



JANUARY 2014
**PROGRESS REPORT
ON WATER SUPPLY
PLANNING**

FUNDED BY THE MINNESOTA CLEAN WATER FUND



The Council's mission is to foster efficient and economic growth for a prosperous metropolitan region.

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The Metropolitan Council is the regional planning organization for the seven-county Twin Cities area. The Council operates the regional bus and rail system, collects and treats wastewater, coordinates regional water resources, plans and helps fund regional parks, and administers federal funds that provide housing opportunities for low- and moderate-income individuals and families. The 17-member Council board is appointed by and serves at the pleasure of the governor.

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Metropolitan Area Water Supply Planning

Reliable sources of clean water have been critical to the development of the Twin Cities metropolitan area, and that need continues today. With a growing population, more business and industry, and a changing environment, the long-range outlook for clean water is a challenging one. Today, increased groundwater pumping to accommodate development is depleting aquifers and affecting lakes, streams, and wetlands. One visible symptom is seen in lakes in the northeast metro, especially White Bear Lake.

With increased growth, the problem will worsen by continued heavy reliance on groundwater sources. A new approach would require exploring the engineering and financial feasibility of water supply alternatives, design analyses, and collaboration among jurisdictions. This report describes planning efforts and projects under way that can help meet the challenge.

Legislative Charge for Metropolitan Council Water Supply Planning Activities

The 2005 Minnesota Legislature directed the Metropolitan Council to “carry out planning activities addressing the water supply needs of the metropolitan area,” including the development of a Twin Cities Metropolitan Area Master Water Supply Plan (Minn. Stat., Sec. 473.1565). After completing that plan, the Council took on many technical and outreach projects that strengthen local and regional water supply planning efforts and work toward making water supply planning a more important part of comprehensive planning, carried out by local communities.

All of the Council’s Clean Water Fund activities are built on the foundation of ongoing water supply planning work that is defined in the Twin Cities Metropolitan Area Master Water Supply Plan.

State Fiscal Year 2013-2015 Funding

In 2013, the state Legislature approved \$2,537,000 from the Clean Water Legacy Fund to evaluate the reliability and sustainability of the water supply throughout the seven county metropolitan area, including the northeast metro (Minn. Laws 2013 Ch. 137, Art. 2, Sec. 9). Specific requirements include:

1. Investigation of groundwater and surface water interaction in the northeast metropolitan area and guidance for other areas to use in addressing groundwater and surface water interaction issues
2. Determination of a sustainable regional balance of surface water and groundwater

The Twin Cities seven-county metropolitan area is home to over half of Minnesota’s population.

Securing their safe and plentiful water, while protecting the region’s diverse water resources, requires coordinated, interdisciplinary and ongoing effort.

3. Feasibility assessment of potential solutions to rebalance regional water use and identification of potential solutions to address emerging subregional water supply issues
4. Development of an implementation plan that addresses regional targets and timelines and defines short- and medium-term milestones for achieving the desirable surface water and groundwater regional balance

This report fulfills the legislative requirement for an interim report on the expenditure of this appropriation by January 15, 2014.

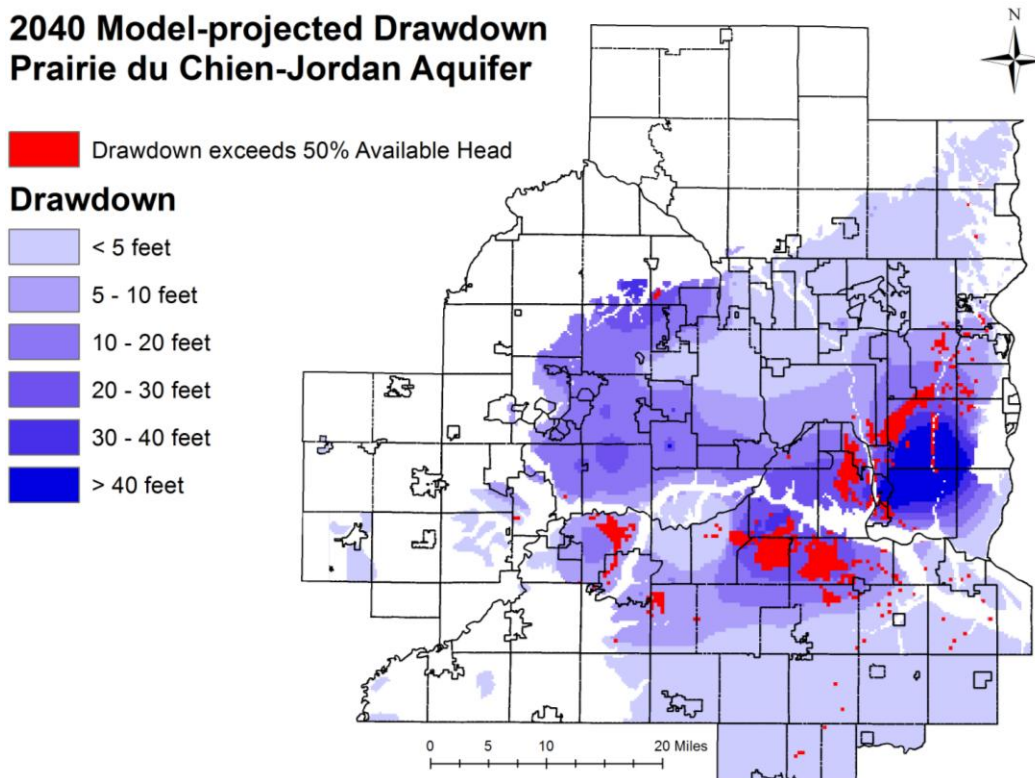
The report provides information about how funds are being allocated, data that has been and continues to be collected, up-to-date analysis findings in the northeast metro, and work that been done and remains to do.

It is important that readers also understand what this progress report is **not yet ready to convey**. This progress report does not include the estimated cost of various water supply options, or recommendations about options to pursue and funding mechanisms with which to implement proposed solutions. More detailed information will be provided as projects are finalized.

Framework for Project Scoping

Water supply reliability and sustainability are achieved through implementation and update of the Twin Cities Metropolitan Area Master Water Supply Plan (Master Plan), the region's framework for sustainable water supply management.

Groundwater modeling, a key component of the Master Plan, makes it evident that our current approach to water supply is not sustainable. Aquifers are being depleted. Lakes, streams, and wetlands are being affected. The good news is that a variety of solutions are possible.

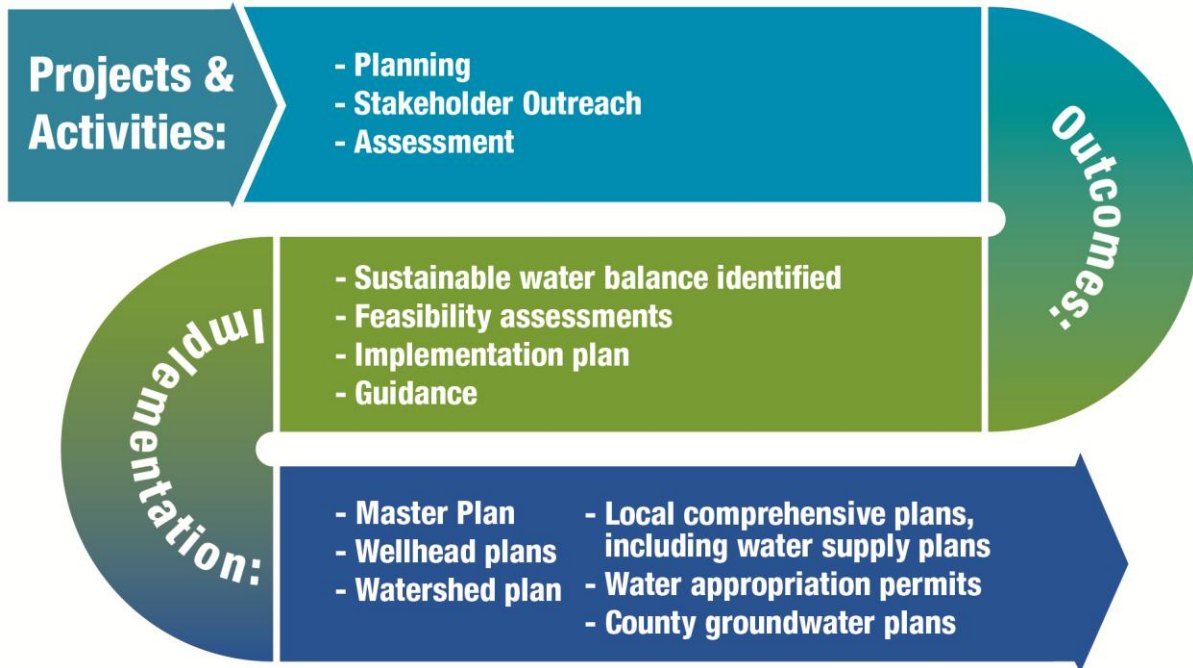


Metropolitan Council considers the Master Plan when preparing regional development frameworks and policies and when reviewing local comprehensive plans (Minn. Stat., Sec. 473.1565). Communities with municipal water supply systems must develop water supply plans that are consistent with the Master Plan (Minn. Stat., Sec. 103G.291).

WATER SUPPLY: CONNECTING CLEAN WATER FUND PROJECTS AND REGIONAL PLANNING	
WINTER 2013/2014	<ul style="list-style-type: none"> January 15, 2014 interm report to legislature on the expenditure of SFY14-15 Clean Water Fund appropriation (this report)
SPRING 2014	<ul style="list-style-type: none"> Stakeholder outreach, data collection, and analyses
SUMMER 2014	<ul style="list-style-type: none"> Thrive MSP 2040, the update metropolitan development guide, complete Metro Model 3, the updated regional groundwater flow model, complete
FALL 2014	<ul style="list-style-type: none"> Northeast metropolitan area feasibility assessment complete Feasibility study of joint water utility complete Regional feasibility assessment of alternative water supplies complete
WINTER 2014/2015	<ul style="list-style-type: none"> Water Resources Policy plan, reflecting sustainable water supply principles in the Master Plan, released for public review
SPRING 2015	<ul style="list-style-type: none"> Water conservation toolbox for water customers complete Stormwater reuse demonstration project complete Master Plan updated based on Metro Model 3, conservation & reuse projects, and feasibility assessments; released for public review
SUMMER 2015	<ul style="list-style-type: none"> Master Plan update complete Water supply planning workshops to support local comprehensive planning
FALL 2015	<ul style="list-style-type: none"> Communities notified to begin updating local comprehensive plans, including local water supply plans, consistent with updated Master Plan
2016	<ul style="list-style-type: none"> USGS Scientific Investigations Report released Communities begin updating local comprehensive plans

Project Outcomes Support Reliable and Sustainable Water Supplies

The Council's State Fiscal Year 2013-2015 Clean Water Fund appropriation finances activities and projects that support the implementation and update of the Master Plan. These activities are *also* designed to deliver products and outcomes that fulfill detailed appropriation requirements. This work provides local and regional guidance, analyses, and tools that are needed by suppliers and water resource managers across the region in order to sustainably manage the region's water supply.



Progress on Funding

The Metropolitan Council has executed four master contracts with consultants and is completing an interagency agreement with the United States Geological Survey, for a total cost of \$2,537,000. In addition, the Council created two full-time employee positions to provide additional technical and project management support. The Council is completing scopes for additional projects in early 2014, for an additional \$834,000.

Project Name	Budget
Water conservation toolbox for customers	\$96,700
Stormwater reuse demonstration project	\$200,000
Regional feasibility of alternative approaches to water sustainability	\$379,300
Characterizing groundwater-surface water interaction in northeast metro lakes	\$537,000
Feasibility study of joint water utility	\$50,000
Feasibility assessment of approaches to water sustainability in northeast metro	\$440,000
<i>Additional feasibility assessment projects</i>	<i>\$834,000</i>
TOTAL	\$2,527,000

Water Conservation Toolbox

BUDGET \$96,700 estimated total.

PROJECT SCHEDULE Estimated completion in summer 2015.

STATUS 25% complete.

SUMMARY

The Metropolitan Council, in conjunction with CDM Smith and HKGi consultants, are undertaking a reorganization and expansion of the water conservation tools on the water supply planning pages of the Council's website. The revised Toolbox will be organized into an online, web-based guide format. These tools will be supplemented with fact sheets and case studies that will serve to educate and provide useful information to support water conservation programs and activities.

DELIVERABLES

The final product will be a user-friendly web-based guide, including:

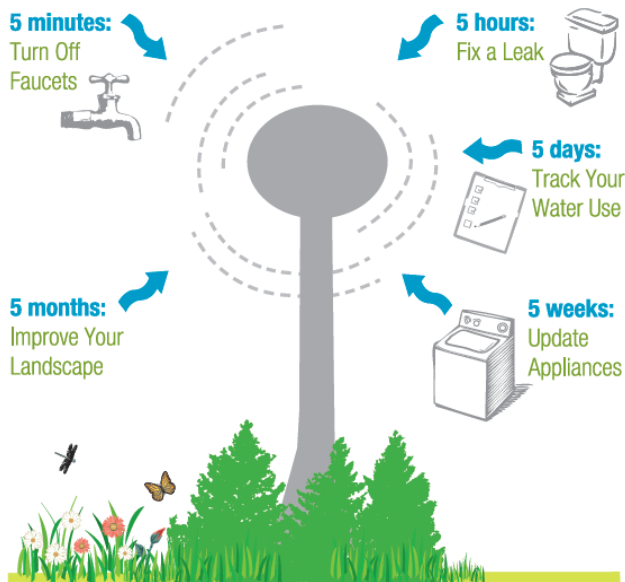
- Justifications for conserving water, both financial and ethical
- Conservation fact sheets and case studies
- Financial calculators for water users and water suppliers

OUTCOMES

- Water users will have access to an online guidance toolbox to select the best water conservation practices, which will reduce per capita water use across the metro area
- Guidance to address groundwater and surface water interaction issues is prepared
- The feasibility of potential solutions to rebalance regional water use is assessed
- Potential solutions to address emerging subregional water supply issues are identified

Water Conservation:

Individual Choices that Sustain Communities



No matter how much time or money you have, you can act to conserve water. In less than a day, you can fix a faucet. If it leaks one drop per second, that simple fix can save over 3,000 gallons per year.

Stormwater Reuse Demonstration Project

BUDGET Estimated project total of \$200,000.

PROJECT SCHEDULE Estimated completion in summer 2015.

STATUS 17% complete.

SUMMARY

The Metropolitan Council and City of Saint Paul are cooperating on a rainwater harvesting and reuse system in downtown Saint Paul. Rainwater from the northern half (2 acres) of the roof at the new Metro Transit Green Line Operations and Maintenance Facility (OMF) will be captured using a modified version of the existing OMF rainwater collection system. The existing collection system will be re-designed to convey rainwater to the new Lowertown Ballpark, future home of the Saint Paul Saints, where potential uses include ball field irrigation and toilet flushing. In addition to reducing potable water use at the stadium, this project will divert hundreds of thousands of gallons of water annually that would otherwise drain to the Mississippi River.

DELIVERABLES

The Metropolitan Council is delivering two separate and related pieces of this project:

- Participation in a project with the City of Saint Paul for the design and construction of the stadium rainwater reuse system
- The work required to convey rainwater from the northern half of the OMF roof to the stadium

OUTCOMES

- The feasibility of potential solutions to rebalance regional water use is assessed
- Potable water use at the stadium will be reduced
- Hundreds of thousands of Lowertown Ballpark visitors will learn about stormwater reuse
- Stormwater discharge to the Mississippi River will be reduced

This rendering of the Lowertown Ballpark illustrates the extent of the green space that could be irrigated by reusing stormwater from the adjacent Metro Transit Green Line Operations and Maintenance Facility. Source: Ballpark Fans and Friends.org.



Regional Feasibility of Alternative Approaches to Water Sustainability

BUDGET \$379,300 estimated total.

PROJECT SCHEDULE Estimated completion in fall 2014.

STATUS 14% complete.

SUMMARY

The Metropolitan Council, in conjunction with HDR Engineering, Inc. consultants, will evaluate a variety of approaches to develop sustainable water supplies across the metro area. Subregional study areas are being selected where multiple communities face potential problems with the long-term sustainability of current water supplies, and where community stakeholders have expressed interest in learning more about sustainable water supply options. Two to three subregional areas are being considered for evaluation. The first subregional area to be identified includes communities in the southeastern portion of the metro area (Mendota Heights, West St. Paul, Eagan, Inver Grove Heights, Burnsville, Apple Valley, Rosemount, Lakeville, Farmington, and Hastings). These communities have formed a groundwater workgroup to address the issue of future sustainability, and they have expressed support for a study led by the Council to examine the feasibility of alternative approaches to water supply. Alternatives to be considered include the development of a joint water system to serve multiple communities based on surface water or alternate groundwater sources, the reuse of treated wastewater or stormwater to serve industrial or irrigation customers, and the use of treated wastewater or stormwater to recharge aquifers. Potential second and third subregional study areas are currently being identified to perform similar analyses.

DELIVERABLES

- Identification of subregional study areas and stakeholder participants
- Criteria for identifying feasible approaches to sustainable water supply development in different parts of the metro area
- Identification of feasible water supply approaches for each study area
- An assessment of infrastructure costs and other challenges to the implementation of alternative water supply systems, along with regional benefits
- Identification of cost-sharing or financing structures that would promote financial equity within a proposed subregional water system
- A plan for implementation of recommended alternatives, including timelines with milestones to achieve water supply sustainability goals

OUTCOMES

- Potential solutions to address emerging subregional water supply issues are identified
- The feasibility of potential solutions to rebalance regional water use is assessed
- Regional targets, milestones, and timelines are identified to achieve a desirable regional balance of surface water and groundwater

Northeast Metro Investigations

The State Fiscal Year 2014-2015 Clean Water Fund appropriation identified the northeast metro as a place where potential solutions are needed to address emerging water supply issues.

Three projects are underway to identify the advantages and disadvantages of combining water supply systems, using new water supply sources such as treated water from Saint Paul Regional Water Services or raw water from the Mississippi or St. Croix rivers, and optimizing groundwater pumping to protect water levels in White Bear Lake and other lakes across the northeast metro:

1. Characterizing Groundwater and Surface Water Interaction in Northeast Metro Area Lakes, MN
2. Feasibility Study of Joint Water Utility – Cities of Centerville, Circle Pines, Columbus, Hugo, Lexington and Lino Lakes
3. Feasibility Assessment of Approaches to Water Sustainability in the Northeast Metro



White Bear Lake, along with other lakes in the northeast metro area, has experienced significant declines in recent years.

Characterizing Groundwater and Surface Water Interaction in Northeast Metro Area Lakes, MN

BUDGET \$537,000 estimated total Council contribution; \$25,000 estimated MDH contribution. \$150,000 estimated USGS contribution. Estimated project total of \$712,000.

PROJECT SCHEDULE Estimated completion in fall 2016.

STATUS 15% complete.

SUMMARY

The State Fiscal Year 2014-2015 Clean Water Fund appropriation identified the northeast metro as an area where potential solutions are needed to address emerging water supply issues. Three projects are underway to identify the advantages and disadvantages of combining water supply systems, using new water supply sources such as treated water from Saint Paul Regional Water Services or raw water from the Mississippi or St. Croix rivers, and optimizing groundwater pumping to protect water levels in White Bear Lake and other lakes across the northeast metro.

“The more research we have, the better we are going to be,” said White Bear Lake mayor Jo Emerson. “It’s not just a White Bear Lake issue; it’s a statewide issue.”

Water levels in White Bear Lake and other lakes in the northeast Twin Cities metropolitan area have generally decreased since 2003. Currently low levels limit access and recreational use of the lakes. A recently completed U.S. Geological Survey (USGS) study of White Bear Lake indicated that water from the lake was flowing to the lower Prairie du Chien-Jordan aquifer and reaching down gradient wells that are open to that aquifer. Little is known, however, about the groundwater and surface water interactions at other lakes in the northeast metro. This study will characterize groundwater and surface water interactions in northeast metro lakes, including White Bear Lake, and the response of lake levels to changes in precipitation and groundwater flow conditions.

An understanding of interactions between groundwater and surface water in the watersheds of closed basin lakes – such as those in the northeast metro – is critical in assessing lake level responses to climate changes and anthropogenic impacts. State and city water managers and planners need this knowledge to assess how groundwater withdrawals may impact water levels in aquifers and connected lakes and to accurately assess source water protection for their water supplies.

DELIVERABLES

- Draft USGS Scientific Investigations Report: June 2016
- Final USGS Scientific Investigations Report: Sept. 2016

OUTCOMES

- Groundwater and surface water interaction in and around White Bear Lake and surrounding lakes is characterized
- Guidance provided to address groundwater and surface water interaction issues
- Land use and watershed planners will gain information to better manage activities that may impact aquifers, assisting with the protection of critical water supplies

Feasibility Study of Joint Water Utility – Cities of Centerville, Circle Pines, Columbus, Hugo, Lexington and Lino Lakes

BUDGET \$50,000 estimated total.

PROJECT SCHEDULE Estimated completion fall 2014.

STATUS 17% complete.

SUMMARY

The State Fiscal Year 2014-2015 Clean Water Fund appropriation identified the northeast metro as an area where potential solutions are needed to address emerging water supply issues. Three projects are underway to identify the advantages and disadvantages of combining water supply systems, using new water supply sources such as treated water from Saint Paul Regional Water Services or raw water from the Mississippi or St. Croix rivers, and optimizing groundwater pumping to protect water levels in White Bear Lake and other lakes across the northeast metro.

This project, led by the Council in conjunction with Barr Engineering Company, Inc. consultants, will evaluate the financial implications of combining certain components of municipal water supply and distribution systems in the cities of Centerville, Circle Pines, Columbus, Hugo, Lexington and Lino Lakes. Two scenarios will be considered. One includes a system where a new entity would own and operate a combined supply, storage and treatment system with the individual cities owning the distribution systems within their own borders. The second is a fully integrated system where the combined entity owns and operates all potable water related infrastructure. Together, the cities cover an area of approximately 100 square miles and have a current combined population of approximately 50,000 people, or 17,000 households. A substantial amount of land in the combined cities is undeveloped, and the population is expected to grow substantially in the next few decades.

The preliminary feasibility report will identify the advantages and disadvantages of combining systems, how a collaborative effort might be managed, and, in a preliminary way, what the financial impacts to each city may be. The feasibility study will look at the effects of collaborative efforts for the current water systems and a future scenario for the year 2040.

DELIVERABLES

- An assessment of infrastructure costs and other challenges to the implementation of alternative water supply systems, along with regional benefits
- Identification of cost-sharing or financing structures that would promote financial equity within a proposed sub-regional water system

OUTCOMES

- The feasibility of potential solutions to rebalance regional water use is assessed
- Improved understanding of the challenges and benefits of water supply collaboration among metropolitan area communities
- A model framework for joint water system projects will be initiated, providing information to communities throughout the metro area

Feasibility Assessment of Approaches to Water Sustainability in the Northeast Metro

BUDGET \$440,000 estimated total.

PROJECT SCHEDULE Estimated completion in fall 2014.

STATUS 25% complete.

SUMMARY

The State Fiscal Year 2014-2015 Clean Water Fund appropriation identified the northeast metro as an area where potential solutions are needed to address emerging water supply issues. Three projects are underway to identify the advantages and disadvantages of combining water supply systems, using new water supply sources such as treated water from Saint Paul Regional Water Services or raw water from the Mississippi or St. Croix rivers, and optimizing groundwater pumping to protect water levels in White Bear Lake and other lakes across the northeast metro.

The Council, in conjunction with S.E.H. consultants, is evaluating water supply approaches to serve the northeastern part of the Twin Cities metropolitan area. Subregional study areas are being selected based on the indication of potential problems with the long-term sustainability of current water supplies, as well as expressed interest by community stakeholders. These communities have formed a groundwater workgroup to address the issue of future sustainability, and have expressed support for a study led by the Council to examine the feasibility of water supply approaches. Approaches to be considered include connection to Saint Paul Regional Water Services to supply drinking water, development of a raw water connection to a new subregional treatment plant, and direct augmentation of White Bear Lake with river water.

DELIVERABLES

- Databases of technical and financial data
- Water demand projections
- Analysis of infrastructure components, benefits and costs, and cost-sharing options for three (3) White Bear Lake restoration alternatives:
 - Connection to Saint Paul Regional Water Services to supply drinking water
 - Raw water connection to a new treatment facility to supply drinking water
 - Direct augmentation of White Bear Lake from St. Croix or Mississippi rivers
- Final report on the engineering feasibility analysis to restore White Bear Lake (Fall 2014)

OUTCOMES

- The feasibility of potential solutions to rebalance regional water use is assessed
- Potential solutions to address emerging subregional water supply issues are identified
- Regional and subregional targets and timelines are identified to achieve a desirable balance of surface water and groundwater
- Short- and medium-term milestones are defined to achieve a desirable regional and subregional balance of surface water and groundwater
- A roadmap for subregional water supply reliability and sustainability will be created that is coordinated with other program outcomes

PRELIMINARY RESULTS

Criteria have been identified to select approaches for evaluation, and existing and future water sources and demand have been evaluated. This information is being used to analyze the feasibility of three (3) approaches to restoring White Bear Lake levels. Preliminary results of these analyses are presented in this report. Final results will be presented in the fall of 2014.

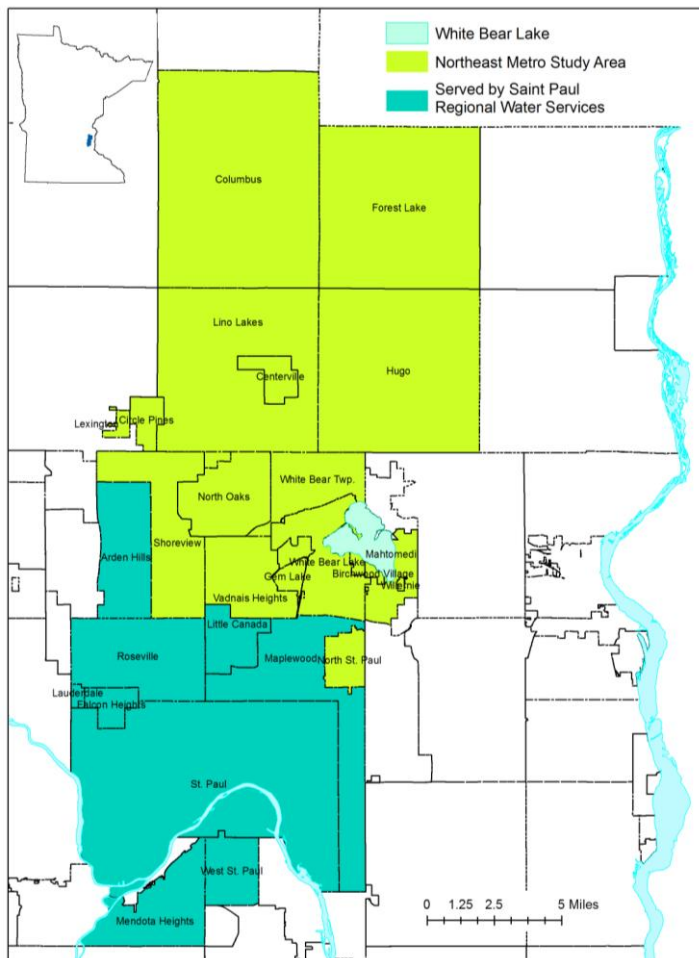
Criteria Used to Select Approaches

Approaches were selected based on their potential to achieve water supply reliability and sustainability goals for the Twin Cities metropolitan area. In particular, the approaches included in the study would either produce a sustainable balance of surface water and groundwater or offset environmental impacts of current groundwater use. Three base approaches met these criteria:

- Approach 1 – Drinking Water Connection to St. Paul Regional Water Service
- Approach 2 – Raw Water Connection to New Regional Treatment Facility
- Approach 3 – Direct Augmentation of White Bear Lake

Approaches 1 and 2 would reduce the metro area's dependence on groundwater, thereby increasing long-term water supply sustainability and reducing impacts to surface water features such as White Bear Lake and other surface waters in the northeast metro. Approach 3 would offset or reduce the impacts of groundwater use on White Bear Lake water levels only.

The base approaches are not intended to be mutually exclusive and the best possible outcome may be a combination of the approaches.



Criteria Used to Define Study Area Boundary

The thirteen (13) northeast metro communities included in the study include North St. Paul, Shoreview, Vadnais Heights, White Bear Lake, Mahtomedi, White Bear Township, Lexington, Circle Pines, Lino Lakes, Centerville, Hugo, Columbus, and Forest Lake (Figure 1). The communities were selected based on their reliance on groundwater, geographical location, and willingness to participate in this study.

Figure 1. Thirteen communities were included in the feasibility assessment of approaches for sustainable water in the northeast metro.

Existing Water Supply Sources and Demand in the Study Area

As indicated in Table 1, all of the study area communities use groundwater as their source of drinking water. These communities rely primarily on the Prairie du Chien – Jordan aquifer, with the exceptions of Forest Lake, Columbus, and Lexington.

Table 1. Number of Prairie du Chien-Jordan and other community wells in the study area.

Community	# of Prairie du Chien – Jordan Wells	# of Other Wells
Centerville	2	0
Circle Pines	1	1 (drift)
Columbus	0	3 (2 drift, 1 FIG)
Forest Lake	0	3 (Mt. Simon)
Hugo	5	0
Lexington	0	1 (drift)
Lino Lakes	5	0
Mahtomedi	4	0
North St. Paul	5	0
Shoreview	6	0
Vadnais Heights	4	0
White Bear Lake	4	0
White Bear Township	6	0

Table 2 summarizes the existing (2010) and future (2040) average and maximum day water demands for the communities in the study area. The water demands are reported as million gallons per day (MGD). Water demand data was gathered from public sources including Comprehensive Plans and the Council 2040 water projections.

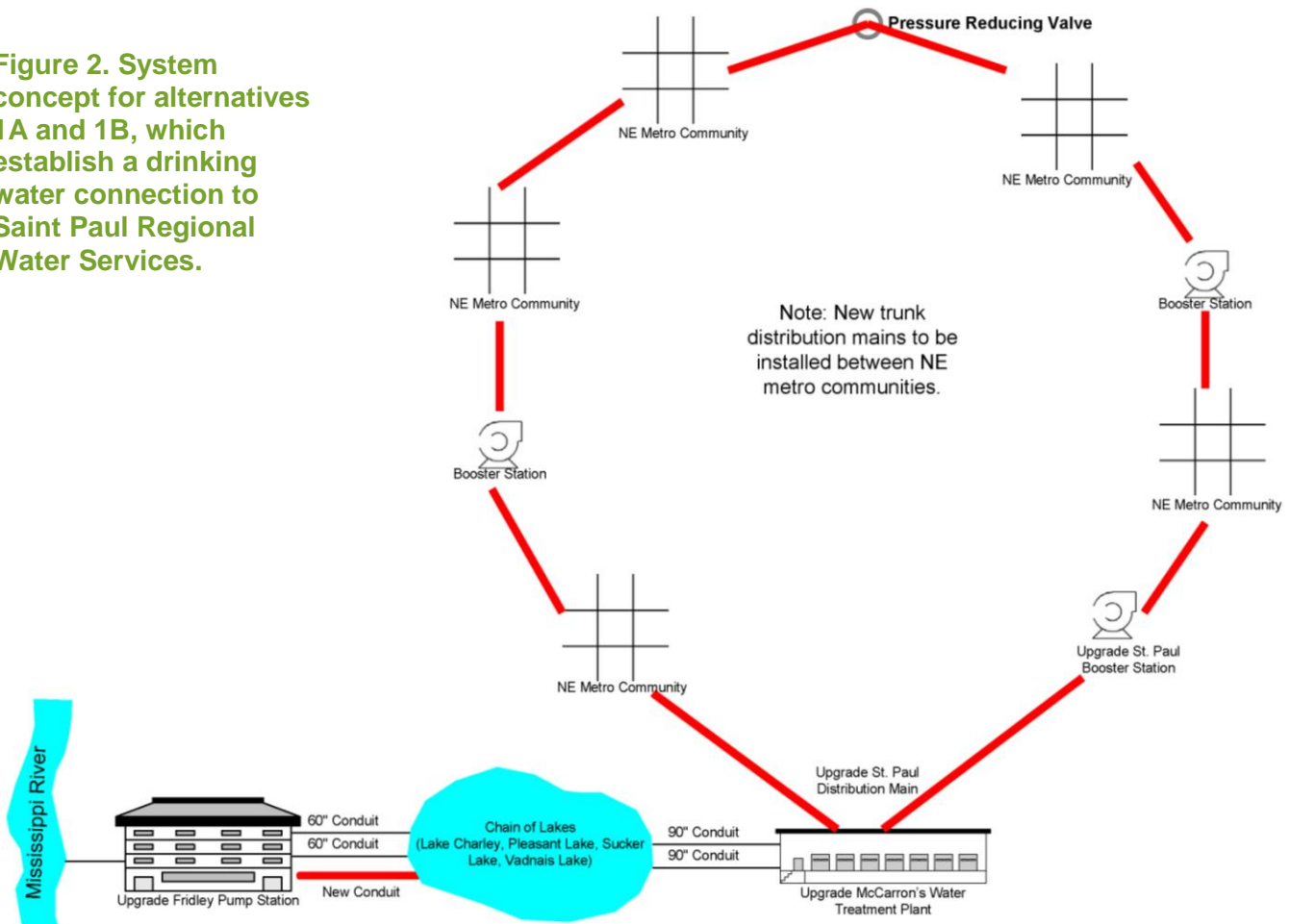
Table 2. Water demand (million gallons per day) by communities in the study area.

Community	2010 Avg. Day Demand (MGD)	2010 Max Day Demand (MGD)	2040 Avg. Day Demand (MGD)	2040 Max Day Demand (MGD)
Centerville	0.4	1.1	0.5	1.4
Circle Pines	0.5	1.5	0.5	1.5
Columbus	0.1	0.1	0.3	0.7
Forest Lake	2.2	3.9	2.7	4.8
Hugo	1.8	6.4	2.5	8.9
Lexington	0.3	1.5	0.3	1.5
Lino Lakes	1.8	6.0	2.2	7.3
Mahtomedi	0.9	2.2	1.0	2.4
North St. Paul	1.4	4.1	1.3	3.8
Shoreview	3.3	10.6	4.0	12.8
Vadnais Heights	1.6	3.9	2.1	5.1
White Bear Lake	2.9	8.1	3.3	9.2
White Bear Twp.	1.7	4.5	1.6	4.2
Total	18.9	53.9	22.3	63.6

Summary of Approach 1 – Drinking Water Connection to St. Paul Regional Water Service

This approach examines the feasibility of connecting communities in the study area to Saint Paul Regional Water Services’ drinking water supply system. Approach 1A includes connecting only 2 or 3 communities to Saint Paul Regional Water Services. Approach 1B includes connecting all communities in the study area to Saint Paul Regional Water Services. Figure 2 provides a system concept for both approaches.

Figure 2. System concept for alternatives 1A and 1B, which establish a drinking water connection to Saint Paul Regional Water Services.



Saint Paul Regional Water Services currently has approximately 30 MGD of excess capacity in the water treatment plant. In 2040, the excess capacity in the water treatment plant is projected to be approximately 16 MGD. As indicated in Table 2, the maximum day demand for all of the study area communities in 2040 is 64 MGD. Therefore, without additional infrastructure, Saint Paul Regional Water Services will not be able to provide drinking water to all of the communities in the study area.

Approach 1A – Connect 2 or 3 Communities to Utilize Existing Saint Paul Regional Water Services Capacity

This approach will connect 2 or 3 study area communities to Saint Paul Regional Water Services, using the existing Saint Paul Regional Water Services' treatment capacity as a water supply source. The communities selected would be based on proximity and infrastructure needs to connect to Saint Paul Regional Water Services. This approach will not reduce groundwater use in all study area communities.

Benefits

- Reduced reliance on groundwater, a declining resource, in the northeast metro
- Provide a higher quality drinking water to selected communities (softened water, free of iron, manganese)

Barriers to Implementation

- Significant increase in cost of water to selected communities
- Managing water chemistry – potential issues with mixing groundwater and surface water (disinfection byproducts, scaling)
- Infrastructure Needs
 - New water distribution main between Saint Paul Regional Water Services and selected communities
 - Booster stations and pressure relief valves to interconnect communities

Estimated Construction Cost: Being determined as design details are finalized

Construction costs will be estimated as design details are developed and presented as a range to reflect the variety of options for construction methods. Construction cost estimates will not include operating costs or increase in cost of water to residents (i.e. cost of Saint Paul Regional Water Services' water is higher than currently charged to study area communities).

Approach 1B – Connect all communities in the Northeast Metro to Saint Paul Regional Water Services

To connect all or a majority of the study area communities to Saint Paul Regional Water Services will require infrastructure upgrades to most of the Saint Paul Regional Water Services water system components, in addition to new water distribution main and booster stations to connect communities.

Benefits

- Reduced reliance on groundwater, a declining resource, in the northeast metro
- Provides a higher quality drinking water to most stakeholder communities (softened water, free of iron, manganese)

Barriers to Implementation

- Significant increase in cost of water to communities in the northeast metro
- A mutually agreeable cost sharing and operational structure needs to be developed
- Managing water chemistry – potential issues with mixing groundwater and surface water (disinfection byproducts, scaling)

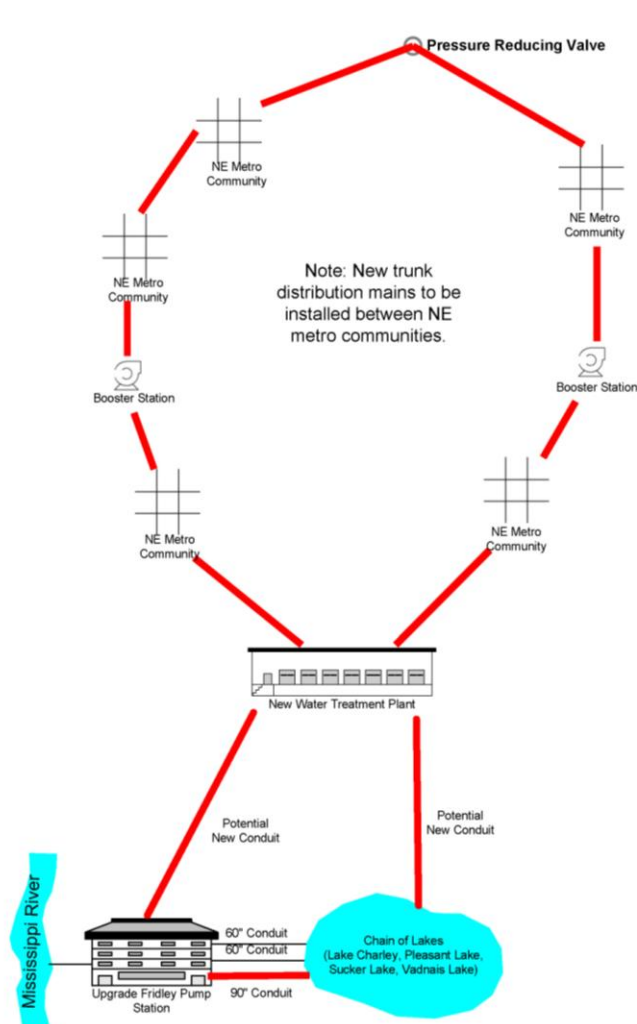
ASSESSMENT: NORTHEAST METRO

- Costly urban construction necessary to upgrade Saint Paul Regional Water Services' and communities' infrastructure
- Infrastructure needs
 - Increase capacity of Saint Paul Regional Water Services' raw water pumping station
 - Additional Saint Paul Regional Water Services raw water pipeline capacity (new pipes)
 - Increase capacity of Saint Paul Regional Water Services treatment plant
 - Increase capacity of Saint Paul Regional Water Services distribution lines
 - Increase capacity of Saint Paul Regional Water Services booster stations
 - New water distribution main between communities in the northeast metro
 - Booster stations and pressure relief valves to interconnect communities

Estimated Construction Cost: Being determined as design details are finalized

Construction costs will be estimated as necessary infrastructure is identified and design details are developed, and it will be presented as a range to reflect the variety of options for construction methods. Construction cost estimates will not include operating costs or increase in cost of water to residents.

Summary of Approach 2 – Raw Water Connection to New Regional Treatment Facility



This approach examines the feasibility of connecting a raw surface water source to a new regional water treatment facility and distributing drinking water to communities in the northeast metro. Figure 3 provides a system concept for this approach.

This approach assumes that a new water treatment facility will need to be constructed to meet EPA drinking water standards. The location of the water treatment plant would be in the northeast metro.

Two possible surface water sources exist that could provide raw water to the northeast metro: the Mississippi and St. Croix rivers.

Because Saint Paul Regional Water Services has an existing raw water pumping station, pipeline, and easement, this approach assumes that the most feasible surface water source is the Mississippi River and that new pipelines follow the Saint Paul Regional Water Services' easement.

Figure 3. System concept for alternative 2, which establishes a raw water connection to a new regional treatment facility.

Benefits

- Reduced reliance on groundwater, a declining resource, in the northeast metro
- Provides a higher quality drinking water to most communities (softened water, free of iron, manganese)
- Allows for the treatment, pumping, and distribution infrastructure to be designed to fit the needs of the northeast metro, rather than retrofitting the Saint Paul Regional Water Services system that was not designed to serve the northeast metro

Barriers to Implementation

- Significant increase in cost of water to communities in the northeast metro
- A mutually agreeable cost sharing and operational structure needs to be developed
- Water treatment plant site needs to be identified
- Managing water chemistry – potential issues with mixing groundwater and surface water (disinfection byproducts, scaling)
- Infrastructure Needs
 - New raw water pumping facility (or upgrade Saint Paul Regional Water Services' pump station)
 - New raw water main
 - New 60 MGD water treatment plant
 - New water distribution main between communities in the northeast metro
 - Booster stations and pressure relief valves to interconnect communities

Estimated Construction Cost: Being determined as design details are finalized

Construction costs will be estimated as necessary infrastructure is identified and design details are developed, and it will be presented as a range to reflect the variety of options for construction methods.

Summary of Approach 3 – Direct Augmentation of White Bear Lake

Direct augmentation of White Bear Lake with water from the Mississippi or St. Croix Rivers. This approach is based on augmentation of White Bear Lake with approximately four (4) billion gallons of water over five years. Continued augmentation at a lower rate will be required to maintain water levels. This base approach alone does not achieve the goal of reducing the reliance upon groundwater in the northeast metro.

To augment White Bear Lake from the Mississippi River, a connection could be made to the Saint Paul Regional Water Services chain of lakes at Sucker Lake or Vadnais Lake. A pumping/filtration station and pipeline would need to be constructed. Saint Paul Regional Water Services has sufficient appropriation from the Mississippi River for augmentation of White Bear Lake. A preliminary review of the water chemistry between White Bear Lake and the Saint Paul Regional Water Services chain of lakes indicates that additional treatment requirements may be minimal.

To augment WBL from the St. Croix River, it would be necessary to construct a new intake, pumping/filtration facility, and pipeline.

Figure 4 provides a system concept for direct augmentation of White Bear Lake from the Mississippi River.

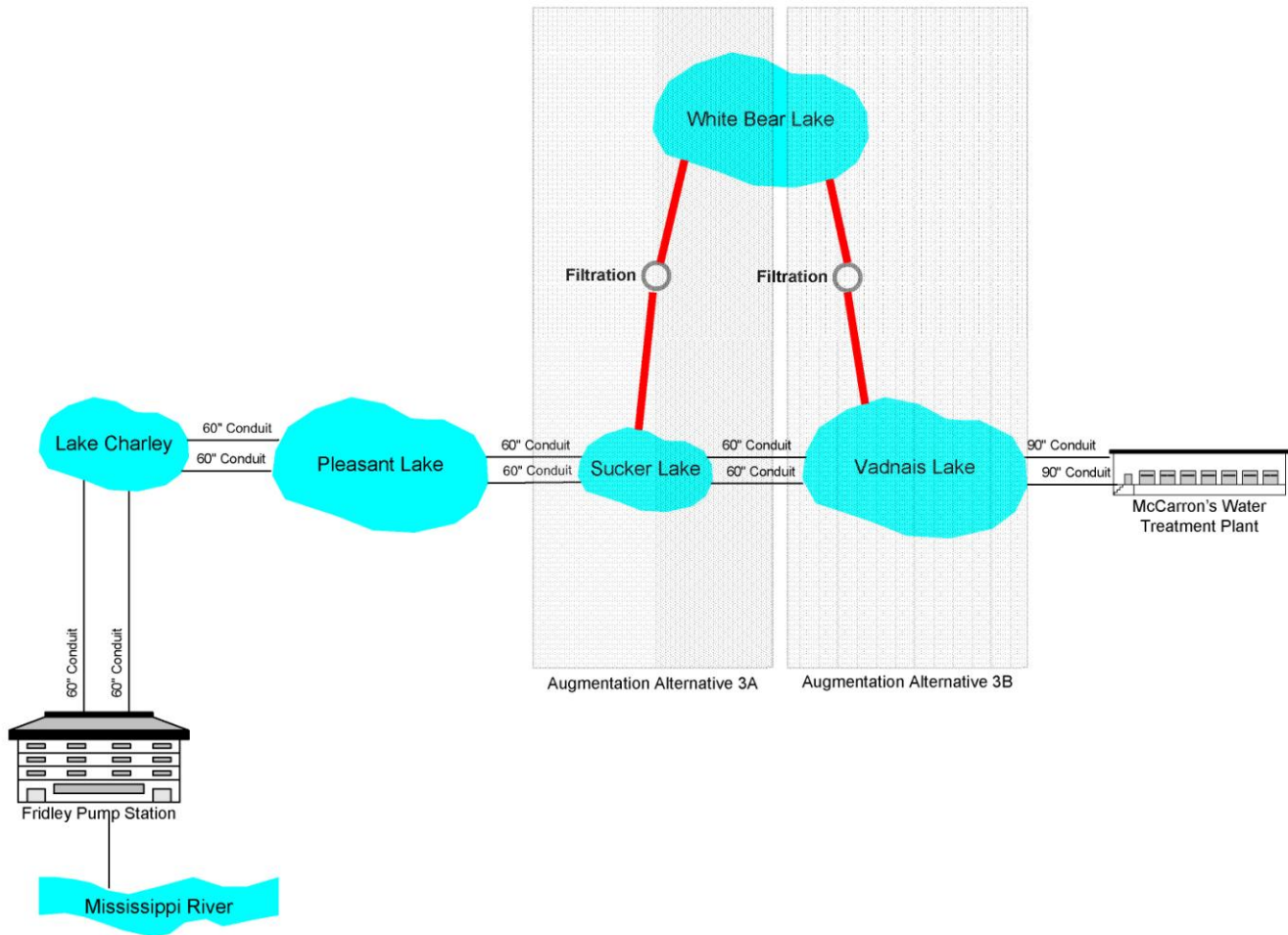


Figure 4. System concept for approach 3, which directly augments White Bear Lake.

Benefits

- Recovery of White Bear Lake water level:
 - Improves recreational opportunities
 - Restores property values for homeowners on White Bear Lake

Barriers to Implementation

- Lake Augmentation from Mississippi
 - Opposition due to environmental concerns
 - Mississippi River is impaired by Zebra Mussels which will require filtration prior to discharge into White Bear Lake
 - Infrastructure needs
 - Filtration/pumping station (potential for other treatment facilities)
 - Pipeline

- Lake Augmentation from St. Croix River
 - Opposition due to environmental concerns
 - Need to overcome approximately 300 feet of elevation difference (130 psi pumping pressure) resulting in high operating costs
 - St. Croix River is federally protected waterway
 - No current appropriation from St. Croix River
 - Infrastructure needs
 - Intake/filtration
 - Pump station – larger pumps than Mississippi River alternative
 - Pipeline – longer than Mississippi River alternative

Estimated Construction Cost: Being determined as design details are finalized

Construction costs will be estimated as necessary infrastructure is identified and design details are developed, and it will be presented as a range to reflect the variety of options for construction methods. Costs will assume augmentation from the Mississippi River, that only mechanical filtration for Zebra Mussels will be required, and that removal of other chemical constituents will not be necessary (i.e. phosphorus or nitrogen).

Evaluating Approaches

Various approaches will be evaluated based on the following criteria:

- Capital costs
- Operation costs
- Constructability
- Permits required
- Environmental issues (wetlands, endangered species, contamination, etc.)
- Community cooperation or opposition

Next Steps

- Finalize criteria for evaluation of alternatives
- Continued analysis of infrastructure requirements for each alternative
- Development of planning level cost estimates
- Assessment of benefits of each alternative
- Draft project report due June 30, 2014
- Stakeholder outreach meetings
- Final project report due October 2014



390 Robert Street North
St Paul, MN 55101-1805

651.602.1000
TTY 651.291.0904
public.info@metc.state.mn.us
metro council.org