan that is consistent with Minnesota Rules Chapter 8410 and Council policy and does not adversely impact the regional wastewater system, and
- A comprehensive sewer plan that is consistent with the regional wastewater system plan.

Inconsistencies between the local plans and the Council's plans may result in the Council's finding that the community's plan is more likely than not to have a substantial impact on, or contain a substantial departure from, the metropolitan system plan, thus requiring modifications to the local comprehensive plan.

Implementation Strategies:

- Provide a level of wastewater service commensurate with the needs of the growing metro area, and in an environmentally sound manner.
- Provide sufficient capacity in the wastewater system to meet the growth projections and long-term service area needs identified in approved local comprehensive sewer plans.
- Stage wastewater system improvements, when feasible, to reduce the financial risks associated with inherent uncertainty in growth forecasts.
- Potentially implement early land acquisition and work closely with communities to preserve utility corridors when it is necessary to expand its facilities or locate new facilities needed to implement the wastewater system plan.
- Efficiently use existing sewer investments in developing and redeveloping areas.
- Preserve unsewered areas inside the Long-Term Wastewater Service Area for future development that can be sewered economically.
- Extend wastewater service to suburban communities if the service area contains at least 1,000 developable acres.
- Require that all communities currently served by the regional wastewater system remain in the system.

- Acquire wastewater treatment plants from suburban communities outside the current service area, based upon request through the comprehensive plan and comprehensive sewer plan process, after soliciting customer input and conducting a public hearing on the request.

Serving the Rural Area

Where rural centers are willing to expand to accommodate the increased growth as forecasted by the Council, they may want to have the Council involved in the possible acquisition, operation and improvement of the wastewater treatment plant located in that community.

Policy on Serving the Rural Area:

The Council will acquire wastewater treatment plants owned by Rural Centers, based upon request through the comprehensive plan and comprehensive sewer plan processes, and based upon criteria that ensures direct identifiable regional benefits after soliciting customer input and conducting a public hearing on the request.

Implementation Strategies:

- Accept the wastewater service request only when the following criteria are met:
  - The community accepts the Council's growth forecasts, as well as preserves at least 1,000 developed or developable acres for growth through the land use planning authority of the county or adjacent township(s) or through an orderly annexation agreement or similar mechanism to provide for staged, orderly growth in the surrounding area.
  - The community has a DNR approved water supply plan.
  - The community has adequate transportation access.
  - The community lies within the long-term wastewater service area or other regional benefits would result, such as economic development unique to the rural area or preservation of high-value water resources.
  - There are feasible and economical options for siting and permitting an expanded wastewater treatment plant, or for extending interceptor service.
  - The Council has sought customer input, has conducted appropriate financial analysis, and has conducted a public hearing on the community's wastewater service request.
- The Council will convene a work group of urban customer representatives to advise the Council regarding growth forecast uncertainty, transportation to support the growth forecast, and the identifiable regional benefits.
- Require that, if the most economical and beneficial wastewater service option is to construct a regional interceptor to serve the community, the Council will not acquire the community's wastewater treatment plant, and the community will be responsible for decommissioning its treatment plant.
- Not allow connections to the regional wastewater system outside the sewered rural community. The Council may construct capacity to serve the long-term needs of the rural and agricultural planning areas, but will not provide service until the Council, in consultation with the appropriate community, designates the area as a developing community and the community amends its comprehensive plan accordingly.

- Preserve areas outside the Long-Term Wastewater Service Area for agricultural and rural uses, while protecting significant natural resources, supporting groundwater recharge, protecting source water quality, and allowing limited unsewered development.

Use of Private Wastewater Systems

There are more than 75,000 subsurface sewage treatment systems and many more community systems in the metro area. Cities and townships located within the rural area have allowed higher density development using community systems that are permitted by the Minnesota Pollution Control Agency. Both individual and community systems largely serve the parts of the region where wastewater collection and treatment is not available.

Policy on Private Wastewater Systems:

Communities that permit the construction and operation of subsurface sewage treatment systems and other private wastewater treatment systems within their communities are responsible for ensuring that these systems are installed, maintained, managed, and regulated consistent with Minnesota Pollution Control Agency rules. The Council will not provide financial support to assist communities if these systems fail.

Implementation Strategies:

- The Council,through the local comprehensive planning process, requires that communities submit copies of their subsurface sewage treatment systems ordinance and information on their management programs for these systems.
- The Council will continue to support State rules for subsurface sewage treatment systems and other private wastewater systems.
- The Council will allow a community to connect a failing subsurface sewage treatment system or other private wastewater treatment system to the regional wastewater system at the community's expense.

Investment

Beginning in early 2000, the Council began a major project to reduce phosphorus outputs from our wastewater treatment facilities. Excessive phosphorus causes algal blooms and causes nutrient problems in lakes that negatively affect the ecosystem health and limit recreational opportunities on our lakes and rivers. The Council has installed new technology at the wastewater treatment plants that allows them to capture and remove significant amounts of phosphorus before it enters the rivers (Figure 4).

Pollution prevention is a key component to the Council's success in reducing adverse impacts on the region's water resources. Pollution prevention programs, such as the mercury reduction program jointly implemented with the Council and area dentists, have reduced the amount of mercury entering MCES wastewater treatment plants by half, thus reducing MCES emissions to rivers, the atmosphere, biosolids, and incinerator ash. The Council's permitting program for industrial waste discharges also reduces loadings of other metals and toxic chemicals, and has contributed to our success in improving water quality in the region.

Even with all of the hard work done to protect the region's water resources, some pollutants still make their way to area lakes, rivers, streams, wetlands and groundwater systems from both point and nonpoint sources. Point sources of pollution have identifiable points of entry into the water such as a discharge from a pipe from a wastewater treatment plant or manufacturing

plant. Nonpoint sources of pollution are more diffuse and generally come from land areas that contribute pollutants when rain runs over the land or snow melts and washes away the pollutants. Nonpoint sources of pollution often pick up contaminants such as fertilizers from lawns and pesticides from farmland, eroded soil from stream and river banks or gas and oil from parking lots. Appendix B includes a list of common nonpoint source pollutants.

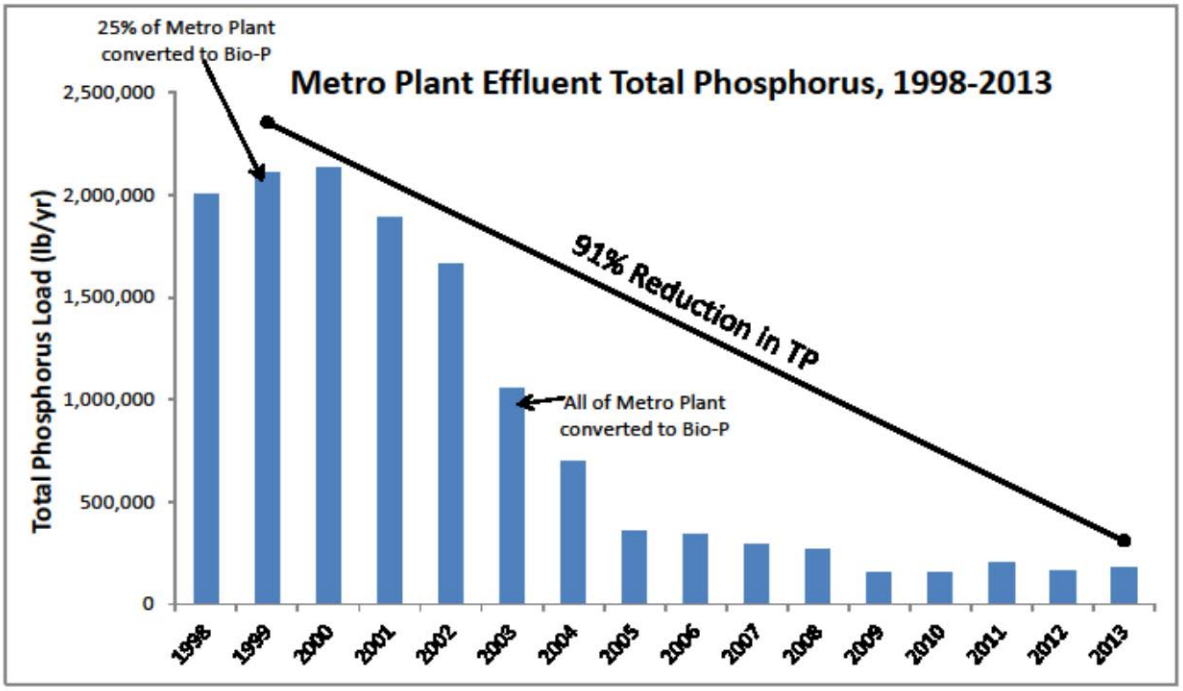
The Council has made significant progress in reducing our contribution from our wastewater treatment plants given the technology we have today to reduce the pollutants of concern. Cities have come a long way with reducing nonpoint sources of pollution by using best management practices and low impact development practices to treat runoff from smaller urban sites and the new Agriculture Certification Program aims to reduce pollutants from farm fields but there is still more that can be done in this area.

Our goal with this Policy Plan is to look more broadly at opportunities and unintended consequences throughout the water cycle and across the region before making costly investments. In this way, the Council will identify the most valuable combination of actions. For example, the Council will investigate whether or not we can more efficiently and effectively reduce nonpoint source pollution instead of or to offset making costly upgrades to our wastewater treatment plants.

The Investment Policy sets the stage for continuing to move forward in our infrastructure investments by balancing costs and benefits as we make decisions on the need to spend more on costly wastewater infrastructure improvements or offsetting some of those improvements by addressing nonpoint sources of pollution. In addition, regionally, it is very important to identify how communities could gain some economic and water resource efficiencies by sharing source, treatment and/or storage facilities. In collaboration with local and state partners, the Council will provide recommendations for the ongoing and long-term funding of capital investments. The Council is committed to work with our partners to develop strategies and criteria for funding regionally beneficial water supply infrastructure projects.

The Cities of Burnsville and Savage have partnered to share a new water supply source – treated surface water from the Kraemer Quarry. The resulting reductions in municipal groundwater pumping have reduced stress on the state-protected Savage Fen.

Figure 4. Metropolitan Plant Effluent Total Phosphorus, 1998-2013



Investment Policy:

The Council will strive to maximize regional benefits from regional investments.

Implementation Strategies:

- Invest in nonpoint-source pollution control when the cost and long-term benefits are favorable compared to further upgrading wastewater treatment.
- Consider pollutant trading or off-set opportunities with nonpoint-sources of pollution when cost-effective and environmentally beneficial.
- Invest in wastewater reuse when justified by the benefits for supplementing groundwater and surface water as sources of water to support regional growth, and by the benefits for maintaining water quality.
- Potentially invest strategically to further the effectiveness of the region's nonpoint-source pollution prevention and control program and to ensure efficient investment to achieve regional water quality objectives.

- Support cost-effective investments in water supply infrastructure to promote sustainable use and protect the region's water supplies by:
    - Developing criteria to identify water supply projects with regional benefit.
    - Promoting equitable cost-sharing structure(s) for regionally-beneficial water supply development projects.
    - Supporting cost-benefit analyses of alternative water supply options.
    - Identifying funding mechanisms for regionally-beneficial water supply development projects.

Wastewater Services

Sustainability

The Council owns and operates eight wastewater treatment plants, which process over 250 million gallons of wastewater each day. The Council works cooperatively with communities, regulatory agencies, and citizens of the region to help ensure that costly infrastructure can be efficiently built and operated in a sustainable manner.

Wastewater Sustainability Policy:

The Council will provide efficient, high-quality, and environmentally sustainable regional wastewater infrastructure and services.

The Council shall conduct its regional wastewater system operations in a sustainable manner as is economically feasible. Sustainable operations relates not only to water resources but also to increasing energy efficiency and using renewable energy sources, reducing air pollutant emissions, and reducing, reusing, and recycling solid wastes.

Implementation Strategies:

- Implement and enforce Waste Discharge Rules for the regional wastewater system.
- Preserve regional wastewater system assets of the Council through effective maintenance, condition and capacity assessment, and capital investment.
- Accept septage, biosolids, leachate, and other hauled liquid waste at designated sites, provided that the waste can be efficiently and effectively processed.
- Reuse treated wastewater to meet water needs within Council wastewater treatment facilities where economically feasible.
- Provide industries with incentives to pretreat wastewater to reduce its strength and thus provide the most environmental and economical benefit for the region.
- Generate energy from biosolids processing, utilize energy efficient processes and equipment, and reduce building energy use.
- Pursue other renewable energy sources, such as solar power generation, thermal energy recovery, and new technologies – such as fuel cells − as they become proven and economical.
- Stabilize and reduce the volume of biosolids through thermal processing or anaerobic digestion, and utilize the remaining solids as fertilizer and soil conditioner.

- Improve sustainability of wastewater operations, when economically feasible.

Inflow and Infiltration

Inflow and infiltration are the ways that clear water makes its way into sanitary sewer pipes, potentially causing basement backups and taking up capacity in sewers and wastewater treatment plants.

With inflow, clear water enters the wastewater system through rain leaders, storm sewer cross connections, sump pumps or foundation drains that are connected to sewer lines. Private service laterals can also be a source of inflow. Factors that contribute to their susceptibility include; age, condition, pipe material, construction, soils, and water table elevation.

In the case of infiltration, groundwater seeps into cracked or broken wastewater pipes. Infiltration is a steady contributor to the problem, causing water that should be filtering down and recharging the region's aquifers to end up in rivers and flow out of Minnesota.

The addition of clear water into the local sewer systems creates multiple problems. First, the additional flow takes capacity that was built to accommodate existing flow and new development and, in some cases, the additional flow exceeds the available sewer system capacity. When the capacity of the sewer is exceeded, the wastewater backs up into basements or spills out of a manhole causing water quality concerns. Second, the clear water that gets into the wastewater system is eventually treated and discharged into the rivers, hence lost to Minnesota. Moreover, the Council charges communities the same rate for its clear water as it does for sewage. Therefore, communities have a fiscal as well as a public policy reason for ensuring that the total system functions effectively and conforms to regulations.

Minneapolis, St. Paul, and South St. Paul are communities originally constructed with combined (storm and sanitary) sewer systems. Because of this, these communities continue to face additional challenges in eliminating sources of inflow in addition to the risk of an overflow to the Mississippi River.

Inflow is the biggest problem because during major rain events it quickly consumes pipe capacity needed for current capacity and future growth. A sump pump can add 7,200 gallons of clear water to the wastewater system in 24 hours, the equivalent of the normal daily flow from 40 homes. In more extreme rain events, inflow can cause sewer backups into homes and businesses.

Policy on Inflow and Infiltration:

The Council will not provide additional capacity within its interceptor system to serve excessive inflow and infiltration.

The Council will establish inflow and infiltration goals for all communities discharging wastewater to the regional wastewater system. Communities that have excessive inflow and

infiltration in their sanitary sewer systems will be required to eliminate the excessive inflow and infiltration within a reasonable time period.

Implementation Strategies:

- Maintain and rehabilitate Council interceptors to minimize inflow and infiltration.
- Develop inflow and infiltration goals for all communities served by the regional wastewater system.
- Require all communities served by the regional wastewater system to include its inflow and infiltration mitigation program in its comprehensive sewer plan, including a program to mitigate sources of inflow and infiltration from private property.
- Limit expansion of service within those communities where excessive inflow and infiltration jeopardizes the Council's ability to convey wastewater without an overflow or backup occurring, or limits the capacity in the system to the point where the Council can no longer provide additional wastewater services. The Council will work with those communities on a case-by-case basis, based on the applicable regulatory requirements.
- Potentially institute a wastewater rate demand charge for those communities that have not met their inflow and infiltration goal(s), if the community has not been implementing an effective inflow and infiltration reduction program as determined by the Council, or if regulations and/or regulatory permits require Council action to ensure regulatory compliance.

  The wastewater demand charge will include the cost of wastewater storage facilities and/or other improvements necessary to avoid overloading Council conveyance and treatment facilities, and the appropriate charges for use of capacity beyond the allowable amount of inflow and infiltration.
- Work with the State to attempt to (1) make funds available for inflow and infiltration mitigation, and (2) promote statutes, rules, and regulations to encourage I/I mitigation.
- Develop a program to assist communities with reducing inflow and infiltration from private property sources.

Finance

The Council uses a regional approach to setting municipal wastewater and industrial rates to optimize equity of costs across the region and support economic development. The Council's approach to rate design is based on a regional cost-of-service philosophy. Communities pay for the wastewater flow originating within their borders. New users pay for the capacity they demand through a sewer availability charge (SAC). Industries pay for the cost of treating their higher-strength discharges through a strength charge. Haulers pay for wastewater loads based on the cost of receiving and treating the loads. In other words, users are charged for the costs that the Council incurs to provide the specific services used.

Material changes proposed to SAC or other fees, that may not be improvements to the cost of service basis, will be subject to a stakeholder process, a public hearing, and at least 3 months notice before implementation, including but not limited to the establishment of a task force or work group to make recommendation(s) to the Council. The Council will have final approval of any and all recommendations.

Wastewater System Finance Policy:

The Council will continue to implement regional wastewater service fees and charges based on regional cost of services and rules adopted by the Council.

Implementation Strategies:

- Metropolitan wastewater charges will be allocated among local government units based on volume of wastewater treated.
- Industrial wastewater strength charges will be based on actual or average discharge strength above domestic wastewater strength.
- Load charges for septage, portable-toilet waste, holding-tank wastewater and out-of-region wastes will be uniform for each type of load, and based on the volume of the load, the average strength of the types of loads, and the costs of receiving facilities.
- Sewer availability charges (SAC) will be uniform within the urban area based on capacity demand classes of customers and the SAC Procedure Manual. Sewer availability charges for a rural center will be based on the reserve capacity and debt service of facilities specific to the rural center.
- Other fees recovering costs of specific services may be imposed, as approved by the Council.
- Cost-sharing between the Council and a local governmental unit may be used when construction of regional wastewater facilities provides additional local benefits for an incremental increase in costs.
- Facilities that are no longer a necessary part of the regional wastewater system will be conveyed to the benefiting local governmental unit, or will be abandoned or sold, pursuant to related statutes.
- Seek customer input prior to, and give at least three months notice of, any material changes in the design of charges.
- Continue efforts to work to simplify and improve SAC and to communicate to customers.

Wastewater System Plan

Existing Facilities

Regional Wastewater Conveyance and Treatment System

The Metropolitan Council provides wastewater collection and treatment services to 2.5 million people in 108 communities, which represents about 95% of the seven-county metropolitan area's population. The regional wastewater system includes eight wastewater treatment plants, 60 pump stations, and 610 miles of regional interceptors that convey flow from approximately 5,000 miles of local sewers to these treatment plants.

The system treats approximately 250 million gallons per day of wastewater from homes, industries, and businesses. The long-term service area map (Appendix F) shows the location of all metropolitan interceptor sewers and wastewater treatment plants in the metro area. Table 1 presents information about the treatment plants.

The Council works with more than 800 industrial clients to substantially reduce the amount of pollution entering the wastewater collection system. The Council also accepts septage from private subsurface sewage treatment systems, community and/or cluster systems, biosolids from municipal wastewater plants, and leachate from landfills throughout Minnesota, and other hauled industrial wastewater. Waste haulers pay for the cost of service through various wastewater fees established by the Council.

Table 1. Regional System Wastewater Treatment Plants

Treatment Plant	Avg. Design Flow (mgd)	Location	Receiving Water	Liquid Treatment	Solids Processing
Blue Lake	32	Shakopee	Minnesota River	NH_3, P	AD, Drying, Land
Eagles Point	10	Cottage Grove	Mississippi River	NH_3, P	To Metro
East Bethel	0.4	East Bethel	Groundwater	TN, P	To Metro
Empire	24	Empire	Mississippi River	NH_3, P	AD, Land
Hastings	2.3	Hastings	Mississippi River	Secondary	To Metro
Metropolitan	251	St. Paul	Mississippi River	NH_3, P	Inc./Energy
St. Croix Valley	4.5	Oak Park Hts.	St. Croix River	P	To Metro
Seneca	34	Eagan	Minnesota River	NH_3, P	Inc.
Total	358				

Notes: NH3 = ammonia removal
P = phosphorus removal
TN = total nitrogen removal
AD = anaerobic digestion
Land = application to agricultural land
Inc. = incineration
Energy = energy recovery as steam and electricity for in-plant use
Secondary = biological treatment to remove organics and suspended solids (used by all plants at a minimum)

There are approximately 200 metering stations used to measure wastewater flow from the communities served by the Council. The flow meters are regularly calibrated and maintained to provide accurate measurements of wastewater flow rates and volumes from each community.

Wastewater volume is used to allocate the primary wastewater service charges among the communities served.

Table 2. Municipal Wastewater Treatment Plants

Treatment Plant	Design Capacity, gpd (1) Avg. Wet Weather	Design Capacity, gpd (1) Avg. Dry Weather	Receiving Water	Effluent Limits (2)
Belle Plaine	840,000	400,000	Minnesota River	B, P. S
Bethel	37,500	31,000	Groundwater	B, S
Cologne	325,000	260,000(4)	Ditch to Lake Benton	B, P, S
Greenfield	100,000	80,000(4)	Crow River	B, P, S
Hamburg	63,000	50,400(4)	Ditch to Bevens Creek (to Minnesota)	B, S
Hampton	101,000	80,800	Ditch to Vermillion River	B, S
Jordan	1,289,000	580,000	Sand Creek (to Minnesota)	B, N, P, S
Loretto	61,000	48,800(4)	Slough to Spurzem Creek	B, P, S
Mayer (3)	435,000	320,000	Crow River	B, N, P, S
New Germany	52,000	41,600(4)	Crow River	B, S
Norwood-Young America	908,000	517,000	Ditch to Bevens Creek (to Minnesota)	B, S
Rogers	1,602,000	1,103,000	Ditch to Crow River	B, P, S
St. Francis	540,000	432,000(4)	Groundwater	B, N, P, S
Vermillion	54,000	43,200(4)	Ditch to Vermillion River	B, S
Watertown	1,200,000	800,000	Crow River	B, N, S

Notes:
1. Flow as stated in NPDES permits, except as described in note 4
2. Effluent Limits:
   B = Biochemical Oxygen Demand
   N = Ammonia Nitrogen
   P = Phosphorus
   S = Suspended Solids
3. Expansion proposed
4. Average flow estimated, based on maximum month flow times 0.8

Non-Council Wastewater Treatment Plants

There are 15 wastewater treatment plants in the metro area that are municipally owned and operated (See Table 2). The Council plans to provide regional service as follows:

1. Rogers is a suburban community which owns and operates its own wastewater treatment plant. It is expected that Rogers will request that the Council acquire its wastewater treatment plant as the City continues to grow.

2. Loretto will be served by the Blue Lake Plant via the Maple Plain Interceptor by 2020, based on state regulatory requirements, for example elimination of their discharge as part of implementing the Total Maximum Daily Load for Lake Independence.
3. The Council has a wastewater treatment plant acquisition agreement with the City of New Germany.

Long-Term Wastewater Service Area

Concept Plan

The wastewater system plan includes a specific plan to serve the region's projected 2040 growth and a general plan to serve the region's growth far beyond 2040. The wastewater system plan has a longer planning horizon than local comprehensive plans because sewers have a long useful life.

The Council is updating the Twin Cities metro area Master Water Supply Plan to address the sustainability of water supply in the region, and has identified areas where groundwater aquifers may not have sufficient capacity to support long-term sewered development. The Regional Wastewater System Plan's long-term wastewater service area (Appendix F) is premised on successful development and implementation of sustainable water supply to support planned sewered development. The Council defines the long-term wastewater service areas based on:

- The capacity of each treatment plant site,
- The potential developable surface area that could be served by the plant, in addition to currently served areas, and
- Using appropriate wastewater generation rates based on location, proximity to transit and major highways, and physical features of area.

The developable area excludes lakes, rivers, wetlands, steep slopes, major highways, and parks. The area effectively available for future development is further reduced in areas where there are other significant natural resources or locations requiring more areas devoted to stormwater management, such as trout stream watersheds and/or tight soils (making infiltration of stormwater more difficult).

For long-term wastewater service areas, communities shall address the staging of sewered development through 2040 as well as protection of the remaining long-term service areas for economical future sewered development in their local comprehensive plan updates, surface water management plans, and water supply plans. The regional wastewater system will be expanded as necessary to facilitate development in communities consistent with their approved comprehensive sewer plans.

The long-term wastewater service area includes large "potential wastewater service areas" in Dakota and Scott Counties. The objective of this designation is to ensure low enough development density to enable future economical sewered development and preserve land for continued agricultural uses. In Carver County, the Council and the County have a memorandum of understanding whereby the County preserves low density in its agricultural area, consistent with the region's potential need for additional area for sewered development.

Long-Term Service Area of Existing Treatment Plants

Blue Lake. Previously wastewater service to Loretto, northwest Medina, and southwest Corcoran was planned through the Elm Creek Interceptor. The revised plan is to serve this area from the Blue Lake Plant via Maple Plain and the downstream interceptor system.

Metropolitan. Three areas (northeast Andover, southeast Nowthen, and northeast Ramsey) have previously been identified as study areas for potential future wastewater service. These areas can be served by the regional wastewater system. However, redevelopment of areas in closer proximity to transit and major highways within the Metropolitan Plant's service area has lower cost and much higher potential for wastewater generation that will utilize the plant and interceptor system's long-term capacity. Consequently, the above study areas have been omitted from the long-term wastewater service area to reserve capacity for those areas that are redeveloping.

Eastern Hugo, which has previously been identified as a study area for potential future wastewater services, has also been omitted from the long-term wastewater service area. Studies are under way to determine the relationships among groundwater withdrawal for municipal water supply, groundwater recharge, and lake levels and then to develop a water sustainability plan for the northeast part of the region.

St. Croix Valley. Previously, the wastewater system plan assumed a future plant expansion. The current regulatory trends indicate the likelihood of much more stringent future discharge permit limits. The additional facilities to meet these limits are likely to fully utilize the remaining capacity at this plant site. Consequently, no plant expansion is planned. A modest service area increase of approximately 1,000 acres should be adequate to utilize the remaining capacity. Given their proximity to Hwys. 36 and 5 and to adjacent sewered development, portions of Baytown and Grant are most viable potential long-term service area additions to the existing service area.

Potential Future Wastewater Treatment Plants

To support long-term sewered development of the region, five new wastewater treatment plants are envisioned in the northwest, northeast, southeast, and southwest areas. These areas also face water supply challenges due to the absence of the Prairie du Chien Jordan aquifer or demand that may cause excessive aquifer drawdown. Consequently, new wastewater treatment plants are proposed to be wastewater reclamation plants that produce treated water that is suitable for non-potable uses, such as toilet flushing and irrigation, which will reduce the water demand on the groundwater aquifers. In the northeast area, groundwater recharge with treated wastewater also appears feasible.

Crow River. The Council and the City of Rogers have been working to locate a new wastewater reclamation plant in western Rogers. This plant will eventually serve Rogers, eastern Corcoran, and western Dayton, and provide long-term capacity relief for the Elm Creek Interceptor.

Carver County. The potential wastewater generation for the long-term service area of the Blue Lake Plant could exceed the build-out capacity of the plant site sometime after 2040. One option to address this possibility is a service area revision that diverts wastewater from western communities to a new regional wastewater reclamation plant in Carver County. This new plant

should be located so that it could serve development along the corridor between Chaska and Cologne.

Scott County. The Scott County 2030 comprehensive plan, prepared in coordination with the regional wastewater system plan, designates portions of western Scott County for potential long-term sewered development. This area will be served by a future regional wastewater reclamation plant located in the Louisville Township area. This plant also could provide capacity relief for the Blue Lake Plant.

Northeast Area. The long-term northeast wastewater service area has the potential to generate wastewater flows that slightly exceed the capacity of the interceptors serving this area. Rather than constructing an extensive capacity relief interceptor system, a potentially feasible alternative is to construct a wastewater reclamation plant with groundwater recharge and wastewater reuse.

Hastings. A new Hastings Plant is planned to replace the existing plant located near downtown. The new plant will be expandable, with a long-term service area that includes portions of Marshan, Nininger, and Vermillion townships. The plant site has been acquired.

Table 3. Planned Wastewater Treatment Plant Capacity (million gallons per day)

Plant	Current Capacity	Current Flow (2010-2014 Average)	Planned Capacity 2040	Planned Capacity Long-Term
Blue Lake	32	26	40	50
Carver County	-	-	-	10
Crow River	-	-	3	6
Eagles Point	10	4.4	10	20
East Bethel	0.4	new	0.8	2
Empire	24	10	24	50
Hastings	2.3	1.5	4	10
Metropolitan	251	178	251	280
New Germany	-	-	0.1	0.2
Northeast	-	-	3	3
Seneca	34	24	34	40
St. Croix Valley	4.5	3.0	4.5	4.5
Scott County	-	-	-	25
Total	358	247	372	500
Service Population	-	2,500,000	3,400,000	6,000,000

Table 3 summarizes the planned capacity of the regional wastewater treatment plants.

Capital Improvement Program

Wastewater Flow Projections

Sewered population and employment forecasts, and the associated average wastewater flow projections, are shown in Tables 4 and 5 by wastewater treatment plant service area. (Forecasts and projections by community are found in Appendices A-3 and A-4). Wastewater flow projections are based on 60 gallons per day (gpd) per person and 15 gpd per employee from new development, and gradual reduction of wastewater flow from existing development, which reflects water conservation and reduction of inflow and infiltration.

Sanitary sewers are designed to handle daily and seasonal variations in generated wastewater flow. The Appendix also presents wastewater flow variation factors, which increase as average flow decreases. Appendix A-1 presents flow variation factors for sewer design. These factors reflect that sanitary sewers (local and regional) have been designed for average residential, commercial, and industrial flow of 100 gallons per capita per day. Currently actual average flow is approximately 85 gallons per capita per day. To establish infiltration and inflow mitigation goals, the design flow variation factors have been adjusted upward (divided by 0.85), which reflects available capacity for infiltration and inflow. These factors are presented in Appendix A-2.

Table 4. Sewered Population and Employment Forecasts (thousands)

Wastewater Treatment Plant	2010 Pop.	2040 Pop.	2010 Emp.	2040 Emp.
Blue Lake	269.18	420.69	162.04	245.62
Crow River (Rogers)	0.00	15.09	0.00	11.79
Eagles Point	68.05	114.13	12.71	26.11
East Bethel	0.00	11.45	0.00	1.28
Empire	133.33	210.61	35.71	59.36
Hastings	22.17	30.10	8.60	11.40
Metropolitan	1,778.36	2,227.87	1,054.38	1,391.07
New Germany	0.00	1.40	0.00	0.09
St. Croix Valley	26.14	32.70	17.64	24.30
Seneca	242.99	292.84	178.38	239.13
Total	2,540.23	3,356.87	1,469.50	2,010.14

Table 5. Treatment Plant Flow Projections (million gallons per day)

Wastewater Treatment Plant	2010	2020	2030	2040
Blue Lake	27.60	29.88	33.00	35.50
Crow River (Rogers)	0.00	0.00	1.71	1.88
Eagles Point	4.94	5.70	6.83	7.46
East Bethel	0.00	0.36	0.55	0.71
Empire	9.98	11.02	12.59	14.08
Hastings	1.49	1.51	1.64	1.87
Metropolitan	171.09	178.43	183.99	187.72
New Germany	0.00	0.05	0.06	0.11
St. Croix Valley	3.01	3.14	3.24	3.23
Seneca	22.66	23.93	24.43	24.53
Total	240.78	254.00	268.02	277.04

Capital Improvement Plan

This section of the system plan presents a capital improvement plan for the 2016- 2040 period. Costs to meet future regulatory requirements are intentionally excluded. The three objectives of the capital improvement plan are:

- Preserve the infrastructure investment through rehabilitation/replacement. Note: Interceptor rehabilitation also reduces inflow and infiltration which recovers system capacity
- Strategically expand the system capacity through treatment plant and interceptor expansions and interceptor extensions, and
- Improve the quality of service by reusing wastewater, increasing system reliability, and conserving and generating energy

Table 6 presents a general description of projected capital improvement needs for the wastewater treatment plants and interceptor system. Capital cost estimates are presented using an inflation factor of 3%. For comparison, Table 7 presents the estimated current replacement value of the regional wastewater system.

Total projected capital cost for 2016 to 2040 is estimated at $5 billion. On an annual spending basis, with adjustment for inflation, this equals the total level of spending from 1970 to 2015. Projected capital investment by type of infrastructure is 64% interceptors and 36% treatment. Investment by objective is approximately 80% for asset preservation, 10% for quality improvement, and 10% for growth. These costs exclude costs associated with potential future regulatory requirements, which are discussed later.

Capital improvements for the regional wastewater system are primarily financed by Metropolitan Council wastewater bonds and Minnesota Public Facilities Authority loans. Bonds and loans are repaid using wastewater fees.

Table 6. Long-Term Capital Improvement Program ($ millions)

Project Name	Purpose	2016-2020	2021-2030	2031-2040
Interceptor System				
Anoka-Coon Rapids Improvements	G, R		200	
Bloomington Improvements	G, R	5	30	
Brooklyn Park LS Relocation	R		100	
Blue Lake System Rehabilitation	R	70	70	100
North Area Rehabilitation	R	70	60	100
Forcemain Rehabilitation	R	40	100	
Interceptor Rehabilitation	R	10	60	100
Lift Station Rehabilitation	R	10	100	150
Maple Plain LS/FM Rehabilitation	R	20		
Minneapolis Interceptor Rehabilitation	R	20	100	100
Meter Improvements	R	15	50	50
Minneapolis Interceptor 310/320 Diversion	R	80		
River Crossings Rehabilitation	R	40	80	
Seneca Int. System Rehabilitation	R	50	20	
Roseville Int. Rehabilitation	R		40	
St. Bonifacius LS/FM	R	10		
St. Paul Int. Rehabilitation	R		100	100
Southeast Anoka County	G		20	
Waconia LS/FM	R	10		
Joint Interceptor Rehabilitation	R			800
Sub-Total		450	1,130	1,500
Treatment Plants				
Blue Lake				
Expansion (to 40 mgd)	G, Q		100	
Rehabilitation (Solids)	R		50	
Rehabilitation (Liquids)				50
Crow River WWRF	G, Q, R		100	
Eagles Point Rehabilitation	R		30	
East Bethel WWRF Expansion	G			15
Empire				
Effluent Forcemain	G			20
Solids Processing	G, R	10		
Rehabilitation	R			80
Hastings	G, Q, R	10	50	
Metropolitan				
Rehabilitation	R	70	130	300
Solids Processing	G, Q	50	70	
New Germany	G, Q			5
Northeast Area WWRF	G, Q		100	

TABLE 6. (CONTD.)				
Project Name	Purpose	2016-2020	2021-2030	2031-2040
Treatment Plants				
Seneca				
Solids Processing	R	20	40	
Rehabilitation	R		70	30
St. Croix Valley Rehabilitation	R	10	10	
System-wide Wastewater Reclamation and Reuse	Q			500
Sub-Total		170	750	1000
Total		620	1,880	2,500

Key
G = Growth
Q = Quality Improvement
R = Rehabilitation/Replacement
WWRF = Wastewater Reclamation and Reuse Facilities
mgd = million gallons per day

Table 7. Estimated Replacement Value of Regional Wastewater System

Facility	Quantity	Estimated Replacement Value ($ Millions)*
Pipelines	600 miles	3,000
Joint Interceptor	10 miles	400
Lift Stations	60	300
Meter Stations	200	100
Metropolitan Plant	1	1,200
Regional Plants	7	1,000
Total System		6,000

2011 ENR Construction Cost Index = 9,000

Environmental Sustainability

Sustainability of the regional wastewater system includes: (1) water sustainability; (2) energy conservation and generation; (3) air emissions reduction; and (4) solid waste reuse and reduction.

Water Sustainability. The Council has two interrelated objectives: (1) sustaining the region's water resources to provide water supply and water quality that supports the region's economic growth and quality of life; and (2) investing the region's financial and technical resources to

maximize benefits. Water supply, stormwater treatment and reuse, and wastewater treatment and reuse should be part of an integrated system that is optimized to meet these regional objectives.

Wastewater reuse has the potential to meet part of the region's water supply needs. Investing strategically to further the region's nonpoint source pollution prevention and control program's effectiveness also may have more benefits than investing to meet more stringent wastewater discharge limits.

The Council's program for mitigating infiltration and inflow in public and private wastewater collection systems also contributes to water sustainability by reducing water quality risks, and limiting the amount of clear water entering the system, which is then lost to the region when treated and discharged to rivers. Reducing infiltration and inflow also recovers system capacity, which improves efficiency.

Solid Waste. The wastewater system plan continues to support the use of wastewater treatment biosolids for energy generation for in-plant uses. The Metropolitan Plant uses thermal processing that reduces the biosolids to a small volume of inert ash, while recovering energy that is converted to electricity and steam for in-plant uses. The beneficial use of ash for its value as a phosphorus fertilizer is also being pursued. The Blue Lake and Empire plants use anaerobic digestion to reduce biosolids volume prior to its agricultural use and to produce biogas (methane) for in-plant uses.

Energy. In addition to generating energy from processing biosolids, energy conservation has been, and continues to be, implemented through wastewater treatment process selection and performance optimization, installation of higher efficiency equipment and lighting, and reducing building energy use. Purchase of power from solar power generation facilities co-located at major treatment plants is also being pursued. Additional technologies, such as fuel cells, will be pursued as their capabilities and economics are proven.

Wastewater Reuse

Injecting highly treated wastewater into aquifers has potential to supplement groundwater and surface water as sources of water. Year-round reuse of wastewater could include recharging groundwater, industrial cooling, and use as nonpotable water. ("Potable" water is water suitable for drinking.) Seasonal possibilities include irrigation of agricultural land, golf courses, parks, and lawns. Each type of use has water quality requirements that may require additional wastewater treatment before it is distributed and used.

Wastewater reuse challenges include:

Groundwater Recharge. Groundwater recharge with treated wastewater is typically implemented in limited areas (sites). Few areas have high soil permeability allowing treated wastewater to seep into the groundwater and depth to groundwater that is shallow enough for it to disperse into the groundwater.

Industrial and Irrigation Uses. Water softeners that are used to remove hardness from groundwater (which is the primary water source for communities outside the urban core) introduce high salt content into water/wastewater. The salt content makes the water undesirable for industrial uses (it corrodes cooling water systems) and irrigation uses (salt buildup can limit

plant productivity). Wastewater treatment with reverse osmosis to remove salts is very costly, and requires a method – for example, evaporation, which is very expensive − to dispose of the brine.

Metro area industries have generally been successful with their own water conservation and re-use programs. There are very few high-volume industrial users of reused wastewater.

Wastewater uses for irrigation are highly dispersed and seasonal, and account for approximately 20% to 40% of total annual municipal water use. Thus, the potential for irrigation use is high, but a costly non-potable water distribution system will be necessary.

Nonpotable Water. Potable water uses include drinking, bathing/showering, food preparation, dish washing, and clothes washing. Toilet flushing is a significant nonpotable water use, estimated at 20% of total water use. Implementing a nonpotable water use system would require separate water distribution and plumbing systems. Inherent challenges are cost, the typical development/financing process (and associated competition), regulatory requirements, institutional arrangements, and public perception.

The Council will consider wastewater reuse as part of its regional planning for water supply. For example, wastewater reuse for toilet flushing and irrigation could reduce groundwater demand to serve growth.

Planning for wastewater reuse will also address key implementation challenges; including: (1) cost and financing of a reclaimed water distribution system; (2) integration of another water source into the municipal water systems across the region; (3) pricing protocol(s) that captures as much value as reasonably possible; and (4) streamlining the regulatory permitting process to move from a “one project, one customer, one permit” approach to a “systems” approach.

In summary, the Council’s preliminary plan for wastewater reuse is to:

1. Increase wastewater reuse within Council wastewater treatment facilities – that is, lead by example
2. Implement groundwater recharge and irrigation (for example, golf courses) in East Bethel as a demonstration project for the region
3. Pursue wastewater reuse for industrial cooling water, where feasible
4. Collaborate with the University of Minnesota to demonstrate wastewater reuse at UMore Park
5. Develop and implement a plan to address the key implementation challenges associated with a nonpotable water system for toilet flushing and irrigation uses, and
6. Integrate nonpotable water systems into plans for future regional wastewater reclamation facilities.

Regulatory Scenarios for Wastewater Treatment

The Minnesota Pollution Control Agency establishes water quality standards for surface waters (lakes and rivers) and discharge limits for wastewater treatment plants. Current discharge limits for the Council’s treatment plants include 1 mg/l for phosphorus and seasonal limits on ammonia nitrogen and organics.

Water quality has improved due to the reduced pollutant discharges from wastewater treatment plants. However, long-term water quality goals established by the Minnesota Pollution Control Agency will require substantial reduction of pollution from urban stormwater, agricultural runoff, and streambank erosion. Federal law focuses compliance and enforcement authority on point sources of pollutant discharge − that is, wastewater treatment plants and urban stormwater systems. As a result, the Minnesota Pollution Control Agency may impose more stringent discharge limits on the Council and its customer communities. This section discusses the potential implications for the Council's wastewater treatment plants.

Phosphorus. The Council's wastewater treatment plants currently average approximately 0.5 mg/l phosphorus and 250 million gallons per day flow. The Council has evaluated two regulatory scenarios. The first assumes that the Council's plants will have to meet a discharge limit of 0.3 mg/l phosphorus. This limit would require the plants to average approximately 0.2 mg/l phosphorus to ensure they comply with the limit. The second scenario assumes a discharge limit of 0.1 mg/l phosphorus, which is the limit of currently available wastewater treatment technology.

The 0.3 mg/l phosphorus limit has been discussed as part of the process of the Minnesota Pollution Control Agency (MPCA) to establish a limit on the Total Maximum Daily Load of phosphorus into Lake Pepin on the Mississippi River. However, the 0.1 mg/l phosphorus limit equals the phosphorus water quality standard for the Mississippi River being considered by the MPCA. Because the Minnesota River, which flows into the Mississippi River, already contains approximately 0.2 mg/l phosphorus, the Mississippi River will likely continue to fail to meet standards unless the Minnesota River quality improves significantly. As a regulatory consequence, wastewater treatment discharge could be required to meet the water quality standard as a discharge limit.

Achieving compliance with a 0.3 mg/l phosphorus limit requires additional facilities for chemical addition, pumping, filtration, and solids processing facilities. Estimated capital cost (current prices) for the Council's wastewater treatment plants is $400 million. Estimated annual operation and maintenance cost is an additional $15 million.

Achieving compliance with a 0.1 mg/l phosphorus limit requires investments for chemical addition, tertiary clarifiers, pumping, membrane filtration, and solids processing facilities. Estimated capital costs (current prices) for the Council's wastewater treatment plants are approximately $2 billion. Estimated annual operation and maintenance costs are approximately an additional $30 million.

Total annual operation and maintenance costs, plus annual debt service on the capital, are estimated at approximately $45 million for 0.3 mg/l phosphorus limit and $180 million for 0.1 mg/l phosphorus limit. These potential costs would raise regional wastewater rates by 40% to 100%.

Nitrogen. The Minnesota Pollution Control Agency is considering a water quality standard for nitrate nitrogen based on levels considered toxic for aquatic life. The Minnesota Pollution Control Agency with assistance and guidance from the U.S. Environmental Protection Agency recently developed a nutrient reduction strategy for the Mississippi River watershed to protect the Gulf of Mexico. Nitrate is a nutrient necessary for aquatic growth, but excessive amounts can lead to problems such as algae blooms, decreased oxygen levels, and fish kills.

Currently, the Council's wastewater treatment plants meet seasonal effluent limits for ammonia nitrogen, to meet a water quality standard for ammonia nitrogen based on toxicity for aquatic life. The wastewater treatment plants use biological treatment to convert ammonia to nitrate nitrogen, with average nitrate discharge of 15 to 20 mg/l.

If the Minnesota Pollution Control Agency adopts a nitrate nitrogen standard, the Mississippi River will likely continue to fail to meet standards because the Minnesota River contributes most of the nitrate nitrogen loading to the Mississippi River. As a regulatory consequence, wastewater treatment plant discharges could be required to meet the water quality standard as a discharge limit. Meeting this standard would require major capital improvements to remove nitrate by a biological denitrification process. A small change in specific concentration limits of nitrate nitrogen and total nitrogen would result in a correspondingly large change in costs. Changes to the biological treatment process would also affect the performance of treatment plants to remove phosphorus. Estimated capital costs are approximately $1.0 billion to meet a 10 mg/l total nitrogen limit and approximately $1.5 billion to meet a 5 mg/l total nitrogen limit.

Substantial Impacts and Substantial Departures from the Metropolitan Wastewater System Plan

Thrive MSP 2040 and the regional system plans comprise the Council's Metropolitan Development Guide, which is the region's plan to ensure orderly and economical development and re-development of the region. Local comprehensive plans and plan amendments that have substantial impacts on - or contain substantial departures from - the metropolitan wastewater system plan affect how the Council constructs, operates, and maintains the regional wastewater system and can result in system inefficiencies if the nonconforming plans are allowed to be implemented. Substantial impact or departures may result either from over-utilization or under-utilization. Over-utilization occurs when local development will use more regional capacity than currently is available or planned. Under-utilization occurs when low-density development uses less than currently available or planned regional capacity. Under-utilization is likely to require additional infrastructure elsewhere in the region to accommodate household growth that would be reasonably expected in the local governmental unit.

As permitted by Minnesota Statutes section 473.175, subdivision 1, the Council may require a local governmental unit to modify any comprehensive plan or part thereof that is inconsistent with the metropolitan system plan if the Council concludes that the local plan is more likely than not to have either a substantial impact on, or to contain a substantial departure from, the Council's adopted policy plans and capital budgets for metropolitan wastewater service. Inconsistencies will provide the Council with grounds for requiring modifications to the local comprehensive plan.

A substantial system impact occurs under various scenarios, including when:

- The regional wastewater system was not designed to provide wastewater service for the proposed sewer service area; or
- The projected flow from the sewer service area is greater than planned; or
- The timing for the proposed growth is prior to implementation of a planned improvement to, and greater than what can be accommodated by, the regional wastewater system; or

- The peak wet-weather flows from the local government unit exceeds its designed capacity within the regional wastewater system, and thus there is inadequate capacity to accommodate the planned growth for the local government unit or tributary local governmental units.

A substantial departure occurs when:

- A local governmental unit proposes forecasts for sewered development densities that are lower than Council density standards that are the basis for regional infrastructure planning purposes; or
- When a local government unit proposes densities that exceed Council policy for unsewered areas that are within the long-term regional wastewater service area, thus precluding future economical sewered development.

Appendices

Appendix A – Wastewater

The actual inflow/infiltration goal will vary over time based on the average base flow for the community, which also changes over time.

Table A-1: MCES Flow Variation Factors for Sewer Design

Average Flow (MGD)	Peak Hourly Flow Factor	Average Flow (MGD)	Peak Hourly Flow Factor
0.00 – 0.11	4.0	**1.90 – 2.29**	2.8
0.12 – 0.18	3.9	**2.30 – 2.89**	2.7
0.19 – 0.23	3.8	**2.90 – 3.49**	2.6
0.24 – 0.29	3.7	**3.50 – 4.19**	2.5
0.30 – 0.39	3.6	**4.20 – 5.09**	2.4
0.40 – 0.49	3.5	**5.10 – 6.39**	2.3
0.50 – 0.64	3.4	**6.40 – 7.99**	2.2
0.65 – 0.79	3.3	**8.00 – 10.39**	2.1
0.80 – 0.99	3.2	**10.40 – 13.49**	2.0
1.00 – 1.19	3.1	**13.50 – 17.99**	1.9
1.20 – 1.49	3.0	**18.00 – 29.99**	1.8
1.50 – 1.89	2.9	**over 30.00**	1.7

Table A-2. Wastewater Flow Variation Factors for Determining Infiltration/Inflow Mitigation Goals

Average Flow (MGD)	Peak Hourly Flow Factor	Average Flow (MGD)	Peak Hourly Flow Factor
<0.10	4.5	2.51-3.00	3.2
0.11- 0.20	4.4	3.01-3.50	3.1
0.21-0.30	4.3	3.51-4.00	3.0
0.31-0.40	4.2	4.01-4.50	2.9
0.41-0.50	4.1	4.51-5.00	2.8
0.51-0.60	4.0	5.01-6.00	2.7
0.61-0.70	3.9	6.01-8.00	2.6
0.71-0.80	3.8	8.01-10.00	2.5
0.81-1.00	3.7	10.01-12.00	2.4
1.01-1.20	3.6	12.01-16.00	2.3
1.21-1.50	3.5	16.01-20.00	2.2
1.51-2.00	3.4	20.01-30.00	2.1
2.01-2.50	3.3	>30.00	2.0

Table A-3. Community Forecasts of Sewered Population, Households, and Employment

Community	Population			Households			Employment		
	2020	2030	2040	2020	2030	2040	2020	2030	2040
Blue Lake WWTP									
Carver	5,209	8,592	13,544	1,890	3,221	5,115	605	1,001	1,637
Chanhassen	24,630	29,617	36,198	9,381	11,438	13,998	13,983	15,305	17,398
Chaska	25,285	29,469	33,851	10,040	11,926	13,786	12,839	14,102	15,663
Corcoran (pt.)	47	46	60	18	18	24	15	10	12
Deephaven	3,790	3,865	3,900	1,370	1,390	1,400	820	820	820
Eden Prairie	69,129	78,610	83,108	27,746	31,699	33,372	59,097	67,935	69,771
Excelsior	2,330	2,390	2,600	1,170	1,190	1,300	2,200	2,200	2,200
Greenfield	134	134	134	57	57	57	0	0	0
Greenwood	780	800	810	300	300	300	200	340	350
Hopkins (pt.)	538	564	547	252	258	247	202	179	161
Independence	950	1,111	1,357	338	447	553	157	178	194
Laketown Twp	651	326	0	140	70	0	77	38	0
Long Lake	1,890	1,940	2,100	810	910	1,000	1,560	1,860	1,930
Loretto	660	670	670	290	300	300	370	370	370
Maple Plain	1,980	2,190	2,300	850	950	1,000	1,740	1,740	1,750
Medina (pt.)	197	272	470	75	107	191	75	138	263

Minnetonka	55,900	60,600	63,000	24,600	26,600	27,500	55,700	61,700	63,200
Minnetonka Beach	570	610	610	210	220	220	210	250	250
Minnetrista	3,181	5,235	6,920	1,178	2,014	2,682	266	352	350
Mound	9,600	9,900	10,500	4,220	4,510	4,800	1,550	1,840	1,900
Orono	4,648	6,713	7,393	1,771	2,794	3,092	913	1,331	1,428
Prior Lake	25,500	31,300	39,300	10,000	12,500	15,700	9,400	10,700	12,900
Shakopee	34,265	48,830	55,981	12,567	18,230	20,924	20,236	27,000	31,784
Shorewood	7,400	7,400	7,400	2,820	2,940	3,000	1,200	1,200	1,200
Spring Park	1,950	2,120	2,200	1,000	1,070	1,100	650	690	700
St. Bonifacius	2,210	2,200	2,200	880	890	900	480	500	500
Tonka Bay	1,490	1,500	1,500	630	670	680	440	540	570
Victoria	9,014	11,000	14,500	3,233	4,000	5,000	1,301	1,700	2,200
Waconia	12,900	16,700	22,100	4,970	6,700	8,900	7,200	8,300	10,200
Wayzata	4,270	4,670	4,900	2,070	2,210	2,300	5,300	5,800	5,900
Woodland	393	530	540	145	180	180	8	20	20
Totals	311,491	369,904	420,693	125,020	149,809	169,621	198,795	228,141	245,620
Crow River WWTP									
Rogers (pt.)	0	12,443	15,085	0	4,707	5,686	0	9,716	11,794

Eagles Point WWTP									
Cottage Grove	32,701	39,167	44,036	11,766	14,554	16,403	5,988	7,339	7,973
Lake Elmo (pt.)	3,497	8,198	12,281	1,338	3,248	4,810	1,145	1,900	2,240
Woodbury (pt.)	45,741	54,787	57,809	16,256	19,919	21,463	10,677	13,243	15,898
Totals	81,939	102,153	114,126	29,360	37,720	42,676	17,810	22,482	26,111
East Bethel WWRF									
East Bethel	5,905	8,868	11,453	2,314	3,597	4,672	712	1,096	1,275
Empire WWTP									
Apple Valley (pt.)	52,081	58,228	60,728	20,788	23,584	24,531	16,619	18,478	18,973
Elko New Market	5,800	8,000	12,200	1,910	2,820	4,500	530	650	840
Empire Twp.	668	1,406	2,048	243	529	777	61	96	111
Farmington	19,937	23,153	28,592	7,341	8,773	10,956	4,815	5,537	6,758
Lakeville (pt.)	54,305	65,235	75,512	19,469	23,988	27,924	16,328	18,782	21,614
Rosemount	20,717	26,651	31,531	7,539	10,047	12,156	5,901	8,633	11,058
Totals	153,509	182,672	210,610	57,290	69,740	80,844	44,254	52,176	59,355
Hastings WWTP									
Hastings	23,100	25,900	30,100	9,600	11,000	12,900	9,200	10,000	11,400

Metropolitan WWTP									
Andover	23,431	24,568	30,955	7,638	9,051	11,615	3,922	4,403	5,292
Anoka	19,096	19,590	20,096	7,900	8,595	8,898	13,707	14,352	14,600
Arden Hills	10,848	12,784	13,499	3,530	4,375	4,600	14,705	17,899	18,399
Birchwood Village	860	850	840	360	360	360	20	30	30
Blaine	66,311	73,341	83,587	23,966	28,135	32,124	24,399	25,671	27,320
Brooklyn Center	31,000	32,900	34,700	11,800	12,800	13,600	12,900	13,900	15,400
Brooklyn Park	83,757	91,487	95,500	30,577	33,893	35,496	32,262	38,951	41,999
Centerville	3,990	4,100	4,200	1,400	1,520	1,700	500	500	500
Champlin	23,900	24,200	25,500	8,800	9,400	10,000	4,860	5,500	5,600
Circle Pines	5,100	5,200	5,300	2,150	2,250	2,300	1,160	1,400	1,450
Columbia Heights	20,000	20,600	21,700	8,400	8,800	9,300	4,540	4,790	5,300
Columbus	591	866	1,213	238	361	512	566	645	758
Coon Rapids	65,308	70,200	72,500	26,300	28,300	29,300	30,700	34,700	35,700
Corcoran (pt.)	2,851	5,746	7,234	1,071	2,243	2,865	586	1,025	1,343
Crystal	22,800	23,100	23,300	9,500	9,800	10,000	4,640	4,970	5,500
Dayton (pt.)	5,255	7,872	9,133	1,993	3,208	3,887	1,177	1,703	2,449
Edina (pt.)	49,402	51,370	52,886	21,332	22,221	22,831	49,250	51,084	53,974

Falcon Heights	5,400	5,400	5,300	2,170	2,180	2,200	5,705	6,000	6,800
Forest Lake	15,759	18,571	22,332	6,545	7,872	9,531	6,271	7,031	8,117
Fridley	28,100	28,600	29,400	11,700	12,400	12,800	25,300	27,000	29,800
Gem Lake	500	560	588	210	237	249	560	630	640
Golden Valley	22,000	23,200	24,300	9,400	9,900	10,300	37,500	38,900	41,500
Hilltop	950	1,030	1,100	480	520	550	320	350	360
Hopkins (pt.)	19,082	20,032	21,052	9,010	9,346	9,753	12,523	13,301	13,839
Hugo	9,490	19,157	26,980	3,846	8,037	11,268	1,911	2,822	3,428
Inver Grove Heights (pt.)	32,186	36,841	41,638	13,507	15,611	17,635	10,078	11,199	12,345
Lake Elmo (pt.)	438	615	911	172	253	376	204	166	162
Landfall	770	770	770	300	300	300	30	30	30
Lauderdale	2,450	2,430	2,400	1,160	1,180	1,200	690	830	1,000
Lexington	2,130	2,260	2,300	890	970	1,000	660	690	700
Lilydale	910	940	1,000	530	570	600	420	420	420
Lino Lakes	14,532	17,974	20,756	4,668	6,243	7,496	2,770	3,399	4,044
Little Canada	10,400	10,800	11,100	4,640	4,810	4,900	7,700	8,500	8,700
Mahtomedi	7,800	7,700	7,700	2,950	3,050	3,099	2,134	2,513	2,660
Maple Grove	60,986	76,000	84,800	22,904	29,400	32,999	35,521	43,100	49,500

Maplewood	41,200	44,800	47,900	16,700	18,400	19,700	32,000	33,700	36,600
Medicine Lake	400	400	400	170	170	170	60	100	100
Medina (pt.)	3,024	4,524	6,078	1,132	1,726	2,337	2,692	3,206	3,284
Mendota	270	290	320	110	120	130	280	300	300
Mendota Heights	12,100	13,000	13,400	4,820	5,200	5,300	12,600	14,200	14,400
Minneapolis	424,700	449,500	466,400	184,200	195,600	202,700	324,000	334,500	356,000
Mounds View	12,400	12,500	13,100	5,100	5,200	5,500	6,900	7,200	8,200
New Brighton	23,000	24,600	26,000	9,800	10,600	11,200	11,200	12,100	13,500
New Hope	21,100	22,000	22,800	9,000	9,500	9,800	12,400	13,600	15,300
Newport	3,730	4,230	4,600	1,630	1,910	2,100	1,990	1,960	2,000
North Oaks	1,786	1,894	1,933	720	805	828	493	517	517
North St. Paul	12,200	12,500	13,100	5,100	5,400	5,700	3,120	3,330	3,610
Oakdale	28,800	30,400	31,000	11,900	12,700	13,000	12,500	14,500	15,000
Osseo	2,660	2,900	3,100	1,270	1,400	1,500	2,130	2,280	2,530
Plymouth	71,431	81,600	87,796	29,102	33,100	35,495	53,534	59,400	66,497
Ramsey	12,726	19,201	21,544	4,432	7,292	8,481	4,356	5,770	6,496
Richfield	37,300	38,800	39,900	16,200	17,000	17,500	17,500	17,700	18,400
Robbinsdale	14,600	14,800	15,300	6,300	6,600	6,800	7,300	7,400	7,600

Rogers (pt.)	0	984	1,870	0	405	777	0	229	397
Roseville	35,100	35,900	38,700	15,100	15,600	17,000	39,700	41,300	44,100
Shoreview	26,200	27,200	27,500	10,800	11,200	11,300	13,300	15,200	15,500
South St. Paul	21,300	22,000	22,500	9,000	9,400	9,600	8,600	9,600	11,000
Spring Lake Park	6,590	6,840	7,020	2,930	3,110	3,200	3,360	3,700	3,770
St. Anthony	9,050	9,950	10,600	4,280	4,570	5,000	3,640	3,810	4,140
St. Louis Park	50,100	52,700	54,500	23,700	24,800	25,500	44,500	46,200	49,100
St. Paul	308,600	324,100	334,700	125,000	132,800	137,600	190,900	201,900	218,000
St. Paul Park	5,600	6,500	7,900	2,250	2,700	3,300	1,830	2,070	2,520
Vadnais Heights	13,200	14,100	14,500	5,700	6,100	6,300	10,200	12,100	12,600
West St. Paul	21,700	22,900	23,900	9,600	10,100	10,500	8,900	9,600	10,600
White Bear Lake	24,350	26,040	28,180	10,520	11,350	12,300	11,950	11,980	12,000
White Bear Twp.	11,084	11,776	11,998	4,482	4,783	4,899	3,553	4,528	4,780
Willernie	500	490	480	230	230	230	200	200	200
Woodbury (pt.)	22,602	23,270	22,278	8,858	9,167	8,813	12,155	12,186	12,369
Totals	1,947,786	2,104,344	2,227,866	802,173	877,229	930,203	1,208,034	1,294,771	1,391,067
New Germany WWTP									
New Germany	500	600	1400	200	250	600	60	70	90

Seneca WWTP									
Apple Valley (pt.)	4,219	4,672	4,872	1,712	1,916	1,969	681	622	527
Bloomington	87,300	91,200	95,400	38,400	40,100	41,900	100,600	105,800	111,000
Burnsville	62,900	65,400	66,700	25,900	27,100	27,700	39,300	43,100	44,100
Eagan	70,800	76,100	79,000	28,200	30,400	31,500	62,600	68,600	70,200
Edina (pt.)	398	430	414	168	179	169	2,150	2,116	2,126
Inver Grove Heights (pt.)	1,794	2,128	2,504	655	794	937	292	410	539
Lakeville (pt.)	4,952	5,300	5,747	1,720	1,848	1,972	1,094	1,112	1,135
Savage	33,900	36,700	38,200	11,600	13,400	14,300	8,123	9,184	9,499
Totals	266,262	281,929	292,838	108,354	115,736	120,448	214,840	230,944	239,125
St. Croix Valley WWTP									
Bayport	3,900	4,185	4,400	1,069	1,200	1,300	4,370	4,940	5,100
Oak Park Heights	5,100	5,600	5,800	2,240	2,490	2,600	6,000	7,300	7,500
Stillwater	20,000	21,700	22,500	8,300	9,100	9,500	10,700	11,500	11,700
Totals	29,000	31,485	32,700	11,609	12,790	13,400	21,070	23,740	24,300
Regional Totals	**2,820,746**	**3,120,550**	**3,357,206**	**1,146,430**	**1,282,671**	**1,381,176**	**1,715,637**	**1,873,210**	**2,010,222**

Table A-4. Community Wastewater Flow Projections

Community	2010 Actual Flow (MGD)	2020 Flow (MGD)	2030 Flow (MGD)	2040 Flow (MGD)
Andover	1.30	1.47	1.51	1.87
Anoka	1.70	1.82	1.81	1.79
Apple Valley	3.36	3.74	4.06	4.13
Arden Hills	0.89	0.98	1.12	1.15
Bayport	0.50	0.52	0.53	0.53
Birchwood	0.06	0.06	0.05	0.05
Blaine	3.80	4.55	4.88	5.40
Bloomington	8.29	8.51	8.58	8.66
Brooklyn Center	2.70	2.70	2.75	2.80
Brooklyn Park	4.92	5.48	5.89	6.03
Burnsville	5.27	5.38	5.43	5.36
Carver	0.00	0.36	0.56	0.86
Centerville	0.26	0.27	0.27	0.27
Champlin	1.69	1.71	1.68	1.71
Chanhassen	2.08	2.30	2.56	2.92

Community	2010 Actual Flow (MGD)	2020 Flow (MGD)	2030 Flow (MGD)	2040 Flow (MGD)
Chaska	2.51	2.73	2.93	3.14
Circle Pines	0.41	0.41	0.41	0.41
Columbia Heights	1.21	1.22	1.23	1.26
Columbus	0.02	0.06	0.07	0.10
Coon Rapids	5.30	5.48	5.68	5.67
Corcoran	0.00	0.18	0.36	0.46
Cottage Grove	2.03	2.11	2.45	2.69
Crystal	1.74	1.74	1.71	1.68
Dayton	0.05	0.27	0.43	0.52
Deephaven	0.40	0.40	0.39	0.38
Eagan	6.08	6.49	6.71	6.73
East Bethel	0.00	0.36	0.55	0.71
Eden Prairie	5.10	5.80	6.35	6.50
Edina	5.95	5.94	5.91	5.86
Elko New Market	0.00	0.33	0.45	0.70
Empire Township	0.13	0.08	0.13	0.16

Community	2010 Actual Flow (MGD)	2020 Flow (MGD)	2030 Flow (MGD)	2040 Flow (MGD)
Excelsior	0.22	0.23	0.22	0.23
Falcon Heights	0.57	0.56	0.55	0.54
Farmington	1.43	1.45	1.61	1.91
Forest Lake	1.64	1.70	1.83	2.03
Fridley	4.70	4.67	4.59	4.54
Gem Lake	0.02	0.05	0.05	0.05
Golden Valley	2.35	2.44	2.46	2.50
Greenfield	0.01	0.01	0.01	0.01
Greenwood	0.04	0.05	0.05	0.05
Hastings	1.49	1.51	1.64	1.87
Hilltop	0.07	0.08	0.09	0.09
Hopkins	1.58	1.68	1.71	1.73
Hugo	0.83	0.96	1.52	1.98
Independence	0.03	0.06	0.07	0.09
Inver Grove Heights	2.09	2.40	2.66	2.92
Lake Elmo	0.02	0.26	0.57	0.83

Community	2010 Actual Flow (MGD)	2020 Flow (MGD)	2030 Flow (MGD)	2040 Flow (MGD)
Laketown Township	0.05	0.02	0.00	0.00
Lakeville	4.02	4.58	5.17	5.74
Landfall	0.08	0.08	0.08	0.08
Lauderdale	0.18	0.17	0.17	0.17
Lexington	0.11	0.12	0.12	0.12
Lilydale	0.07	0.09	0.09	0.09
Lino Lakes	0.99	1.10	1.29	1.44
Little Canada	1.15	1.19	1.19	1.18
Long Lake	0.24	0.25	0.25	0.25
Loretto	0.00	0.08	0.08	0.08
Mahtomedi	0.46	0.48	0.46	0.45
Maple Grove	5.23	5.30	6.16	6.63
Maple Plain	0.28	0.28	0.29	0.29
Maplewood	3.51	3.66	3.80	3.92
Medicine Lake	0.03	0.03	0.03	0.03
Medina	0.31	0.37	0.47	0.56

Community	2010 Actual Flow (MGD)	2020 Flow (MGD)	2030 Flow (MGD)	2040 Flow (MGD)
Mendota	0.02	0.03	0.03	0.03
Mendota Heights	1.30	1.34	1.38	1.37
Minneapolis	44.76	46.58	46.89	46.88
Minnetonka	5.41	5.79	6.00	6.01
Minnetonka Beach	0.05	0.05	0.06	0.05
Minnetrista	0.30	0.31	0.43	0.52
Mound	0.95	0.96	0.96	0.96
Mounds View	1.08	1.07	1.05	1.07
New Brighton	1.74	1.81	1.86	1.92
New Germany	0.00	0.05	0.06	0.11
New Hope	1.90	1.90	1.92	1.94
Newport	0.23	0.25	0.27	0.29
North Oaks	0.07	0.13	0.13	0.13
North St. Paul	1.02	1.04	1.03	1.04
Oak Park Heights	0.54	0.58	0.62	0.62
Oakdale	2.60	2.66	2.71	2.68

Community	2010 Actual Flow (MGD)	2020 Flow (MGD)	2030 Flow (MGD)	2040 Flow (MGD)
Orono	0.58	0.58	0.70	0.72
Osseo	0.18	0.20	0.21	0.22
Plymouth	6.76	6.82	7.32	7.59
Prior Lake	1.62	1.76	2.08	2.54
Ramsey	0.78	0.88	1.27	1.39
Richfield	3.07	3.13	3.13	3.11
Robbinsdale	1.03	1.05	1.03	1.03
Rogers	0.00	0.00	1.78	1.99
Rosemount	1.37	1.39	1.75	2.04
Roseville	3.37	3.43	3.40	3.51
Savage	2.00	2.53	2.65	2.69
Shakopee	3.55	3.62	4.49	4.88
Shoreview	2.37	2.39	2.41	2.36
Shorewood	0.95	0.93	0.90	0.88
South St. Paul	3.43	3.40	3.35	3.30
Spring Lake Park	0.55	0.55	0.55	0.55

Community	2010 Actual Flow (MGD)	2020 Flow (MGD)	2030 Flow (MGD)	2040 Flow (MGD)
Spring Park	0.24	0.25	0.25	0.25
St. Anthony	0.75	0.78	0.82	0.84
St. Bonifacius	0.25	0.24	0.23	0.23
St. Louis Park	4.88	5.09	5.12	5.13
St. Paul	22.87	23.82	24.23	24.42
St. Paul Park	0.37	0.38	0.43	0.51
Stillwater	1.98	2.04	2.09	2.09
Tonka Bay	0.23	0.23	0.22	0.22
Vadnais Heights	1.25	1.32	1.36	1.36
Victoria	0.61	0.74	0.85	1.05
Waconia	0.98	1.11	1.32	1.65
Wayzata	0.52	0.55	0.56	0.56
West St. Paul	2.05	2.14	2.16	2.17
White Bear Lake	2.52	2.48	2.51	2.56
White Bear Township	0.98	1.07	1.10	1.08
Willernie	0.05	0.05	0.05	0.05

Community	2010 Actual Flow (MGD)	2020 Flow (MGD)	2030 Flow (MGD)	2040 Flow (MGD)
Woodbury	4.60	5.06	5.55	5.57
Woodland	0.00	0.02	0.03	0.03

Appendix B – Surface Water Management

Appendix B-1: Nonpoint Source Pollutants

Stormwater Pollutant	Examples of Sources	Related Impacts
Nutrients: Nitrogen, Phosphorus	Animal waste, fertilizers, failing septic systems	Algae growth, reduced clarity, other problems associated with eutrophication (oxygen deficit, release of nutrients and metals from sediments)
Sediments: Suspended and Deposited	Construction sites, other disturbed and/or non-vegetated lands, eroding banks, road sanding	Increased turbidity, reduced clarity, lower dissolved oxygen, deposition of sediments, smothering of aquatic habitat including spawning sites, sediment and toxicity for bottom-dwelling organisms
Organic Materials	Leaves, grass clippings	Oxygen deficit in receiving water body, fish kill
Pathogens: Bacteria, Viruses	Animal waste, failing septic systems	Human health risks via drinking water supplies, contaminated swimming beaches
Hydrocarbons: Oil and Grease, PAHs (Napthalenes, Pyrenes)	Industrial processes, automobile wear, emissions and fluid leaks, waste oil	Toxicity of water column and sediment, bioaccumulation in aquatic species and through food chain
Metals: Lead, Copper, Cadmium, Zinc, Mercury, Chromium, Aluminum, others	Industrial processes, normal wear of auto brake linings and tires, automobile emissions and fluid leaks, metal roofs	Toxicity of water column and sediment, bioaccumulation in aquatic species and through the food chain, fish kill
Pesticides: PCBs, Synthetic Chemicals	Pesticides (herbicides, insecticides, fungicides, rodenticides, etc.), industrial processes	Toxicity of water column and sediment, bioaccumulation in aquatic species and through the food chain, fish kill
Chlorides	Road salting and uncovered salt storage	Toxicity of water column and sediment
Trash and Debris	Litter washed through storm drain networks	Degradation of the beauty of surface waters, threat to wildlife

Appendix B-2: Priority Lakes List

The Council's roles in managing the sustainability of the region's lakes can be summarized by the following points:

- Work to maintain and improve the quality and availability of the region's water resources to support habitat and ecosystem health while providing for recreational opportunities, all of which are critical elements of our region's quality of life.
- Collaborate and convene with state, regional, and local partners to protect, maintain, and enhance natural resources protection and the protection of the quality and quantity of the region's water resources and water supply.

Need for a Priority Lakes List

The Council performs a variety of specific roles in the management of the region's water resources, in partnership with watershed management organizations, local units of government, state and federal agencies, and other partners. Given that there are 950 lakes in the Twin Cities metro area, the Council developed a Priority Lakes List in 2003 to focus its limited resources toward managing the sustainability of the region's lakes. These roles include:

- Plan and implement the MCES lake-monitoring activities as conducted by MCES staff. (Note that the MCES Citizen-Assisted Monitoring Program enrolls lakes that are outside the priority lakes list, in addition to lakes that are on the list.)
- Perform lake assessments.
- Provide monitoring data and lake assessment information so local partners can make effective management and planning decisions.
- Promote protection of priority lakes by promoting effective surface water management by:
  - Asking local units of government to adopt local land uses and planning strategies to protect natural resources and minimize development impacts.
  - Reviewing local comprehensive plans, watershed management plans, local surface water management plans, environmental permits, water supply plans, local stormwater ordinances, and other environmental documents to ensure that local units of government are fulfilling their nonpoint-source reduction requirements.
  - Providing direction, guidance, and technical assistance on BMPs for stormwater management and land use strategies.
- Strengthen protection of priority lakes by promoting wise use of water through a sustainable balance of surface water and groundwater use, conservation, reuse, aquifer recharge, and other practices.
- Work in conjunction with the MPCA to develop TMDLs that reduce the effects of nonpoint-source pollution on the region's lakes.
- Assist in the environmental review process to determine which lakes need to have a nutrient budget analysis completed if a lake is affected by a proposed project.

Priority Lakes List
The Priority Lakes List provides useful information for the management of the region's lakes and their watersheds. The Priority Lakes List:

- Indicates the criteria for categorizing a lake as a Council Priority Lake.
- Identifies basic lake characteristics that can influence the management of the lake and its watershed. This type of information can be used to rapidly assess, on a large scale, the appropriate management techniques and challenges for a lake and its watershed. For example, it can be useful in reviewing watershed and surface water management plans, or prioritizing limited funding for lake/watershed improvement projects.

The lakes that were on the Priority Lakes List for the *2030 Water Resources Management Policy Plan* as well as 20 lakes that are new to the Priority Lakes List are included in the updated priority lakes list for the *2040 Water Resources Policy Plan*. For this Policy Plan, the reference "Spring Lake / U.S. Lock and Dam #2 Pool" was changed to "Spring Lake" because Spring Lake is just a portion of the much larger Pool #2.

Priority Lakes Criteria
The lakes on the Priority Lakes List were chosen if they met at least one of the following criteria:

- High regional recreational value which includes the requirement that the surface area of the lake must be **at least 100 acres**
- Water supply lake
- Good water quality
- Special significance for wildlife habitat

High Regional Recreational Value. A lake is considered to have high regional recreational value if:

- The lake has a public boat access.
- The lake has an adjacent park.
- The lake has a surface area of at least 100 acres.

Water Supply Lake. A lake is considered a water supply lake if it is listed as having a drinking-water beneficial use as defined in Minnesota Rule 7050 and it is identified as a drinking water source (principal or reserve) in a water management plan by a local unit of government.

Good Water Quality. A lake is considered to have good water quality if the annual summer (May-September) trophic status indicators are relatively low, as follows:

- Mean water clarity (Secchi transparency) greater than or equal to 3 meters.
- Mean chlorophyll-a (trichromatic) concentration less than or equal to 10 ug/L.
- Mean total phosphorus concentration less than or equal to 23 ug/L.

Good water quality lakes are restricted to those with a surface area of 10 acres or larger.

Wildlife Significance. The Council's recently updated comprehensive development guide, *Thrive MSP 2040*, discusses the importance of ecological resources, habitat, and a healthy natural environment. There are several lakes in the Twin Cities metro area that have special significance for wildlife habitat, including some where wild rice grows. A lake is considered to have special significance for wildlife habitat if it meets at least one of the following conditions:

- Designated by the MnDNR as a *Migratory Waterfowl Feeding and Resting Area* (MWFRA).
- Designated by the MnDNR as a *Wildlife Lake.*
- Has an estimated coverage of wild rice per the MnDNR's *Wild Rice Distribution and Abundance Inventory (2008).*

Basic Lake Characteristics for Management Decisions
The basic lake characteristics are:

- Lake surface area
- Shallow lake status
- Impaired water
- Watershed area
- Watershed area to lake surface area ratio

Lake Surface Area. The lake surface area is the areal extent of the lake basin as given in the MCES Lakes and Rivers GIS layer (2005).

Shallow Lakes. The Priority Lakes List uses the MnDNR definition of a shallow lake as one having a maximum depth of 15 feet or less. Whereas both shallow lakes and deeper lakes can benefit from improved watershed management, shallow lakes may require additional in-lake management strategies to address those issues that have a more pronounced effect on shallow lakes (for example, frequent internal cycling of nutrients, greater loading of nutrients, disturbance by bottom dwelling animals, and maintaining healthy aquatic plant populations).

Impaired Water. The Priority Lakes List indicates whether a lake is listed as an impaired water because of a negatively affected beneficial use according to the 2014 Inventory of Impaired Waters of the Minnesota Pollution Control Agency (MPCA). An impaired lake means it is not meeting water quality standards and beneficial use(s), as designated in Minnesota Rule 7050.

Watershed Area. The watershed area of a priority lake is the total area of the lake basin itself and any upgradient basins as delineated in MnDNR's GIS layer "DNR Watersheds - DNR Level 08 - All Catchments."

Watershed Area to Lake Surface Area Ratio. The ratio of the watershed area to lake surface area provides an indication of the potential relative stress put on a lake by runoff from the lake's watershed. The greater the ratio, the greater the stress applied to the lake from external loadings of pollutants.

Priority Lakes List											
Lake Name	DNR ID	County	Surface Area (acres)	Shallow Lake	Recreation	Water Supply	Good Water Quality	Wildlife Significance	Impaired Beneficial Use	Watershed Area (acres)	Watershed Area to Lake Area ratio
Centerville	20006	Anoka	472.8		Y	Reserve			R	1,640	3.5
Coon	20042	Anoka	1532.8		Y				C (Hg)	6,297	4.1
Crooked	20084	Anoka	118.9		Y				C (Hg)	469	3.9
East Twin	20133	Anoka	96.8		Y		Y		C (Hg)	443	4.6
Fish	20065	Anoka	337.1	Yes				Wildlife		1,619	4.8
George	20091	Anoka	491.5		Y				C (Hg)	1,853	3.8
Ham	20053	Anoka	180.5		Y				C (Hg)	853	4.7
Linwood	20026	Anoka	570.3		Y				R	7,122	12.5
Little Coon	20032	Anoka	87.9	Yes				Wild rice		2,990	34.0
Martin	20034	Anoka	249.4		Y				R	24,620	98.7
Otter	20003	Anoka	294.6		Y	Reserve			C (Hg)	1,505	5.1
Peltier	20004	Anoka	573.4		Y				R, C (Hg)	69,035	120.4
Pickerel	20130	Anoka	246.1	Yes				Wild rice		616	2.5
Rice	20008	Anoka	370.2	Yes	Y				R	81,646	220.5
Round	20089	Anoka	263.5	Yes	Y					1,573	6.0
Swan	20098	Anoka	41.2	Yes				Wild rice		868	21.1
Ann	100012	Carver	116.3		Y				C (Hg)	1,247	10.7
Auburn	100044	Carver	287.2		Y				R	8,027	27.9
Brickyard Clayhole	100225	Carver	13.9				Y			173	12.4
Courthouse	100005	Carver	12.0				Y			33	2.8
Eagle	100121	Carver	179.9	Yes	Y				R, C (Hg)	1,840	10.2
Hydes	100088	Carver	219.4		Y				R, C (Hg)	3,280	14.9
Lotus	100006	Carver	242.2		Y				R, C (Hg)	1,369	5.7
Maria	100058	Carver	168.8	Yes	Y				R	479	2.8
Minnewashta	100009	Carver	686.0		Y				C (Hg)	3,116	4.5

Priority Lakes List											
Lake Name	DNR ID	County	Surface Area (acres)	Shallow Lake	Recreation	Water Supply	Good Water Quality	Wildlife Significance	Impaired Beneficial Use	Watershed Area (acres)	Watershed Area to Lake Area ratio
Parley	100042	Carver	255.9		Y				R	12,857	50.2
Patterson	100086	Carver	234.3	Yes	Y			Wildlife		2,685	11.5
Piersons	100053	Carver	291.6		Y					1,178	4.0
Rice	100078	Carver	239.3	Yes	Y					8,534	35.7
Riley	100002	Carver	295.4		Y				R, C (Hg)	5,333	18.1
Steiger	100045	Carver	169.7		Y				C (Hg)	819	4.8
Tiger	100108	Carver	385.6	Yes	Y			Waterfowl & Wildlife		4,497	11.7
Waconia	100059	Carver	3088.1		Y				C (Hg)	10,751	3.5
Wasserman	100048	Carver	166.2		Y				R, C (Hg)	2,878	17.3
Zumbra-Sunny	100041	Carver	225.4		Y				C (Hg)	534	2.4
Byllesby	190006	Dakota	1368.5		Y				R, C (Hg)	733,166	535.7
Chub	190020	Dakota	241.5	Yes				Wild rice	R	1,487	6.2
Crystal	190027	Dakota	287.1		Y				R, C (Hg)	4,006	14.0
Kingsley	190030	Dakota	80.2	Yes			Y			213	2.7
Lac Lavon	190446	Dakota	67.0				Y		C (Hg)	371	5.5
Marcott (Ohmans)	190042	Dakota	34.1				Y			3,553	104.2
Marion	190026	Dakota	573.1		Y				C (Hg)	5,081	8.9
Orchard	190031	Dakota	236.0		Y				C (Hg)	2,348	9.9
Spring Lake	190005-01	Dakota	1839.0		Y				L (TSS), C (PCB, PFOS, Hg)	23,780,000	12,931
Bryant	270067	Hennepin	176.1		Y				R, C (Hg)	5,567	31.6
Bush	270047	Hennepin	189.0		Y		Y		C (Hg)	1,241	6.6
Calhoun	270031	Hennepin	414.8		Y				C (PFOS, Hg)	6,851	16.5
Cedar	270039	Hennepin	168.4		Y				C (Hg)	2,482	14.7
Christmas	270137	Hennepin	268.2				Y		C (Hg)	741	2.8

Priority Lakes List											
Lake Name	DNR ID	County	Surface Area (acres)	Shallow Lake	Recreation	Water Supply	Good Water Quality	Wildlife Significance	Impaired Beneficial Use	Watershed Area (acres)	Watershed Area to Lake Area ratio
Dutch	270181	Hennepin	173.8		Y				R	1,787	10.3
Eagle	270111-01	Hennepin	294.2		Y				R, C (Hg)	3,620	12.3
Fish	270118	Hennepin	234.8		Y				R, C (Hg)	2,276	9.7
Harriet	270016	Hennepin	338.5		Y				C (PFOS, Hg)	8,354	24.7
Independence	270176	Hennepin	834.1		Y				R, C (Hg)	8,395	10.1
Lake of the Isles	270040	Hennepin	114.0		Y				C (PFOS, Hg)	3,225	28.3
Little Long	270179	Hennepin	85.6				Y		C (Hg)	269	3.1
Long	270160	Hennepin	297.9		Y				R, C (Hg)	6,841	23.0
Medicine	270104	Hennepin	922.3		Y				R, C (Hg)	11,603	12.6
Minnetonka	270133	Hennepin	14185.0		Y				R, C (Hg)	78,770	5.6
Mitchell	270070	Hennepin	114.4		Y				R	1,405	12.3
Nokomis	270019	Hennepin	200.4		Y				R, C (PCB, Hg)	2,942	14.7
Nordmyr (Normandale)	271045	Hennepin	108.4	Yes	Y					21,117	194.8
Pike	270111-02	Hennepin	57.4		Y				R, C (Hg)	984	17.1
Rebecca	270192	Hennepin	265.6		Y				R, C (Hg)	1,539	5.8
Sarah		Hennepin									
Staring	270078	Hennepin	163.2		Y				R, C (Hg)	15,323	93.9
Weaver	270117	Hennepin	149.2		Y				C (Hg)	489	3.3
Whaletail	270184	Hennepin	518.1		Y				R, C (Hg)	2,333	4.5
Bald Eagle	620002	Ramsey	1044.0		Y	Reserve			R, C (Hg)	19,573	18.7
Charley	620062	Ramsey	35.2			Principal				129 + Miss. R.	
Deep	620018	Ramsey	71.6	Yes		Principal				5,712	79.8
Gervais	620007	Ramsey	235.0		Y				C (Hg)	16,622	70.7
Johanna	620078	Ramsey	210.6		Y				C (PFOS, Hg)	3,645	17.3

Priority Lakes List											
Lake Name	DNR ID	County	Surface Area (acres)	Shallow Lake	Recreation	Water Supply	Good Water Quality	Wildlife Significance	Impaired Beneficial Use	Watershed Area (acres)	Watershed Area to Lake Area ratio
Josephine	620057	Ramsey	114.1		Y				C (Hg)	859	7.5
Owasso	620056	Ramsey	371.2		Y				C (Hg)	3,033	8.2
Phalen	620013	Ramsey	197.4		Y				C (Hg)	21,186	107.3
Pleasant	620046	Ramsey	601.7			Principal			R, C (Hg)	8,240 + Miss. R.	
Snail	620073	Ramsey	148.0		Y				C (Hg)	1,050	7.1
Sucker	620028	Ramsey	61.7			Principal			C (Hg)	8,857 + Miss. R.	
Turtle	620061	Ramsey	439.1		Y				C (Hg)	778	1.8
Vadnais	620038	Ramsey	603.4			Principal			R, C (Hg)	15,157 + Miss. R.	
Wilkinson	620043	Ramsey	91.0	Yes		Principal			R	5,033	55.3
Blue	700088	Scott	150.5	Yes				Wild rice		30,451	202.3
Cedar	700091	Scott	793.6	Yes	Y				R, C (Hg)	2,447	3.1
Cleary	700022	Scott	146.4	Yes	Y				R, C (Hg)	5,624	38.4
Fish	700069	Scott	175.9		Y				R, C (Hg)	699	4.0
Fisher	700087	Scott	274.3	Yes				Wild rice		31,396	114.5
Lower Prior	700026	Scott	966.9		Y				C (Hg)	18,904	19.6
O'Dowd	700095	Scott	317.9		Y				R, C (Hg)	774	2.4
Pleasant	700098	Scott	319.0	Yes				Waterfowl		907	2.8
Rice	700025	Scott	145.6	Yes				Wild rice		1,102	7.6
Spring	700054	Scott	593.0		Y				R, C (Hg)	12,431	21.0
Thole/Schneider	700120	Scott	161.3	Yes	Y				R, C (Hg)	1,797	11.1
Upper Prior	700072	Scott	387.4		Y				R, C (Hg)	16,039	41.4
Battle Creek	820091	Washington	105.9	Yes	Y				L (Cl), C(Hg)	4,264	40.3
Big Carnelian	820049	Washington	451.6		Y		Y		C (Hg)	14,794	32.8
Big Marine	820052	Washington	1889.6		Y				C (Hg)	7,669	4.1

Priority Lakes List											
Lake Name	DNR ID	County	Surface Area (acres)	Shallow Lake	Recreation	Water Supply	Good Water Quality	Wildlife Significance	Impaired Beneficial Use	Watershed Area (acres)	Watershed Area to Lake Area ratio
Bone	820054	Washington	222.6		Y				R, C (Hg)	10,027	45.0
Clear	820045	Washington	45.9				Y			2,500	54.5
Clear	820163	Washington	429.2		Y				C (Hg)	2,554	6.0
DeMontreville	820101	Washington	157.0		Y		Y			4,294	27.4
Elmo	820106	Washington	294.3		Y		Y		C (PFOS, Hg)	14,573	49.5
Forest	820159	Washington	2282.9		Y				C (PCB, Hg)	10,724	4.7
Jane	820104	Washington	152.7		Y		Y			1,207	7.9
Lake St. Croix	820001	Washington	7800.0		Y				R	4,961,920	636.1
Little Carnelian	820014	Washington	156.7				Y		C (Hg)	16,233	103.6
Mays	820033	Washington	54.3				Y			2,393	44.1
Olson	820103	Washington	87.0	Yes			Y			4,896	56.3
Oneka	820140	Washington	393.3	Yes	Y					785	2.0
South Twin	820048	Washington	54.2				Y			1,244	23.0
Square	820046	Washington	201.9		Y		Y		C (Hg)	806	4.0
Sylvan	820080	Washington	107.3				Y			691	6.4
Terrapin	820031	Washington	149.0	Yes			Y			2,241	15.0
West Boot	820044	Washington	64.4				Y			317	4.9
White Bear	820167	Washington	2416.7		Y				C (Hg)	7,629	3.2

Beneficial Use abbreviations: R = Aquatic Recreation; L = Aquatic Life; C = Aquatic Consumption.
Pollutant/Stressor abbreviations: Cl = Chloride; Hg = Mercury; PCB = Polychlorinated biphenyl; PFOS = Perfluorooctane sulfonate; TSS = Total suspended solids
Miss. R. = The lake receives water from the Mississippi River via artificial inter-basin transfer in addition to water received from the lake's watershed.
Green highlight = new priority lake. Orange highlight = Change from previous priority lakes list

Appendix C - System Plan Requirements

The Council looks for provisions in a community's comprehensive plan that provides for wastewater service commensurate with the needs of expected future development. The Council's requirements for the wastewater, surface water and water supply sections of a comprehensive plan are listed below.

Appendix C-1: Wastewater System Plan Elements

Under state law, local governments are required to submit both a wastewater plan element to their comprehensive plan as well as a comprehensive sewer plan describing service needs from the Council. Before any local government unit in the metro area may proceed with a sewer extension, the comprehensive sewer plan must be consistent with the Council's Wastewater System Plan and be approved by the Council. The required information in comprehensive sewer plan has been broader in scope than the information required for the comprehensive plan and has provided more detailed engineering information. To simplify this process and allow the Council to review and approve both documents simultaneously, the Council has combined the required elements of both plans into the following criteria:

This section is divided into two parts:

- Requirements for communities that are served by the Council's regional system, also known as the Metropolitan Disposal System.
- Requirements for all other communities (and/or parts of communities) in the region.

Requirements for Areas Served by the Regional System

- Adopted community sewered forecast of households and employment in 10-year increments to 2040, based on the Council's 2040 forecasts with any subsequent negotiated modifications.
- A map or maps showing the following information:
  - The communities existing sanitary sewer system identifying lift stations, existing connections points to the metropolitan disposal system, and the future connection points for new growth if needed.
  - Intercommunity connections and any proposed changes in government boundaries based on orderly annexation agreements.
  - Copy of any intercommunity service agreements entered into with an adjoining community after December 31, 2008.
  - The location of all private and public wastewater treatment plants.
  - Description of community's management program for subsurface sewage treatment systems to comply with MPCA 7080, and a copy of the community's current subsurface sewage treatment system ordinance.
  - Each existing or future connection point to the metropolitan disposal system as a local sewer service district.
- A table or tables that provide the following information:
  - Capacity and design flows for existing trunk sewers and lift stations.
  - Information on the number of existing and potential connections by local sewer service district, and projected flow volume in 10-year increments through 2040 and

build-out. There is no preferred method for projecting interceptor flows. Communities may use the method that is most appropriate, and indicate methodology and assumptions used.

  - Proposed time schedule for the construction of new trunk sewer systems that require connections to the Metropolitan Disposal System.
  - Accompanying information on the type and capacity of the treatment facilities, whether municipally or privately owned, as well as copies of their appropriate National Pollutant Discharge Elimination System (NPDES) or State Disposal System (SDS) permit.

- City goals, policies and strategies for preventing and reducing excessive infiltration and inflow (I/I) in local sewer system, including:
  - Requirements and standards for minimizing inflow and infiltration and for the disconnection of sump pump and foundation drain connections to the sanitary sewer system. To be included are copies of ordinances prohibiting the discharge of foundation drains and/or roof leaders to the sanitary disposal system as well as copies of ordinances requiring the disconnection of existing foundation drains, sump pumps and roof leaders from the sanitary disposal system.
  - Information on the extent, source and significance of existing I/I problems along with an analysis of costs for remediation.
  - Implementation plan including program strategy, priorities, scheduling, and financing mechanisms for eliminating and preventing excessive I/I from entering the system.

Requirements for Areas Not Served by the Regional System

- Adopted community sewered forecast of households and employees in 10-year increments to 2040 (based on Council's 2040 forecasts with any subsequent negotiated modifications).
- Description of community's management program for subsurface sewage treatment to comply with MPCA 7080, and a copy of the community's current subsurface sewage treatment system ordinance.
- Map showing the locations of existing public and private treatment systems, if any, including package treatment plants and communal on-site systems.
- Map identifying location of on-site sewage disposal systems. Location of known nonconforming systems or systems with known problems should be identified.
- Description of conditions under which private, community treatment systems (for example, package treatment plants, community drainfields) would be allowed. Examples of such conditions should include allowable land uses, installation requirements, management requirements, and local government responsibilities.
- Capacity of and existing flows to public and private treatment systems.
- Brief description of the community's sewer system plan (proposed to 2040), including the following information:
  - Projected flows in 2020, 2030, and 2040.
  - Local objectives, policies and strategies for preventing and reducing excessive infiltration and inflow, including sump pumps and drain tile in the local sewer system.

- Proposed timing and financing of any expanded/new wastewater treatment facilities.
- Copies of facility planning reports for the upgrading of the wastewater treatment plants.
- Map showing the service areas through 2040, staging plan if available, and any proposed changes in governmental boundaries affecting the community, including any areas designated for orderly annexation.

Appendix C-2: Local Surface Water Management Plan Elements

Background

In 1995, the Metropolitan Land Planning Act was amended to require that each city and township's comprehensive plan include a local water management plan. Local water management plans need to be consistent with the requirements in Minn. Stat. 103B.235, the Metropolitan Land Planning Act and with Minnesota Rules Chapter 8410. Local water management plans are reviewed by the Council as part of the local comprehensive planning process prior to their approval by the appropriate watershed organization(s) and adoption by the city or township. Local water management plans are crucial in helping the region meet the challenge of cost-effective protection and management of water quality and quantity.

Local Water Plan Requirements

Minnesota Rules Part 8410.0160 requires the local water management plans to address specific elements. If a community does not have a current local water management plan as part of its 2018 comprehensive plan update, the comprehensive plan will be found incomplete for review. If a community has a plan that does not meet the requirements for local water management plans, the Council will likely find the plan to have an impact on our system, thus requiring a plan modification.

In general, local water plans need to include a summary of the priorities and problems in the community; structural, nonstructural and programmatic actions to take to address the priorities and problems; and clearly identified funding mechanisms to fix the problems.

The following is a list of suggested plan elements in addition to the requirements under Ch. 8410 and Minn. Stat. 103B.235.

1. An executive summary that summarizes the highlights of the local water plan.
2. A summary of the appropriate water resource management-related agreements that have been entered into by the local community.
3. A description of the existing and proposed physical environment and land use. Data may be incorporated by reference for other required elements of this section as allowed by the WMO. The community should be aware that not all WMO plans will contain the level of detail needed for the community and, in those instances, the community will need to provide additional information. In addition, the following must be defined in the plan:
    - Drainage areas
    - Volumes, rates, and paths of stormwater runoff (runoff rates are recommended for a 24-hour precipitation event with a return frequency of 1 or 2 years.

Communities with known flooding issues may want to require rate control for storms with other return frequencies such as 10, 25 or 100-year events)

4. An assessment of existing or potential water resource-related problems. At a minimum, the plan should include:
    - A prioritized assessment of the problems related to water quality and quantity in the community.
    - A list of any impaired waters within their jurisdiction as shown on the current Minnesota Pollution Control Agency (MPCA) 303d Impaired Waters list.
    - If a Watershed Restoration and Protection Strategy (WRAPS) or TMDL study has been completed for the community, the community should include implementation strategies, including funding mechanisms that will allow the community to carry out the recommendations and requirements from the WRAPS or TMDL specific to that community. More information on the MPCA's WRAPS and TMDL programs can be found on the MPCA's web site at *www.pca.state.mn.us*.
    - Communities with designated trout streams should identify actions in their plan to address the thermal pollution effects from development.
    - Communities with special waters, such as outstanding resource value waters, need to meet state requirements for development near these waters.
5. A local implementation program/plan that includes prioritized nonstructural, programmatic and structural solutions to priority problems identified as part of the assessment completed for number 4, above. Local official controls must be enacted within six months of the approval of the local water plan. The program/plan must:
    - Include areas and elevations for stormwater storage adequate to meet performance standards or official controls established in the WMO plan(s)
    - Define water quality protection methods adequate to meet performance standards or official controls. At a minimum, the plan should include:
        - Information on the types of best management practices to be used to improve stormwater quality and quantity. (A five-year establishment period is recommended for native plantings and bioengineering practices).
        - The maintenance schedule for the best management practices.
    - Clearly define the responsibilities of the community from that of the WMO(s) for carrying out the implementation components
    - Describe official controls and any changes to official controls. At a minimum, the plan should include:
        - An erosion and sediment control ordinance consistent with NPDES Construction Stormwater permit requirements and other applicable state requirements
        - Identify ways to control runoff rates so that land-altering activities do not increase peak stormwater flow from the site for a 24-hour precipitation event with a return frequency of 1 or 2 years. Communities with known

flooding issues may want to require rate control for storms with other return frequencies (10-year, 25-year or 100-year)

- Consider use of NOAA Atlas 14, Volume 8 (Precipitation Frequency Atlas of the United States) to calculate precipitation amounts and stormwater runoff rates.
- Consider adoption of the MPCA Minimal Impact Design Standards (MIDS) performance goals and flexible treatment options.
- For communities that do not adopt MIDS, the plan should use stormwater practices that promote infiltration/filtration and decrease impervious areas, such as with better site design and integrated stormwater management, where practical.

– Include a table that briefly describes each component of the implementation program and clearly details the schedule, estimated cost, and funding sources for each component including annual budget totals

– Include a table for a capital improvement program that sets forth by year, details of each contemplated capital improvement that includes the schedule, estimated cost, and funding source

6. A section titled “Amendments to Plan” that establishes the process by which amendments may be made.

Appendix C-3: Local Water Supply Plan Elements

Public water suppliers serving more than 1,000 people, and all communities in the Twin Cities metropolitan area, are required to prepare and implement water supply plans consistent with Minn. Stat. 103G.291 and Minn. Stat. 473.859. The Master Water Supply Plan (Minn. Stat. 473.1565) provides information to consider during plan development. A local water supply plan template has been developed by the Minnesota Department of Natural Resources and the Metropolitan Council to meet the plan requirements of both agencies.

Additional benefits of completing this template include:

- Fulfills the demand reduction requirements of Minnesota Statutes, section 103G.291 subd 3 and 4.
- Fulfills the requirements for contingency planning for water supply interruption in Minnesota Administrative Rules 4720.5280.
- Will ensure that a community is prepared to handle droughts, water emergencies, and to resolve water conflicts.
- Will allow for submission of funding requests to the Department of Health for their revolving funds and other grants and loan programs.
- Will allow community to submit requests for new wells or expanded capacity of existing wells.

The local water supply plan should encourage conservation and include information about water use by customer category. The water supply plan also should include an implementation program that includes at least the following:

- a description of official controls addressing water supply and a schedule for the preparation, adoption and administration of such controls
- a capital improvement program for water supply

Appendix D – Summary of Policies and Implementation Strategies

Water Resources Policy Plan Overall Goal and Policy

Thrive MSP 2040 Water Sustainability Direction:
The region's water resources are sustainable, supported by a regional strategy that balances growth and protection to improve and maintain the quality and quantity of water in our lakes, rivers, streams, wetlands and groundwater.

The Council will work with state, local and regional partners to provide for sustainable water resources through effective water supply, surface water, and wastewater planning and management.

Water Sustainability Goal:
To protect, conserve and utilize the region's groundwater and surface water in ways that protect public health, support economical growth and development, maintain habitat and ecosystem health, and provide for recreational opportunities, which are essential to our region's quality of life.

Working toward Sustainability using the Watershed Management Approach

Policy on Watershed Approach:
The Council will work with our partners to develop and implement a regional watershed-based approach that addresses both watershed restoration (improving impaired waters) and protection (maintaining water quality in unimpaired waters).

Implementation Strategies:

- Work with the watershed management structure in the metro area on issues that transcend watershed organization boundaries in order to prepare water management plans that promote the protection and restoration of local and regional water resources (lakes, rivers, streams, wetlands and groundwater).
- Through the review process for comprehensive plans, local water plans, and watershed management plans, make water resources management a critical part of land use decisions, planning protocols and procedures to ensure these plans are making progress toward achieving state and regional goals for protection and restoration of water resources.
- Provide technical and financial assistance to local governments and other partners on water issues and water management activities.
- Facilitate discussions on regional water issues that transcend community or watershed organization boundaries.
- Provide technical information to watershed organizations on practices to use and incorporate into their plans that protect water quality for our water supply sources
- Support educational efforts and partnership opportunities with agricultural communities in the region and outstate on watershed issues.

Working toward Sustainability of our Water Supplies

Policy on Sustainable Water Supplies:
The Council will work with our partners to develop plans that meet regional needs for a reliable water supply that protects public health, critical habitat and water resources over the long-term, while recognizing local control and responsibility for owning, operating, and maintaining water supply systems.

Implementation Strategies:

- Collaborate with state agencies, watershed organizations, and community water suppliers to update the regional Master Water Supply Plan.
- Support community efforts to improve water supply resiliency by cooperatively identifying economically and technically feasible water supply alternatives.
- Review and comment on local water supply plans as required by Minnesota Statutes.
- Review and comment on Groundwater Management Areas and water appropriation permits as requested by the DNR.
- Review and comment on wellhead protection and county groundwater plans as required by Minnesota Statutes.
- Facilitate discussions on water supply issues that transcend community boundaries, through subregional work groups and on an ad hoc basis as needed.
- Collaborate with partners to perform special studies as needed.

Assessment of Regional Water Resources

Policy on Assessing and Protecting Regional Water Resources:
The Council will continue to assess the condition of the region's lakes, rivers, streams, and aquifers to evaluate impacts on regional water resources and measure success in achieving regional water goals.

Implementation Strategies:

- With our many partners, monitor the quality of regional lakes and rivers and quality and flow of regional streams.
- Work with our partners to fill gaps in assessments of lake, stream, river, and groundwater data.
- Assess and evaluate long-term water quality trends for the region's lakes, streams, and rivers and identify key issues to be addressed.
- Maintain a regional database that contains easily accessible water quality, quantity and other water related information collected as part of the Council's monitoring programs.
- In partnership with others, complete technical studies to understand regional and subregional long-term water supply availability and demand.

- Support community efforts to identify and evaluate the economic and technical feasibility of water supply approaches and best practices that increase water conservation, enhance groundwater recharge, and make the best use of groundwater, surface water, reclaimed wastewater, and stormwater.

- Convene stakeholders and collaborate with partners to identify water quality improvement implementation paths.

Water Conservation and Reuse

Policy on Water Conservation and Reuse:
The Council will work with our partners to identify emerging issues and challenges for the region as we work together on solutions that include the use of water conservation, wastewater and stormwater reuse, and low impact development practices in order to promote a more sustainable region.

Implementation Strategies:

- Identify and pursue options to reuse treated wastewater to supplement groundwater and surface water as sources of water to support regional growth, when economically feasible.
- Promote water supply resiliency through the use of stormwater best management practices that minimize aquifer impacts and maximize groundwater recharge, where practical.
- Promote water conservation measures, including tool development and outreach.
- Encourage low impact development, land uses, and cooperative water use practices that minimize impacts on aquifers.
- Investigate reusing treated wastewater, and when cost-effective, implement reuse.
- Provide research and guidance on best management practices to use for effective surface water management.
- In partnership with others, research and promote the development of innovative best management practices including low impact development technologies and agricultural best practices.
- Install and monitor innovative nonpoint source pollution reduction practices at Council facilities and support economically feasible projects that demonstrate new technologies and their effectiveness.

Planning for Regional Growth

Policy on Serving the Urban Area:
The Council will plan for sustainable water resources that protect public health, provide recreational opportunities, maintain habitat and ecosystem health and ensure that supplies of potable water are sufficient for the orderly and economical development and redevelopment of the metro area long into the future. A community's comprehensive plan is expected to

accommodate the forecasts and to meet the densities specified in the Council's *Thrive MSP 2040* plan.

A community's comprehensive plan must include:

- A water supply plan that is informed by the Twin Cities metro area Master Water Supply Plan and meets the Department of Natural Resources plan requirements.
- A local surface water management plan that is consistent with Minnesota Rules Chapter 8410 and Council policy and does not adversely impact the regional wastewater system, and
- A comprehensive sewer plan that is consistent with the regional wastewater system plan.

Inconsistencies between the local plans and the Council's plans may result in the Council's finding that the community's plan is more likely than not to have a substantial impact on, or contain a substantial departure from, the metropolitan system plan, thus requiring modifications to the local comprehensive plan.

Implementation Strategies:

- Provide a level of wastewater service commensurate with the needs of the growing metro area, and in an environmentally sound manner.
- Provide sufficient capacity in the wastewater system to meet the growth projections and long-term service area needs identified in approved local comprehensive sewer plans.
- Stage wastewater system improvements, when feasible, to reduce the financial risks associated with inherent uncertainty in growth forecasts.
- Potentially implement early land acquisition and work closely with communities to preserve utility corridors when it is necessary to expand its facilities or locate new facilities needed to implement the wastewater system plan.
- Efficiently use existing sewer investments in developing and redeveloping areas.
- Preserve unsewered areas inside the Long-Term Wastewater Service Area for future development that can be sewered economically.
- Extend wastewater service to suburban communities if the service area contains at least 1,000 developable acres.
- Require that all communities currently served by the regional wastewater system remain in the system.
- Acquire wastewater treatment plants from suburban communities outside the current service area, based upon request through the comprehensive plan and comprehensive sewer plan process, after soliciting customer input and conducting a public hearing on the request.

Policy on Serving the Rural Area:
The Council will acquire wastewater treatment plants owned by Rural Centers, based upon request through the comprehensive plan and comprehensive sewer plan processes, and based

upon criteria that ensure direct identifiable regional benefits, after soliciting customer input and conducting a public hearing on the request.

Implementation Strategies:

- Accept the wastewater service request only when the following criteria are met:
  - The community accepts the Council's growth forecasts, as well as preserves at least 1,000 developed or developable acres for growth through the land use planning authority of the county or adjacent township(s) or through an orderly annexation agreement or similar mechanism to provide for staged, orderly growth in the surrounding area.
  - The community has a DNR approved water supply plan.
  - The community has adequate transportation access.
  - The community lies within the long-term wastewater service area or other regional benefits would result, such as economic development unique to the rural area or preservation of high-value water resources.
  - There are feasible and economical options for siting and permitting an expanded wastewater treatment plant, or for extending interceptor service.
  - The Council has sought customer input, has conducted appropriate financial analysis, and has conducted a public hearing on the community's wastewater service request.

- The Council will convene a work group of urban customer representatives to advise the Council regarding growth forecast uncertainty, transportation to support the growth forecast, and the identifiable regional benefits.
- Require that, if the most economical and beneficial wastewater service option is to construct a regional interceptor to serve the community, the Council will not acquire the community's wastewater treatment plant, and the community will be responsible for decommissioning its treatment plant.
- Not allow connections to the regional wastewater system outside the sewered rural community. The Council may construct capacity to serve the long-term needs of the rural and agricultural planning areas, but will not provide service until the Council, in consultation with the appropriate community, designates the area as a developing community and the community amends its comprehensive plan accordingly.

- Preserve areas outside the Long-Term Wastewater Service Area for agricultural and rural uses, while protecting significant natural resources, supporting groundwater recharge, protecting source water quality, and allowing limited unsewered development.

Policy on Private Wastewater Systems:

Communities that permit the construction and operation of subsurface sewage treatment systems and other private wastewater treatment systems within their communities are responsible for ensuring that these systems are installed, maintained, managed, and regulated consistent with Minnesota Pollution Control Agency rules. The Council will not provide financial support to assist communities if these systems fail.

Implementation Strategies:

- The Council,through the local comprehensive planning process, requires that communities submit copies of their subsurface sewage treatment systems ordinance and information on their management programs for these systems.
- The Council will continue to support State rules for subsurface sewage treatment systems and other private wastewater systems.
- The Council will allow a community to connect a failing subsurface sewage treatment system or other private wastewater treatment system to the regional wastewater system at the community's expense.

Investment

Investment Policy:
The Council will strive to maximize regional benefits from regional investments.

Implementation Strategies:

- Invest in nonpoint-source pollution control when the cost and long-term benefits are favorable compared to further upgrading wastewater treatment.
- Consider pollutant trading or off-set opportunities with nonpoint-sources of pollution when cost-effective and environmentally beneficial.
- Invest in wastewater reuse when justified by the benefits for supplementing groundwater and surface water as sources of water to support regional growth, and by the benefits for maintaining water quality.
- Potentially invest strategically to further the effectiveness of the region's nonpoint-source pollution prevention and control program and to ensure efficient investment to achieve regional water quality objectives.
- Support cost-effective investments in water supply infrastructure to promote sustainable use and protect the region's water supplies by:
    - Developing criteria to identify water supply projects with regional benefit.
    - Promoting equitable cost-sharing structure(s) for regionally-beneficial water supply development projects.
    - Supporting cost-benefit analyses of alternative water supply options.
    - Identifying funding mechanisms for regionally-beneficial water supply development projects.

Wastewater Services

Wastewater Sustainability Policy:
The Council will provide efficient, high-quality, and environmentally sustainable regional wastewater infrastructure and services.

The Council shall conduct its regional wastewater system operations in a sustainable manner as is economically feasible. Sustainable operations relates not only to water resources but also to

increasing energy efficiency and using renewable energy sources, reducing air pollutant emissions, and reducing, reusing, and recycling solid wastes.

Implementation Strategies:

- Implement and enforce Waste Discharge Rules for the regional wastewater system.
- Preserve regional wastewater system assets of the Council through effective maintenance, condition and capacity assessment, and capital investment.
- Accept septage, biosolids, leachate, and other hauled liquid waste at designated sites, provided that the waste can be efficiently and effectively processed.
- Reuse treated wastewater to meet water needs within Council wastewater treatment facilities where economically feasible.
- Provide industries with incentives to pretreat wastewater to reduce its strength and thus provide the most environmental and economical benefit for the region.
- Generate energy from biosolids processing, utilize energy efficient processes and equipment, and reduce building energy use.
- Pursue other renewable energy sources, such as solar power generation, thermal energy recovery, and new technologies – such as fuel cells − as they become proven and economical.
- Stabilize and reduce the volume of biosolids through thermal processing or anaerobic digestion, and utilize the remaining solids as fertilizer and soil conditioner.
- Improve sustainability of wastewater operations, when economically feasible.

Policy on Inflow and Infiltration:
The Council will not provide additional capacity within its interceptor system to serve excessive inflow and infiltration.

The Council will establish inflow and infiltration goals for all communities discharging wastewater to the regional wastewater system. Communities that have excessive inflow and infiltration in their sanitary sewer systems will be required to eliminate the excessive inflow and infiltration within a reasonable time period.

Implementation Strategies:

- Maintain and rehabilitate Council interceptors to minimize inflow and infiltration.
- Develop inflow and infiltration goals for all communities served by the regional wastewater system.
- Require all communities served by the regional wastewater system to include its inflow and infiltration mitigation program in its comprehensive sewer plan, including a program to mitigate sources of inflow and infiltration from private property.
- Limit expansion of service within those communities where excessive inflow and infiltration jeopardizes the Council's ability to convey wastewater without an overflow or backup occurring, or limits the capacity in the system to the point where the Council can

no longer provide additional wastewater services. The Council will work with those communities on a case-by-case basis, based on the applicable regulatory requirements.

- Potentially institute a wastewater rate demand charge for those communities that have not met their inflow and infiltration goal(s), if the community has not been implementing an effective inflow and infiltration reduction program as determined by the Council, or if regulations and/or regulatory permits require Council action to ensure regulatory compliance.

  The wastewater demand charge will include the cost of wastewater storage facilities and/or other improvements necessary to avoid overloading Council conveyance and treatment facilities, and the appropriate charges for use of capacity beyond the allowable amount of inflow and infiltration.

- Work with the State to attempt to (1) make funds available for inflow and infiltration mitigation, and (2) promote statutes, rules, and regulations to encourage I/I mitigation.

- Develop a program to assist communities with reducing inflow and infiltration from private property sources.

Wastewater System Finance Policy:
The Council will continue to implement regional wastewater service fees and charges based on regional cost of services and rules adopted by the Council.

Implementation Strategies:

- Metropolitan wastewater charges will be allocated among local government units based on volume of wastewater treated.
- Industrial wastewater strength charges will be based on actual or average discharge strength above domestic wastewater strength.
- Load charges for septage, portable-toilet waste, holding-tank wastewater and out-of-region wastes will be uniform for each type of load, and based on the volume of the load, the average strength of the types of loads, and the costs of receiving facilities.
- Sewer availability charges (SAC) will be uniform within the urban area based on capacity demand classes of customers and the SAC Procedure Manual. Sewer availability charges for a rural center will be based on the reserve capacity and debt service of facilities specific to the rural center.
- Other fees recovering costs of specific services may be imposed, as approved by the Council.
- Cost-sharing between the Council and a local governmental unit may be used when construction of regional wastewater facilities provides additional local benefits for an incremental increase in costs.
- Facilities that are no longer a necessary part of the regional wastewater system will be conveyed to the benefiting local governmental unit, or will be abandoned or sold, pursuant to related statutes.

- Seek customer input prior to, and give at least three months notice of, any material changes in the design of charges.

- Continue efforts to work to simplify and improve SAC and to communicate to customers.

Appendix E – Definitions

Agricultural Area: Communities that encompass areas with prime agricultural soils that are planned and zoned for long-term agriculture. Maximum allowable density is 4 units/40 acres.

Aquifer: A saturated geologic formation that will yield a sufficient quantity of water to serve as a private or public water supply.

Best management practices: A set of recommendations pertaining to the development and maintenance of varied land uses, aimed at limiting the effects of development, such as soil erosion and stormwater runoff, on the natural environment. See the Council's *Urban Small Sites Best Management Practices Manual* for specific examples of Best Management Practices.

Conservation: The management of natural resources to prevent waste, destruction or degradation.

Density: The number of dwelling units per net residential acre of land.

Design to average flow ratio: The design average flow is calculated as the product of the long-term service area times 800 gallons per acre per day. This value represents an annual average flow from a service area for long-term development.

Design peak average flow: The design peak to average ratio is the ratio of the peak hour flow used for hydraulic design divided by the design average flow.

Design peak hour flow: The design peak hour flow is calculated as the product of the design average flow times the MCES specified peak to average ratio.

Developable land: Land that is suitable as a location for structures and that can be developed free of hazards to, and without disruption of, or significant impact on, natural resource areas.

Diversified Rural: Communities that are home to a variety of farm and nonfarm land uses including very large-lot residential, clustered housing, hobby farms, and agricultural uses. Located adjacent to the Emerging Edge Suburban communities, the Diversified Rural designation protects rural land for rural lifestyles today with the potential of becoming urbanized after 2040. Maximum allowable density is 1-2.5 units for existing lots, and 1 unit/10 acres where possible.

Economic feasibility: Funding exists to cover the costs of the improvements or the financing for them is secured, and the net present value of the expected cash flows of the improvement over its life cycle is greater than zero.

Emerging Suburban Edge: Cities, townships and portions of both that are in early stages of transitioning into urbanized levels of development. In the majority of these communities, less than 40% of the land has been developed. Parts of Emerging Suburban Edge communities are in the MUSA and all have a minimum average net density of 3-5 units/acre.

Excessive I/I: a) I/I that results in the communities wet weather flows to be violation of the Metropolitan Council's established I/I goals for the community. b) I/I that causes the peak hourly flow to exceed the value determined by multiplying the average flow by the value of the peak to

average ratio used by MCES to design interceptors and pump stations.c) I/I that exceeds 25 gallons per day per capita on a maximum monthly basis.

Forecast: In *Thrive MPS 2040*, a calculation of growth in population, households and jobs based on data about current conditions (for example, the 2010 Census) that is extrapolated into the future.

Groundwater: The supply of freshwater under the surface in an aquifer or soil that forms a natural reservoir. (Compare with *surface water.*)

Growth strategy: The Council's selection of an urban growth and development pattern for the region and the measures to implement it.

Household: All the people who occupy a housing unit.

Imminent threat to public health or safety: Situations with the potential to immediately and adversely impact or threaten public health and safety.

Infill: Development or redevelopment of land that has been bypassed, remained vacant, and/or is underused as a result of the continuing urban-development process.

Infiltration: 1. The seepage of water from land surface down below the root zone. This water may move horizontally through the soil toward nearby streams, wetlands, and lakes – becoming baseflow. Or this water may move vertically down to recharge deeper regional aquifers. 2. The seepage of groundwater into sewer pipes through cracks or joints in the pipes.

Inflow: Inflow is typically flow from a single point, such as discharge from sump pumps and foundation drains, or stormwater entering openings in the sewer access covers.

Infrastructure: Fixed facilities, such as sewer lines and roadways; permanent structures.

Integration: The incorporation of all planning aspects (for example, land use, transportation, housing, water resources, and natural resources) into decisions about development.

Investments, regional investments: Investments made by the Metropolitan Council into regional infrastructure.

Land planning act : (See *Metropolitan Land Planning Act.*)

Land supply: Available amount of developable land.

Local comprehensive plan: Plans for local land use and infrastructure. Counties, cities and townships are required to have their local comprehensive plans reviewed by the Metropolitan Council to ensure that they are consistent with metropolitan system plans. (Compare with *comprehensive plan.*)

Local government: Municipal units of government, such as counties, cities and townships.

Low Impact Development (LID): an approach to stormwater management that mimics a site's natural hydrology as the landscape is developed.

MDS: Metropolitan Disposal System

Measured wet weather peak to average ratio: The observed peak-hour flow during wet weather divided by the target annual flow.

Metropolitan Development Guide: The collection of regional plans that includes Thrive MSP 2040 and the policy plans for the regional systems: transportation, wastewater and water quality, regional parks and open space.

Metropolitan Land Planning Act : Minnesota Statute 473 directing the Council to adopt long-range, comprehensive policy plans for transportation, airports, wastewater services, and parks and open space, and authorizing the Council to review the comprehensive plans of local governments.

Metropolitan Urban Service Area (MUSA): The area, in which the Metropolitan Council ensures that regional services and facilities under its jurisdiction are provided.

Multifamily housing: Residential structure with two or more separate dwelling units.

Nonpoint source pollution: water and air pollution from diffuse sources.

Nonurban land uses: Residential, commercial or industrial land uses that are not found in the urban area, and where urban services are unavailable. (Compare with *urban land uses.*)

Observed peak-hour flow: The observed peak- hour flow is the highest flow rate over one hour duration during a 24-hour period that has been measured and reported.

Observed peak-to-average ratio: The observed peak to average ratio is the observed peak hour flow divided by the annual average flow.

On-site septic system: System for disposing and treating human and domestic waste at or near the location where the waste is generated, such as a septic tank and soil absorption system or other system, allowed by state and city when access to the municipal sewer system is not required of feasible.

Open Space: Public and private land that is generally natural in character. It may support agricultural production, or provide outdoor recreational opportunities, or protect cultural and natural resources. It contains relatively few buildings or other human-made structures. Depending on the location and surrounding land use, open space can range in size from a small city plaza or neighborhood park of several hundred square feet, corridors linking neighborhoods of several acres to pasture, croplands or natural areas and parks covering thousands of acres.

Ordinance: A law or regulation adopted by a governmental authority, usually a city or county.

Policy Area: An area distinguished by its land use patterns, community needs and other factors, with its own set of specified policies and implementation strategies.

Recharge: 1. Process by which water from rainfall, snowmelt or other sources seeps through the soil into the saturated zone. 2. The portion of infiltration that moves from the unsaturated sediment below the root zone into the underlying aquifers (saturated zone).

Recharge Area: An area where surface water from rainfall, snowmelt or other sources seeps through the soil into the saturated zone.

Redevelopment: Any proposed expansion, addition, or major façade change of an existing building, structure, or parking facility.

Regional Infrastructure: Infrastructure pertaining to any of the Council's systems: wastewater, transportation, and parks and open space (See also *regional systems.*)

Regional Systems: Systems for which the Metropolitan Council is the responsible planning and operating authority. They include wastewater services, transportation, parks and open space, and airports. (See also *regional infrastructure*.)

Reinvestment: Investment intended to improve upon, remodel or replace existing infrastructure that has become out-dated and obsolete.

Runoff: Rainfall or snowmelt that has not evaporated or infiltrated into the soil, but flows over the ground surface.

Rural Centers: Local commercial, employment, and residential activity centers serving rural areas in the region. These small towns are surrounded by agricultural lands and serve as centers of commerce to those surrounding farm lands. The density is 3-5 units/acre.

Rural Residential Area: Communities that have residential patterns characterized by large lots and do not have plans to provide urban infrastructure. Maximum allowable density is 4 units/40 acres.

Septage: Solids and liquids removed during periodic maintenance of an individual sewage treatment system, or solids and liquids that are removed from toilet waste treatment devices such or a holding tank.

Septic system: (See *on-site septic treatment system.*)

Sewershed: The area that actually or could potentially contribute wastewater to a single point in the MCES interceptor system.

Stormwater: Surplus surface water generated by rainfall that does not seep into the earth but flows overland to flowing or fixed bodies of water. (See also *runoff.*)

Suburban area: Communities that saw their primary era of development during the 1980s and early 1990s. Suburban communities also include places that were once resort destinations along Lake Minnetonka and White Bear Lake and along the St. Croix River. Suburban communities are in the MUSA and have a minimum average net density of 5 units/acre.

Suburban Edge: Communities that have experienced significant residential growth beginning in the 1990s and continuing to the 2010s. At least 40% of the land in these communities is developed, but significant amounts of land remain for future development. Suburban Edge communities are in the MUSA and have a minimum average net density of 3-5 units/acre.

Surcharging: To fill beyond the capacity of the pipe; overflow.

Surface Water: Water on the earth's surface exposed to the atmosphere, such as rivers, lakes and creeks. (Compare with *groundwater.*)

Sustainable Development: Development that maintains or enhances economic opportunity and community well-being while protecting and restoring the natural environment upon which people and economies depend. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs.

System Plans: Long-range comprehensive policy plans for transportation, airports, wastewater services, and parks and open space.

System Statements: Statements sent to communities that include system plan information used to guide the preparation of the comprehensive plan.

Urban area: Communities that are adjacent to the Urban Center communities and have seen considerable development and growth along highways. Urban areas are in the MUSA and have a minimum average net density of 10 units/acre.

Urban Center: Communities that include the largest, most centrally located and most economically diverse cities of the region. Urban centers are in the metropolitan urban service area (MUSA) and have a minimum average net density of 20 units/acre.

Wastewater: Water carrying waste from domestic, commercial, or industrial facilities together with other waters that may inadvertently enter the sewer system through infiltration and inflow.

Wastewater treatment plant: A facility designed for the collection, removal, treatment, and disposal of wastewater generated within a service area.

Wet-weather peak ratio: Average of three highest peak days divided by the average daily flow.

Appendix F – Map of Regional Wastewater System Long-Term Service Areas