CITY OF MINNETRISTA

2040
Comprehensive Plan

Minnetrista

wsb

November 2019

INTRODUCTION

The City of Minnetrista has recognized the need to develop a Comprehensive Plan as a means of addressing and accommodating the community's future growth and development. The Background portion of the Comprehensive Plan introduces the City of Minnetrista, its location, and a history and profile of the community. This portion of the Comprehensive Plan also identifies the vision of the community and its residents, introduces the Planning Area Designations of the city, and outlines the growth that has been forecasted by the Metropolitan Council. The vision and goals established will help the community address a broad base of land use and development issues. With the help of a solid background and vision-oriented foundation, decision makers can evaluate and prioritize proposals for the community while fulfilling the City's long term goals and objectives.

The City of Minnetrista has continued to experience significant growth since the last Comprehensive Plan Update, which was adopted in 2009. The growth that the City is currently experiencing is expected to continue and, as such, the City's Comprehensive Plan becomes even more important in order to manage this growth. Minnetrista's profiles, as well as surrounding communities' and Hennepin County's profiles, will be evaluated in order to compare changes that the City is experiencing compared with the region surrounding it.

COMMUNITY LOCATION

The City of Minnetrista is 32 square miles in area, located on the western bays of Lake Minnetonka and the agricultural rich plains and idyllic woodlands of southwestern Hennepin County.

COMMUNITY VISION STATEMENT

During this round of comprehensive planning, Minnetrista developed focused community vision statements to guide the intent and the direction of future planning efforts. Visioning was undertaken early in the planning process. Staff collected feedback in different public forums. In May 2016, the city gathered feedback at Trista Day and a Community Visioning meeting. Trista Day visitors were asked what they love, what they would change, and what destinations they like to visit in Minnetrista. At the Community Visioning meeting, participants identified favorite and problematic locations on a map, offered ideas for Key Strategies to make Minnetrista a premiere community by 2040, and engaged in a SWOT analysis of problems and solutions related to land use planning themes. The City also maintained an online conversation by hosting a MySidewalk webpage. MySidewalk is a data portal and online engagement tool that allows users to view and respond to images, maps, and posted questions at any time.

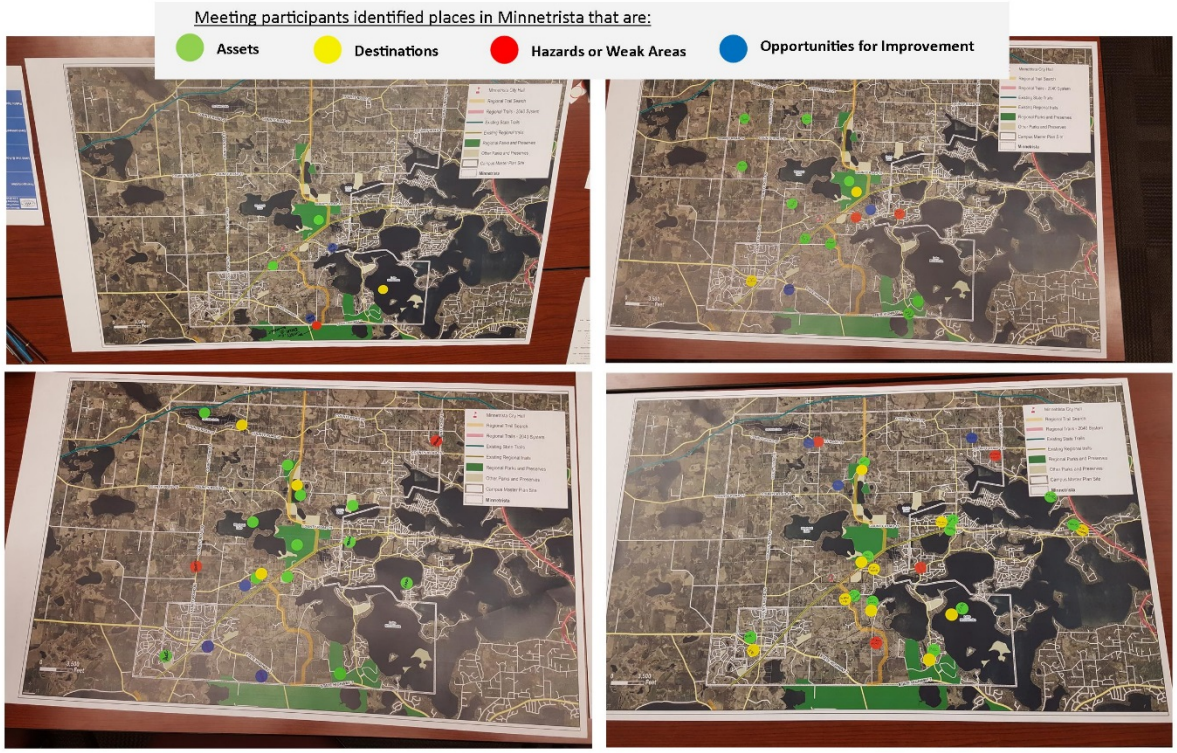


Figure 1 Mapping exercise results from the Community Visioning meeting

From these engagement forums, key themes and identifying remarks were distilled into vision statements and formally adopted by the comprehensive plan Steering Committee. The green statements relate to the community's natural resources, orange statements to community development and infrastructure, and blue statements to community services and partnerships. Together, these statements form the community's guiding vision for the future.

Open Space and Rural Character	• Minnetrista strives to maintain its rural character including preserving areas for farmland while protecting and improving natural resources, such as lakes, streams and wetlands, as perpetual open space.
Parks, Trails and Recreation	• Parks and trails are important components of Minnetrista's rural character and the continued expansion of recreational opportunities available to residents should be incorporated with continued development.
Lake Minnetonka	• Minnetrista's identity includes the use, access and water quality improvement of Lake Minnetonka and its tributary waterbodies.
Urban Development	• Minnetrista is attractive to families seeking single family homes with yards allowing families to gather and play. As family members age, alternative housing styles should be considered allowing residents to remain in Minnetrista throughout their lives, while supporting the efforts of seniors to live independently, and to be able to attract extended family members to remaining involved in the community.
Retail/Commercial	• Current commercial needs are met within the communities of Mound and St. Bonifacius. Restaurants and small scale retail including groceries and local businesses along MN Hwy 7 should be considered as additional residential development warrants further commercial development.
Public Safety	• Minnetrista values its public safety staff and its ability to provide a safe and secure community through its excellent training and engagement with residents.
Outside Forces	• Minnetrista's resident's well-being is supported by entities and organizations beyond that provided by City services. Communication and coordination with school districts and other organizations to provide opportunities for partnerships that provide better and more efficient services, including community gathering spaces. Any partnership must maintain Minnetrista's overall rural character and lifestyle.

SOCIAL INVENTORY

The purpose of the Social Inventory is to identify past trends, to document the current conditions and to help identify issues for establishing a hierarchy of planning policies.

GROWTH TRENDS

The following table illustrates past, current, and forecasted statistics for the population, number of households, average households size, and employment for the City of Minnetrista from 1970 and projected to 2040. The Metropolitan Council, as part of the Regional Development Framework, provides forecasts for population, households, and employment for each community in the Metropolitan Area. The forecasts are intended to serve as a basis for future community planning, which is why it is important to begin the Inventory portion of the Comprehensive Plan with the forecast of these figures.

The table indicates that overall, the population, households, and employment is expected to increase over the years until 2040, although the pace of employment growth is projected to slow considerably in the decades to come.

Historical & Forecasted Population, Household, & Employment Information 1970 to 2040

Year	Population	Households	Household Size	Employment
1970	2,878	731	3.94	10
1980	3,236	974	3.32	50
1990	3,439	1,195	2.88	300
2000	4,358	1,505	2.9	379
2010	6,384	2,176	2.93	665
2014	6,763	2,286	2.96	709
2020	8,000	2,900	2.76	720
2030	9,800	3,870	2.53	870
2040	12,000	5,000	2.4	1,020

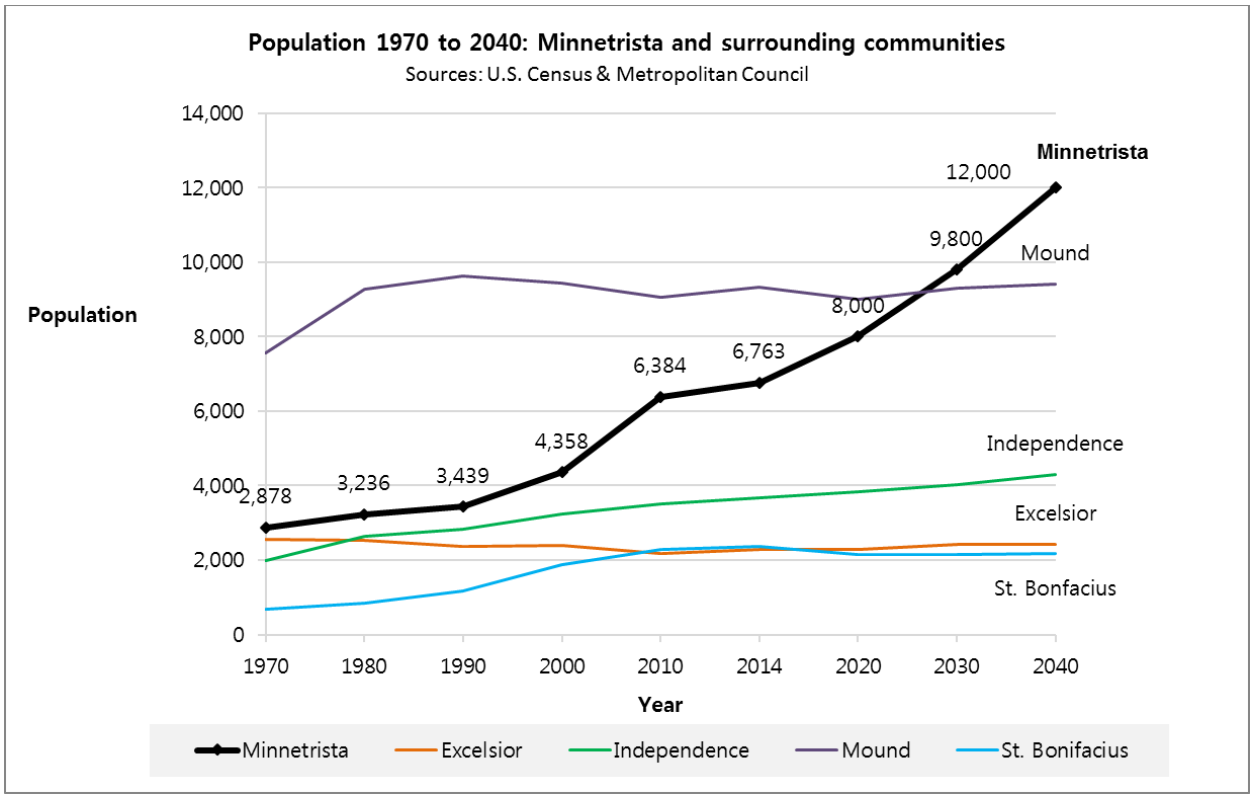
Source: U.S. Census; Metropolitan Council *Thrive 2040 MSP Forecasts* (July 8, 2015); Metropolitan Council Minnetrista Community Profile

POPULATION GROWTH

The statistics in the following table illustrate past trends in population, current population, and forecasted population trends within Minnetrista and the surrounding communities. Minnetrista's population growth rate has been steadily increasing since the 1970s. In the decade from 2000 to 2010, the population grew at a rate of 46 percent. As the table indicates, it is projected that Minnetrista will reach a population of 12,000 by 2040.

Compared to surrounding communities, Minnetrista is expected to experience significant population growth between 2010 and 2040. In this thirty year period, the population is expected to grow from 6,384 to 12,000, which is an 88 percent increase in population.

This is very significant for the future of the community. The other communities are expected to experience more gradual increases in population through 2040, with St. Bonifacius forecasted to experience the smallest increase in population by 2040.



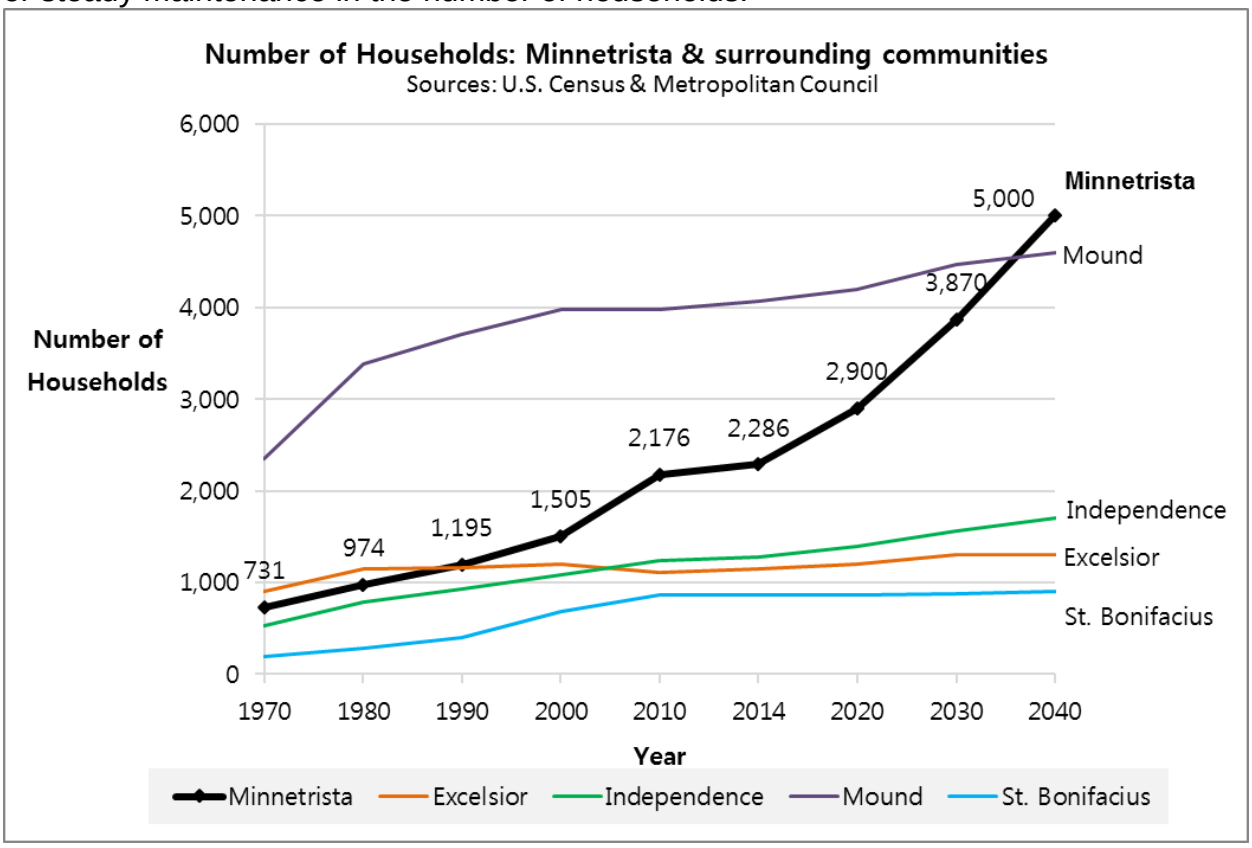
Another manner to analyze the change in population is through building permits issued. The following table illustrates annual building permits issued for new home construction from 2005 through 2015 in Minnetrista. During this period, Minnetrista added 1,097 new single family detached homes. The number of permits issued was highest in 2005, with 105 building permits being issued.

From 2005 to 2010, the number of building permits issued for single family homes decreased every year. Since 2010, total annual permit numbers have risen again from a low of 22 permits in 2010 to 85 permits in 2015.

Minnetrista Building Permits Issued For Single Family Detached Homes 2005 through 2015			
Year	Number of Permits	Annual Change	% Change
2005	105	-25	-19%
2006	61	-44	-42%
2007	51	-10	-16%
2008	42	-9	-18%
2009	40	-2	-5%
2010	22	-18	-45%
2011	32	10	45%
2012	28	-4	-13%
2013	40	12	43%
2014	61	21	53%
2015	85	24	39%
Source: Metropolitan Council Building Permit data by Year			

HOUSEHOLDS

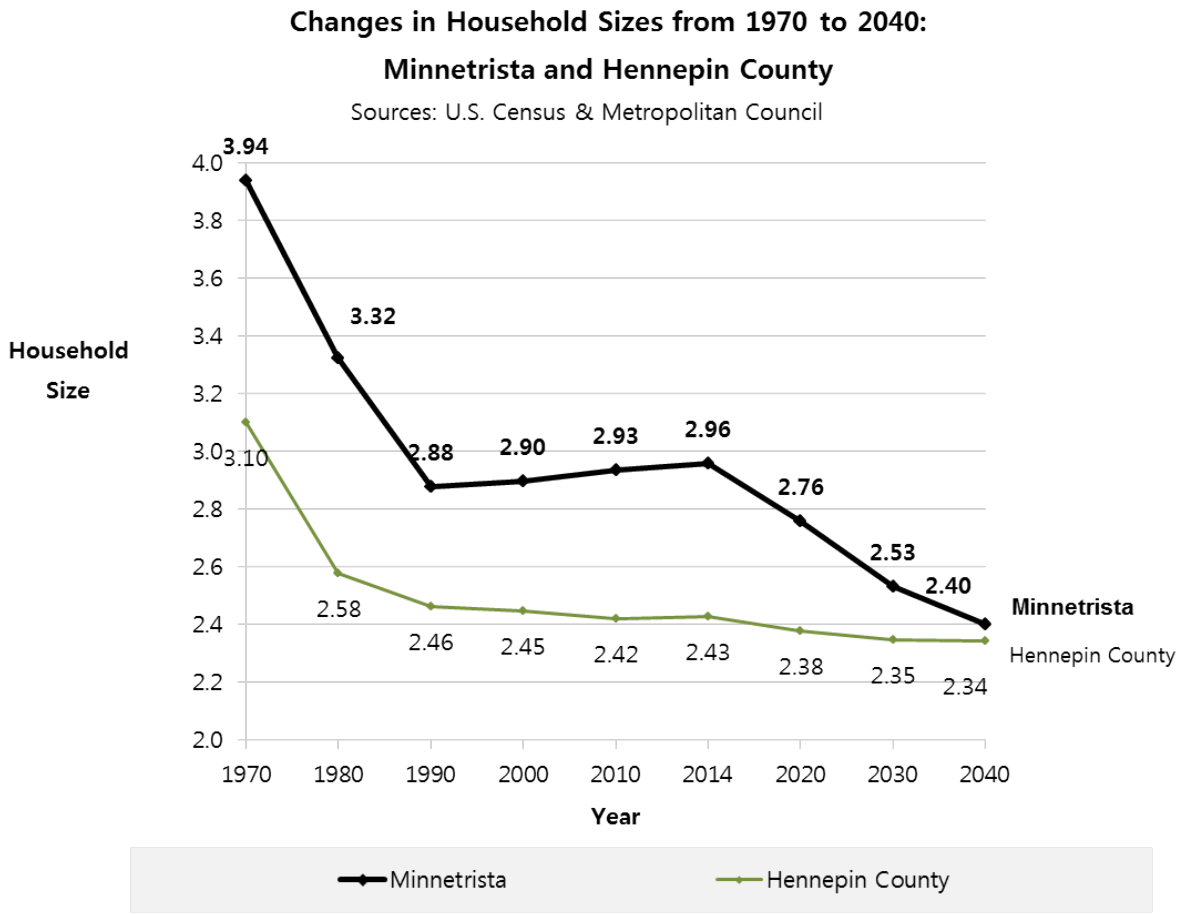
The following table illustrates the past number of households in Minnetrista and its surrounding communities and also illustrates the projected number of households, according to the Metropolitan Council. Consistent with the population forecasts, the households are forecasted to experience a significant increase between 2010 and 2040 in Minnetrista. The surrounding communities are expected to experience a slight increase or steady maintenance in the number of households.



HOUSEHOLD SIZE

The following graph compares the number of persons per household in Minnetrista with Hennepin County, estimated from 1970 and forecasted until 2040. The number of persons per household in both Minnetrista and Hennepin County dropped significantly between 1970 and 1990. In 1970, the average household size in Minnetrista was 3.94 and by 1990, it had dropped to 2.88. In 1970, the average household size was 3.1 in Hennepin County, and by 1990, it had dropped to 2.46. Minnetrista is expected to have an average household size of 2.40 by 2040, while Hennepin County is expected to have an average household size of 2.34 by 2040.

In 1970, the average household size in Minnetrista was 3.94 persons per household; by 2000, the household size was 2.9; and by 2040, the household size is projected to drop to 2.40 persons per household. Overall, Minnetrista has had and is expected to continue to have a larger average household size than Hennepin County; although, their averages appear to become closer together the further into the future the projections go.



The decreasing household size is reflective of the changing dynamics of the modern family. According to the U.S. Department of State, there have been several changes in family dynamics over the last few decades that have affected the modern family, including the increase in dual-earning households, an aging population, people postponing marriage, people postponing having children, people having fewer children, the rise in divorce rates, and the rise in life expectancy.

HOUSEHOLD TYPE

Two types of householders are distinguished in the 2000 and 2010 U.S. Census: a family and a non-family householder. A family householder is a householder living with one or more people related to him or her by birth, marriage, or adoption. The householder and all people in the household related to him or her are family members. A non-family householder is a householder living alone or with non-relatives only. To clarify, male householder indicates that no wife is present; and female householder indicates that no husband is present.

The 2000 and 2010 Census provides a demographic profile of the households in Minnetrista, as illustrated in the following table. In 2000, there were 1,149 married couple family households in Minnetrista, and by 2010, there were 1,668 married couple family households. Both married couple families with children and without children grew from 2000 to 2010. The number of family households headed by a male or female, and with persons under the age of 18, also rose from 2000 to 2010.

As the table indicates, in 2000, 633 family and non-family households contained persons under the age of 18, and 872 households were without persons under the age of 18. By 2010, 991 households in Minnetrista contained persons under the age of 18, and 1,185 households did not. Both household types grew in the ten-year period.

Minnetrista: 2000 and 2010 Household Types

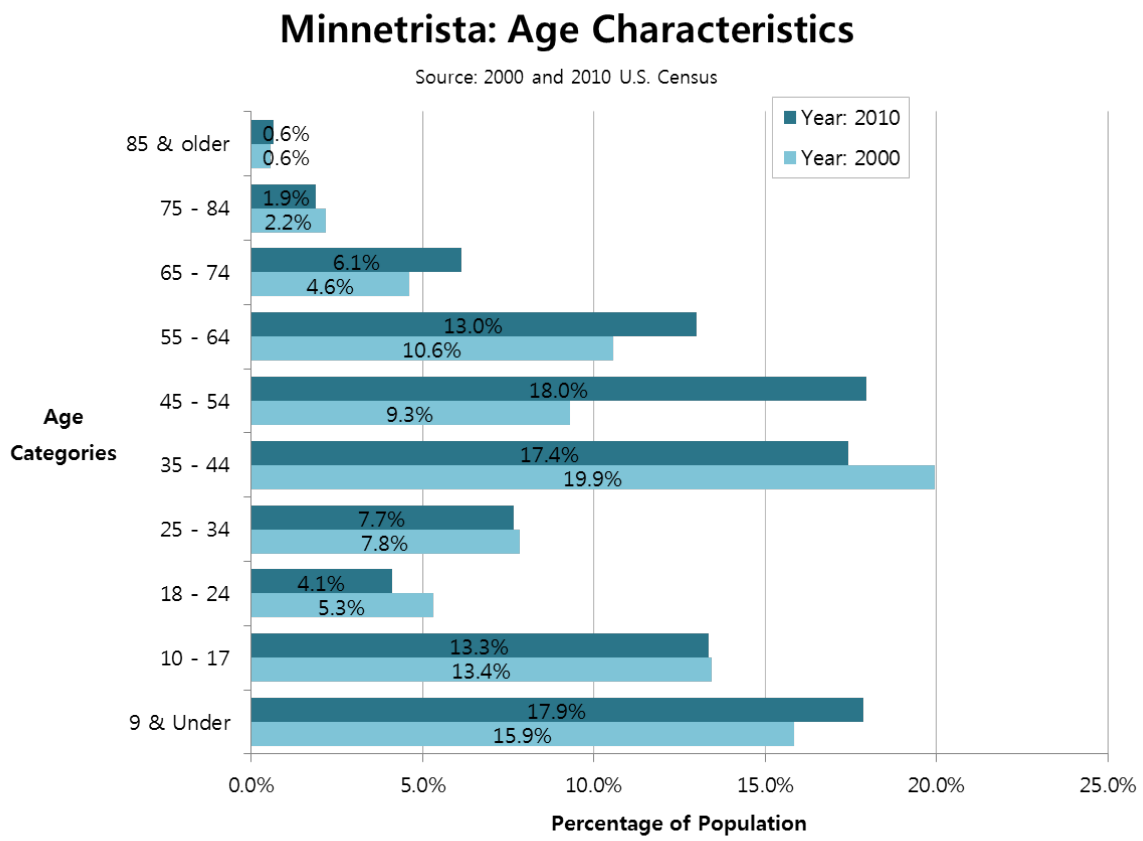
Household Type	Total Households		Households w/ Persons Under 18		Households w/o Persons Under 18	
	2000	2010	2000	2010	2000	2010
Family-Married Couple	1,149	1,668	569	878	580	790
Family- Male Householder	34	63	18	46	16	17
Family- Female Householder	92	92	43	61	23	31
Family Households	1,249	1,823	630	985	619	838
Male Householder	143	208	3	5	140	203
Female Householder	113	145	0	1	113	144
Non-Family Households	256	353	3	6	253	347
Total Households	1,505	2,176	633	991	872	1185

Source: U.S. Census 2000, 2010

AGE CHARACTERISTICS

The following table illustrates Minnetrista's population by age group. The table utilizes information from the 2000 and 2010 Census. In 2000, the age group that represented the largest percentage of the population was the 35 to 44 year olds, which represented 19.9 percent of Minnetrista's population. By 2010, that age category had dropped to 17.4 percent. In 2010, both the 9 and under and 45 to 54 year old categories had risen to represent the largest segments of the population at around 18 percent each., Continuing a declining trend in young adult population, both the 18 to 24 year olds and the 25-24 year olds experienced a decrease in percentage from 2000 to 2010.

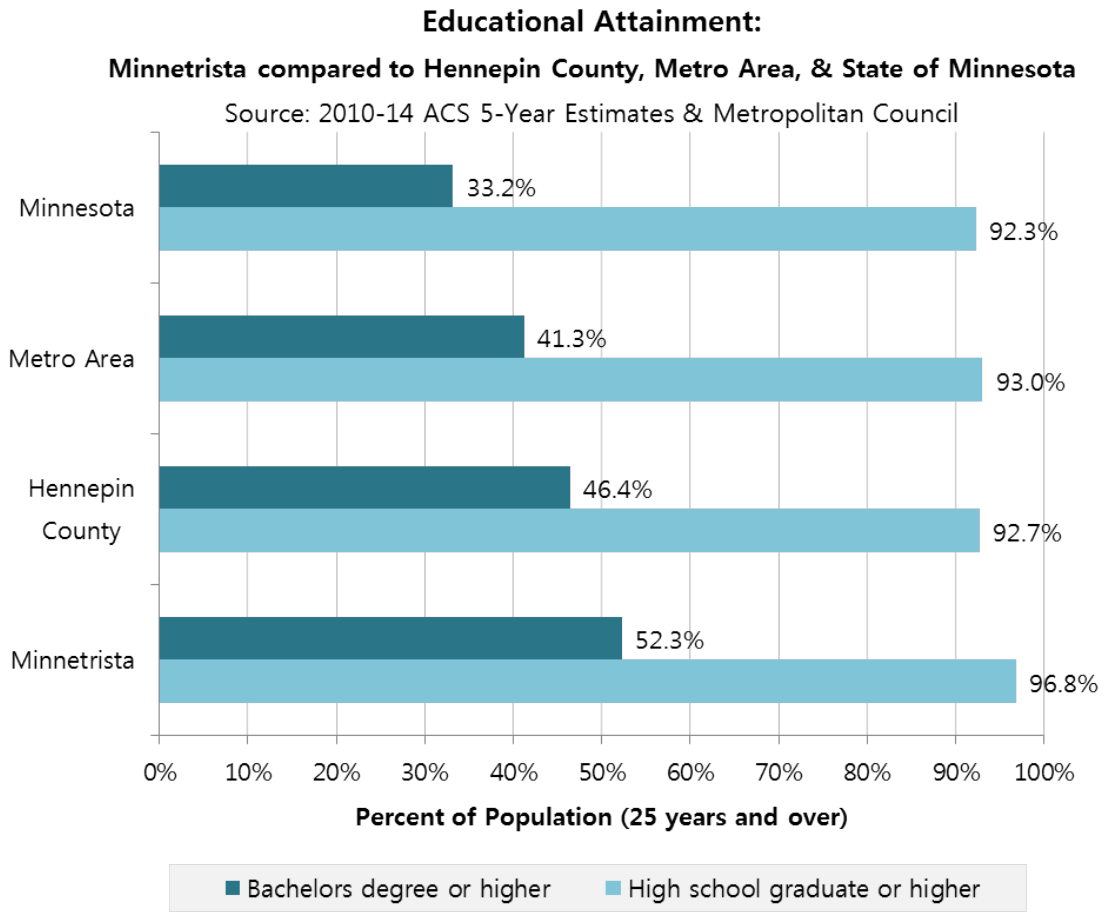
As far as overall trends, in 2000 53 percent of the population was made up of 18 to 64 year olds, which is a large portion of the labor force. By 2010, this group increased to 60 percent of the population. The percent of children in Minnetrista in 2000 was 29 percent. By 2010, the percent of children experienced a slight increase to 31 percent. The percent of the retired population, ages 65 and older, in 2000 was 7.4 percent, but increased to 8.9 percent by 2010.



EDUCATION

The following table illustrates education levels for residents in Minnetrista, compared with Hennepin County, the metropolitan area, and the State of Minnesota, ages 25 and over in 2010. As indicated, approximately 97 percent of the City's population has attained a high school diploma or higher degree, while 52 percent of the population has attained a Bachelor's degree or higher. These rates are somewhat higher than the overall Hennepin County and Metro area education rates, which are both 93 percent for high school graduation and 46 and 41 percent for bachelor's degree and higher attainment, respectively. Statewide, 92 percent of the population has attained a high school diploma or higher, while 33 percent of the state's population has attained a Bachelor's degree or higher.

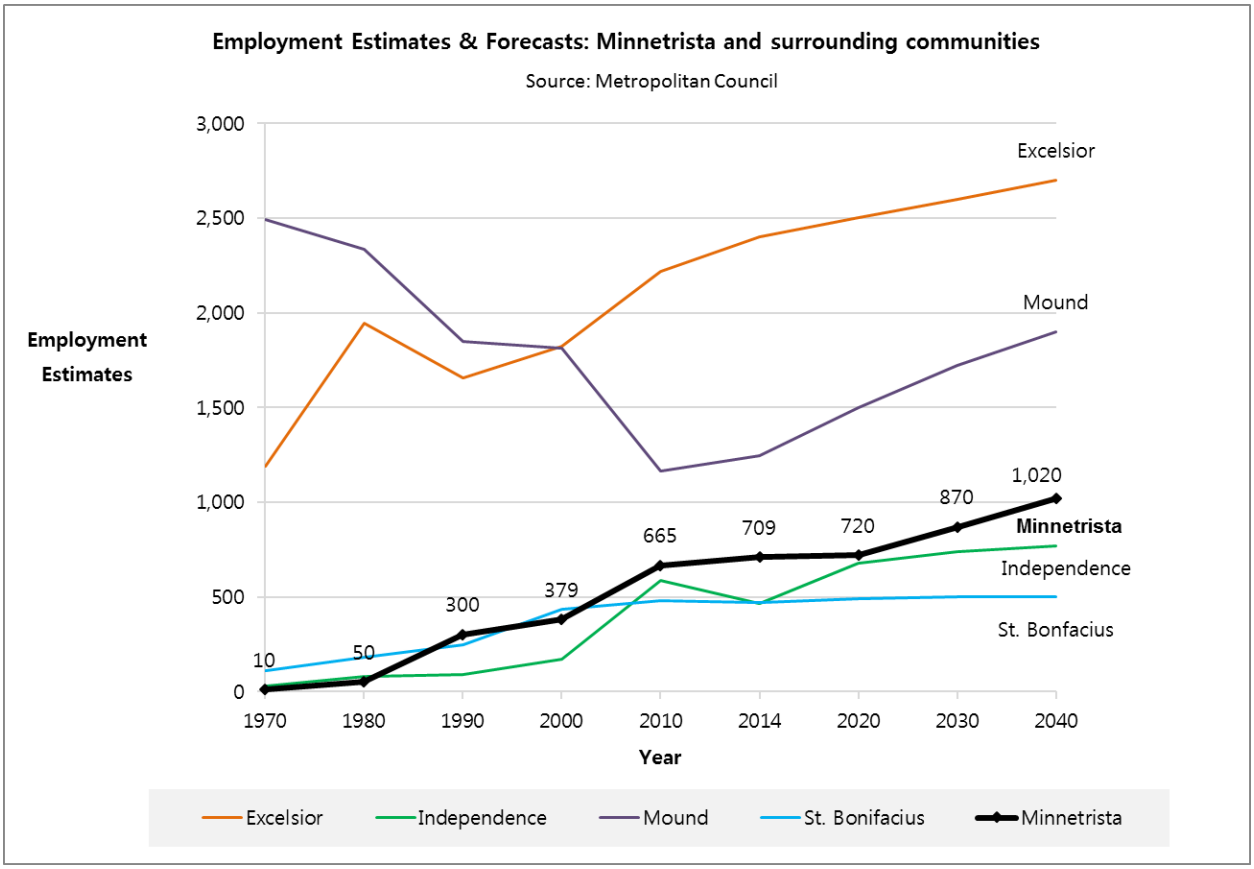
There are four school districts serving the City: Waconia, Watertown, Westonka, and Delano. Two public facilities for the Westonka School District are located in Minnetrista. The High School and Hilltop Elementary are located on Sunnyfield Road and Game Farm Road, respectively, just west of County Road 110.



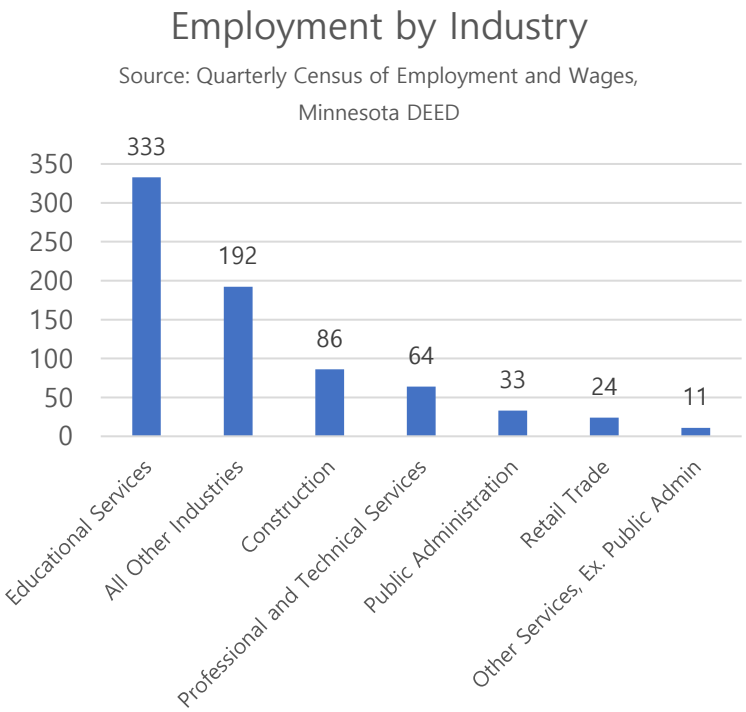
EMPLOYMENT

Employment growth estimates and forecasts were taken from the Metropolitan Council. Minnetrista's estimated employment numbers are indicated on the line graph. According to the line graph, Minnetrista's employmentincreased from 10 jobs in 1970 to 665 jobs in 2010, which was a large increase. From 2010 until 2040, Minnetrista is projected to increase to 740 jobs, which is a 11 percent increase in employment. The most current information gathered (2014), estimates that there are 709 jobs in Minnetrista.

From the Metropolitan Council's projections, Minnetrista is expected to experience an increase in employment of 300 jobs. The steady growth in employment projection is similar to the trend in the neighboring communities of Excelsior and Mound through 2040. Two other neighboring communities, St. Bonifacius and Independence, are projected to experience no significant changes in employment over the next 25 years.

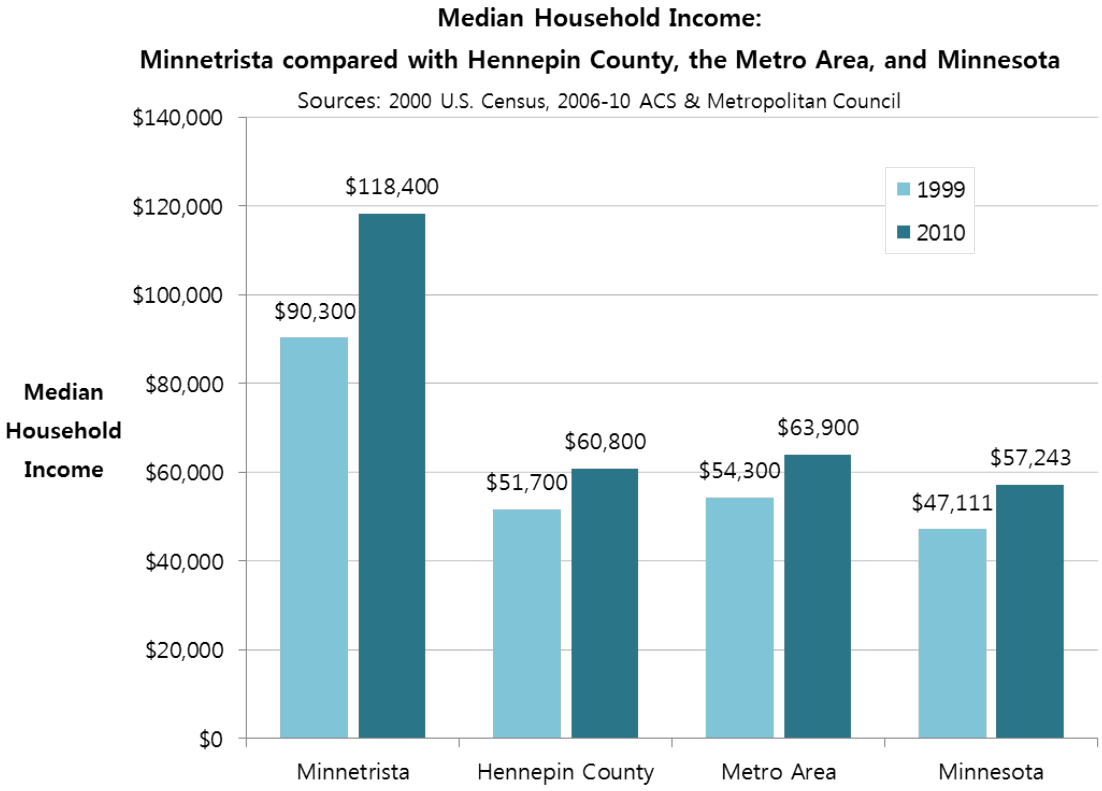


According to 2015 estimates showing employment by industry, the greatest percentage of jobs in Minnetrista are in educational services. There are 743 total jobs located in Minnetrista, but there are 3,718 employed residents of the city, meaning that the majority of Minnetrista's working population works in a location outside of the city.



INCOME

The median household incomes for the City of Minnetrista, Hennepin County, the metropolitan area, and the state of Minnesota are all depicted in the following bar graph. The City of Minnetrista exceeds the other regions median household incomes in 2000 and in 2010. In 2000, Minnetrista's median household income was $90,300, and by 2010, it had reached $118,400. This was a 31 percent increase over the ten year period. This rate of increase exceeds that of the county, metro area, and the state over this period. The state of Minnesota had the lowest median household income in 2000, at $47,111, and also in 2010, at $57,243. However, it had the second largest percent increase in its median household income from 2000 to 2010, at 31 percent. Both Hennepin County and the metropolitan area had fairly similar median household incomes in 2000, and the both increased by around 18 percent over the ten-year period.



The following chart illustrates the household income ranges for the City of Minnetrista in 1999 and 2009, according to Census and ACS data.

Minnetrista's household income distribution is more concentrated in the upper income categories, and that concentration became more defined over the ten-year period. In 1999, 38 percent of households earned over $100,000. By 2010, that number climbed to 59 percent of households. Meanwhile, the percentage of households earning $50,000 or less changed very little over the decade, falling slightly from 20.2 percent in 1999 to 18,8 percent in 2010. Every income category representing $99,999 or less fell in percentage between 1999 and 2010, whereas both income categories at $100,000 or more saw percentage increases over the decade. The top income bracket, $150,000 or more, saw the largest change, increasing 108 percent over the decade.

The City of Minnetrista faces a unique challenge in addressing the needs and concerns of wealthier citizens, as its median household income in 2010 was $54,500 above that of the overall metropolitan area. The goods and services that are requested by high income individuals differ greatly from those requested of low income individuals, which needs to be addressed by the City of Minnetrista.

POVERTY RATES

Following a decrease in poverty from 1990 to 2000, U.S. Census data show that Minnetrista poverty rates have now increased in the decade from 2000 to 2010. The number of individuals below the poverty level in 1999 was 121, or 2.8 percent of the population. The number of individuals in poverty increased to 269 in 2010, representing 4.5 percent of Minnetrista's population. This trend mirrored the overall statewide increase in poverty over the decade, from 7.9 percent of Minnesota's population in 1999 to 10.6 percent in 2010. The number of families below poverty level also increased from 26 to 78 by 2010, which was 4.7 percent of the families in Minnetrista.

Minnetrista Poverty Rates: 1999 vs. 2010
Source: 2000 U.S. Census & 2006-10 ACS estimates

	Below Poverty Level in 1999		Below Poverty Level in 2010	
	Number	Percent	Number	Percent
Individuals	121	2.8%	269	4.5%
Families	26	2.1%	78	4.7%

PUBLIC SAFETY

The City of Minnetrista has an active Public Safety Department that serves both the Cities of Minnetrista and St. Bonifacius. The Public Safety Department employs a Chief, Lieutenant, two Sergeants, seven Police Officers (including a Detective and a School Resource Officer), two Community Service Officers, and two secretaries. There is also an active reserve unit, which currently has 12 members. Fire protection is provided by both the City of St. Bonifacius and Mound Fire Departments.

MUNICIPAL FACILITIES

City Hall is located at 7701 County Road 110 W and houses the City's Administrative Offices, Public Safety Department, and Public Works Department. All City meetings are held out of City Hall, as well. With the growth and expansion of the City's Staff, the City Council is currently reviewing options for new facilities to be located at or near the current City Hall.

COMMUNITY HISTORY (Source: *City of Minnetrista*)

During the last glacial period, large amounts of glacial till was deposited and accumulated forming hills as the glacier passed over and receded from this area. The twisting and undulation of the land forms as well as the shape of the lakes may be the basis for the city's name - Minnetrista (*Minne* from the Dakota word meaning water and *trista* from the Dakota word meaning crooked or twisted).

Much of the area became covered with hard and soft wood forest and was settled by the Dakota Indians centuries ago. The tribe nearest the Minnetrista area was the Mdewakantan, the largest tribe of the Dakota. Indian mounds were prevalent in Minnetrista and some remain to this day. Some say that these mounds were built by Indians of an earlier period known as the "Mound Builders." These mounds are such a prominent part of the area landscape that our neighbor, the City of Mound, was named for them.

In 1849, Minnesota was organized as a territory and pressure was put on Congress to acquire the valuable Indian land. In 1851, The Treaty of Traverse des Sioux was signed and the Dakota left the area.

The first European settlers came to the area in the 1850's. In 1854, the Merz Brothers moved into the Saint Bonifacius area, Nathaniel Sanders and J. F. Buck settled on the shores of Saunders Lake, and John Carman and Mathias Cook moved into the Cook's Bay area.

Notable early settler Frank W. Halsted arrived in the area in 1855. He built a cabin on the shores of Lake Minnetonka, on what is now known as Halstead Bay, in his honor. Captain Halsted served in the Navy during the Civil War with distinction and then returned to the area and built a larger cabin, which was called "the Hermitage" by area residents. Captain Halsted was the Justice of the Peace and solemnized the first marriage in Minnetrista. The Hermitage was an often visited site, as Captain Halsted and the house itself were intriguing to all visitors. After Captain Halsted's mysterious death in 1876, his brother Major George Halsted moved into the Hermitage and welcomed visitors until his tragic demise in the 1901 fire that destroyed the landmark.

Samuel Merriman was the first settler in the northwestern part of the community, when he moved onto a large claim in between Whaletail and Ox Yoke Lakes in 1857.

On April 10, 1858, Hennepin County Commissioners set apart Town 117, Range 24 as German Home Township, named for the large number of residents of German stock. In 1859, the town government was organized when voters met in Mathias S. Cook's log cabin. During this meeting, there were several proposals to change the name of the town and name "Minnetrista" was chosen.

In the early 1900s, one of America's first transcontinental auto routes, the Yellowstone Trail, passed through that portion of Minnetrista bordering the City of Victoria, running

over the top of the bluff between Lake Minnetonka and Lake Zumbra. Travelers on their way west often stopped at the area hotels and inns including the Chapman House and the Palmer House hotel which featured a gazebo, celestial observatory telescope, and formal gardens complete with a fountain.

Over the years, the Cities of Mound and Saint Bonifacius separated from Minnetrista Township and incorporated into cities. Minnetrista Township remained as not only a popular tourist destination with hotels, cabins, a prominent boat landing, and summer camps, as well as a thriving rural agricultural community.

Minnetrista Township continued until 1960, when the government adopted municipal structure and became known as the Village of Minnetrista. In the early 1970s, Minnetrista was fully incorporated as a statutory City.

NATURAL RESOURCE INVENTORY

Effective land use planning requires a comprehensive understanding of the physical features, natural resources, and environmental limitations of the land. Appropriate uses for the land are determined through an inventory of the topography, soils, surface water, and vegetation. The natural environment of Minnetrista is highly valued by its residents and is considered superior in its quality and diversity. Minnetrista's superior environmental qualities are evident, and the need to protect and preserve these qualities is equally evident. Without adequate forethought, significant portions of the City's natural amenities could be lost through development and through other activity or inactivity.

Minnetrista's natural environment was inventoried through a field survey and review of aerial photographs, topographic maps, bedrock, and soil maps and wetland information in 1997.

Geology

Minnetrista's underlying bedrock structure was formed when sediments were deposited by sea waters that moved in and receded. These layers of sediment built up and formed layers of limestone, sandstone, and shale. Layers of sedimentary rock underwent erosion and stream valleys formed. This was followed by a series of continental glaciers, which covered Minnetrista and most of Minnesota. The glaciers had tremendous force capable of gouging out and reshaping the area through deposits of rock, till, and sediments. The last of these glaciers, named the Wisconsin, receded some 10,000 years ago. Lakes, streams, wetlands, valleys, and hills are the result of glacial action and the melt waters which deposited the sands and glacial till.

Topography

Minnetrista is comprised of approximately 32 square miles of rolling terrain. The City has many steep, long, and wooded slopes. The most dominating slopes are located in a stretch between Whaletail Lake and Dutch Lake. Large hills with steep slopes are also

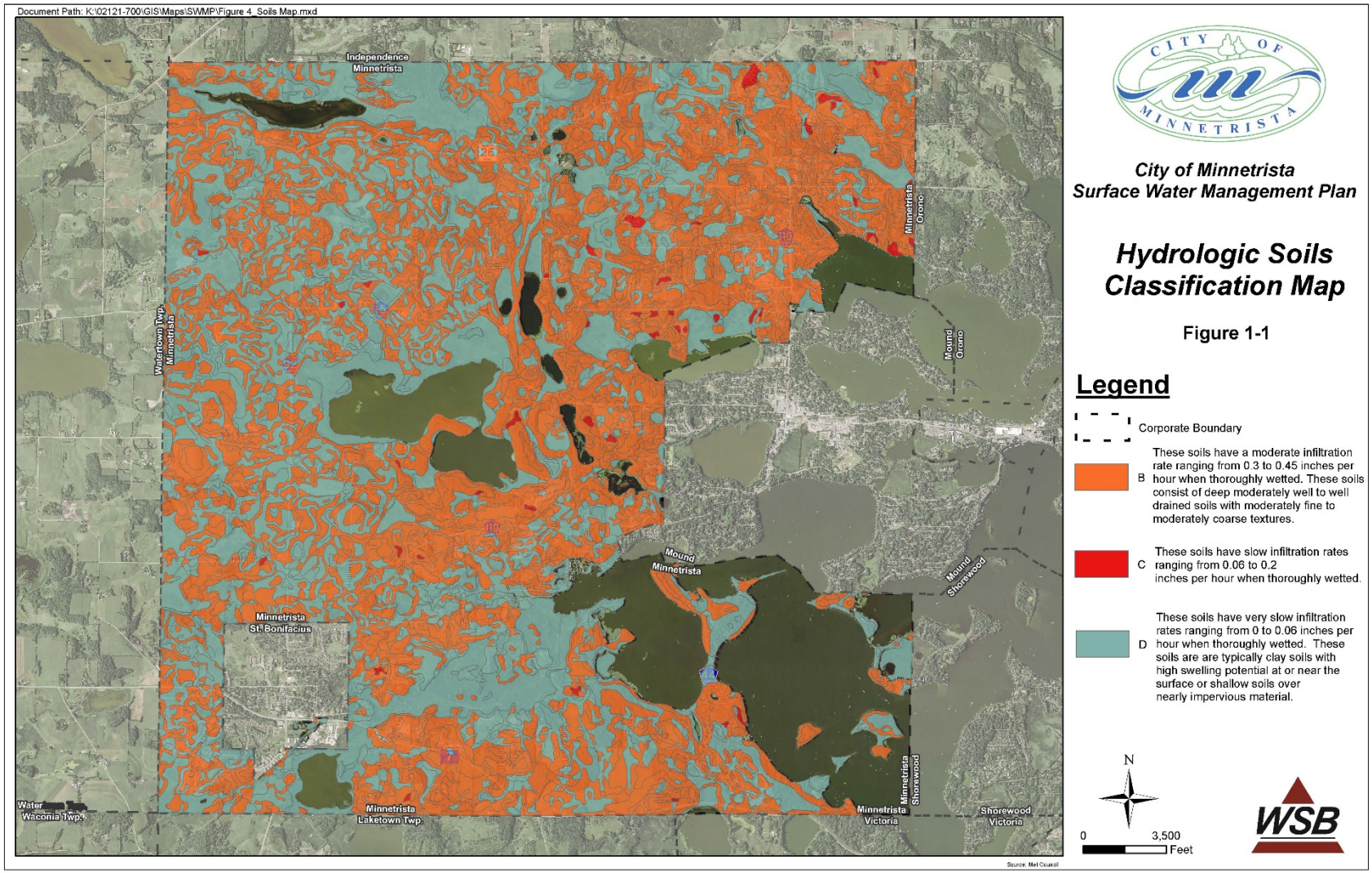
in the west central part of the City, north of Jennings Bay, along Six Mile Creek, and on the east side of Halstead Bay. A rolling topography exists over much of the remaining area with the hilltops providing pleasant views.

Soils

Minnetrista's drift soil is often a thick accumulative of unstratified material, including shale and limestone originating in Canada. The top soil is usually classified as Hayden Loam, whose surface is gray in color and has a fine sandy loam to loam texture. The upper portion of the subsoil is yellowish brown, which becomes sticky when wet and hard when dry. The deeper subsoil is light clay loam, which contains considerable lime. The composition of the surface soil is considered to be very productive: it holds moisture well, and the surface dries fast, allowing it to be worked early in the spring.

The soils in a particular area often determine the type and extent of development that can occur in a community. Factors such as soil strength, drainage, and frost characteristics may limit the development of homes or location of septic systems that can be accommodated on the land.

The soil map included in this document illustrates the drainage characteristics of the soils in the City of Minnetrista. The soils are characterized as: somewhat poorly drained, poorly drained, and very poorly drained. Somewhat poorly drained soils remain wet for prolonged periods, but not all the time. Poorly drained soils drain so slowly that the soil remains wet for a large portion of the year. These conditions are caused by a high water table or a slowly permeable layer within the soil profile. Very poorly drained soils occur when the water table remains at or near the surface most of the year. These soils are often found in depressed sites and are frequently ponded.


Document Path: K:\02121-700\GIS\Maps\SWMP\Figure 4_Soils Map.mxd
Independence
Minnetrista
Watertown Twp.
Minnetrista
Minnetrista
Orono
Mound
Orono
Mound
Minnetrista
Mound
Shorewood
Minnetrista
St. Bonifacius
Minnetrista
Shorewood
Water
Waconia Twp.
Minnetrista
Laketown Twp.
Minnetrista
Victoria
Shorewood
Victoria
Source: Met Council
City of Minnetrista
Surface Water Management Plan
Hydrologic Soils
Classification Map
Figure 1-1
Legend
Corporate Boundary
B These soils have a moderate infiltration rate ranging from 0.3 to 0.45 inches per hour when thoroughly wetted. These soils consist of deep moderately well to well drained soils with moderately fine to moderately coarse textures.
C These soils have slow infiltration rates ranging from 0.06 to 0.2 inches per hour when thoroughly wetted.
D These soils have very slow infiltration rates ranging from 0 to 0.06 inches per hour when thoroughly wetted. These soils are are typically clay soils with high swelling potential at or near the surface or shallow soils over nearly impervious material.
N
0
3,500
Feet
WSB

Watersheds

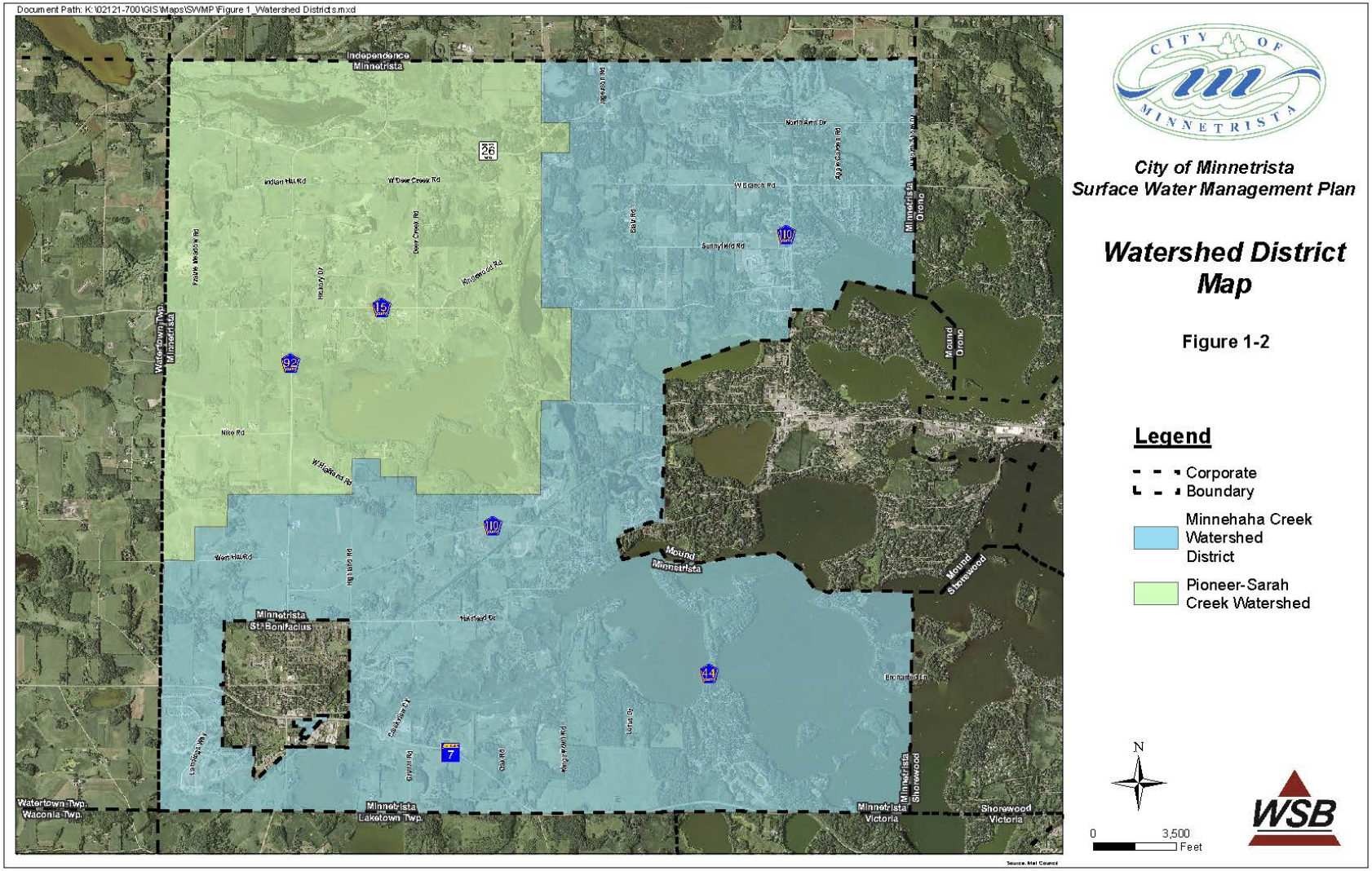
The City of Minnetrista is located within the Minnehaha Creek Watershed District, the Carver County Watershed Management Area, and the Pioneer Sarah Creek Watershed Management Commission.

The Minnehaha Creek Watershed District (MCWD) is the regional governmental unit responsible for managing and protecting the water resources of the Minnehaha Creek watershed, located in the area including and immediately west of Minneapolis, Minnesota, according to the MCWD. The District was established in 1967 under the Minnesota Watershed District Act, which recognizes that hydrologic boundaries rarely match political boundaries. The 1955 act established watershed districts to integrate water management efforts between city, county, and state agencies.

The District covers approximately 181 square miles that ultimately drain into the Minnehaha Creek, which then enters the Mississippi River. The watershed includes natural resources, such as Minnehaha Creek, Lake Minnetonka, the Minneapolis Chain of Lakes, and Minnehaha Falls. There are eight major creeks, 129 lakes, and thousands of wetlands within the MCWD. The MCWD also includes all or part of 27 cities and two townships in Hennepin and Carver Counties.

Carver County is the watershed management organization for what is called the Carver County Water Resource Management Area, of which Minnetrista is located within. The Carver County watershed plan was approved by BWSR in 2001.

The Pioneer-Sarah Creek watershed covers about 70.5 square miles in northwestern Hennepin County. The six cities in the watershed jointly manage the water resources in this area through the Commission. The member cities are Greenfield, Independence, Loretto, Maple Plain, Medina, and Minnetrista. The goal of the Pioneer-Sarah Creek Watershed Management Commission (PSCWMC) is to enhance the water quality of the water resources within the watershed. The Commission seeks to carry out this goal through public information and education, analysis of the causes of harmful impacts on the water resources, regulation of the use of water bodies and their beds, regulation of land use, and capital improvement projects.


Document Path: K:\02121-700\GIS\Maps\SWMP\Figure 1_Watershed Districts.mxd
City of Minnetrista
Surface Water Management Plan
Watershed District Map
Figure 1-2
Legend
Corporate Boundary
Minnehaha Creek Watershed District
Pioneer-Sarah Creek Watershed
N
0
3,500
Feet
WSB
Independence
Minnetrista
Mound
Minnetrista
Minnetrista
St. Bonifacius
Watertown Twp.
Waconia Twp.
Minnetrista
Laketown Twp.
Minnetrista
Victoria
Shorewood
Victoria
Mound
Orono
Mound
Shorewood
Source: Met Council

Surface Water – Lakes, Wetlands, Rivers, and Ponds

The City of Minnetrista is covered with numerous acres of lakes and wetlands. The City contains 3,270 acres of open water, which includes lakes, ponds, and Six Mile Creek. Other creeks and streams are considered only in terms of lineal feet. Part of Lake Minnetonka, the state's tenth largest lake, is located within the City. 2,076.4 acres of the Lake are located within the City limits.

Numerous bays and islands of Lake Minnetonka are located within Minnetrista. Jennings Bay, Halstead Bay, and parts of Priest Bay, Phelps Bay, and West Upper Lake are all part of Lake Minnetonka and are located within the City. Islands in Lake Minnetonka within Minnetrista are: Crane Island, Eagle Island, Wawatosa Island (Boy Scout Island), Island Park, and part of Enchanted Island.

Other lakes and their areas include the following:

- Dutch Lake (to City limits) – 95.3 acres
- Long Lake Chain – 83.9 acres
- Mud Lake – 85.0 acres
- Lake Minnetonka (to City limits) – 2,076.4 acres
- Ox Yoke Lake – 94.3 acres
- Saunders Lake – 39.6 acres
- Whaletail Lake – 509.0 acres
- Stone Lake (to City limits) – 6.7 acres
- Three parcels labeled water – 5.9 acres
- Ponds – remaining area

The City also contains areas of cattail marsh, often surrounding the lake areas, some areas of wet meadow, and a small area of Tamarack swamp. These wetland areas are concentrated within the center of the City limits.

Vegetation

A large deciduous hardwood forest known as the "Big Woods" evolved after the glacier receded. The main species found in the Big Woods included: sugar maple, basswood, white elm, slippery elm, and red oak. Ironwood formed an understory. Ground foliage consisted of dogwood, sumac, thorn apple, and wildflowers such as trillium, hepatica, wood anemone, bloodroot, Dutchman's breeches, and bellwort.

Wildlife

Minnetrista has a diversity of wildlife due primarily to its variety of habitats. Although no specific inventory was made, collectively the habitats appear to support ring-necked pheasant, cottontail rabbit, white-tailed deer, grey squirrel, fox duck, geese, turkey, muskrat, and mink. Songbirds and a variety of fish are also found, including northern pike, walleyed pike, largemouth bass, bluegill, crappie, sunfish, bullhead, and carp.

Some of the common urban wildlife species include a variety of birds, raccoons, gophers, etc. The wildlife is highly valued and contributes significantly to the community's appeal.

PLANNING AREA DESIGNATIONS

In the *2030 Regional Development Framework*, municipalities are identified according to their regional planning area designation. The planning area designation and related policies identify the Metropolitan Council's expectations for the amount, location, and standards for development. The community's designation therefore guides local plans, policies, and forecasts.

A community's planning area designation is based on its geographic location, amount of land available for development, existing development patterns, planned land uses, and availability of infrastructure. The City of Minnetrista is designated partially as a *Emerging Suburban Edge*, *Diversified Rural*, and partially as an *Agricultural* geographic planning area.

URBAN PLANNING AREAS

Thrive MSP 2040 defines five different designations for Urban Areas within the 7-county region. Urban Areas make up about half of the land area of the Region and contain roughly 90 percent of the population, according to the Metropolitan Council. Minnetrista is partially designated as an Emerging Suburban Edge community, which is an Urban designation and is within the Metropolitan Urban Service Area.

Emerging Suburban Edge

Emerging Suburban Edge communities include cities, townships and portions of both that are in the early stages of transitioning into urbanized levels of development.

Emerging Suburban Edge communities are expected to plan for forecasted population and household growth at average densities of at least 3-5 units per acre for new development and redevelopment. In addition, Emerging Suburban Edge communities are expected to target opportunities for more intensive development near regional transit investments at densities and in a manner articulated in the *2040 Transportation Policy Plan*.

RURAL PLANNING AREAS

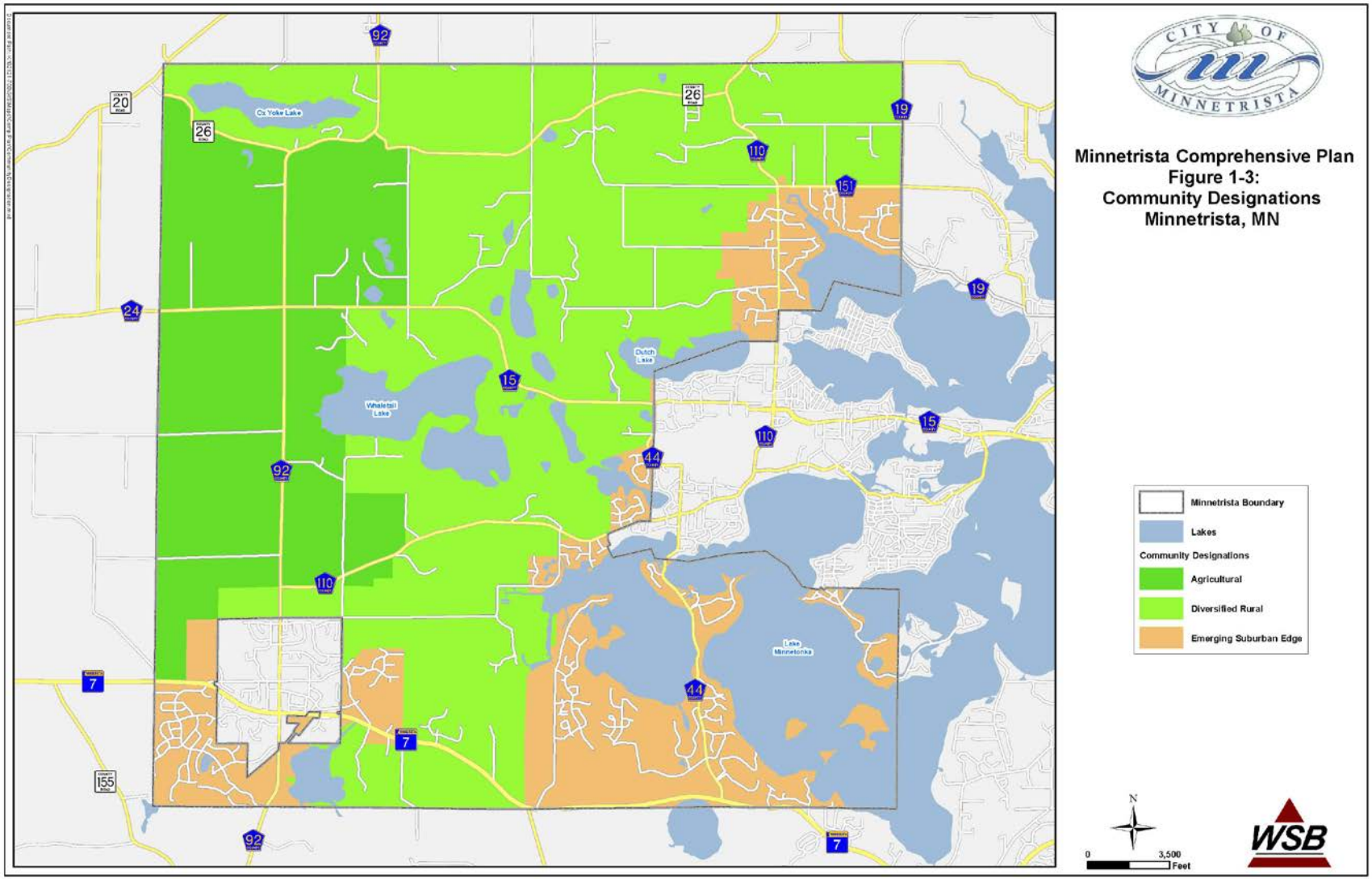
Roughly half of the 3,000 square miles in the seven-county Twin Cities area is rural. That includes cultivated farmland, nurseries, tree farms, orchards and vineyards, scattered individual home sites or clusters of houses, hobby farms, small towns, gravel mines, woodlands, and many of the region's remaining important natural resources. , Less than 10 percent of the Metro population lives in rural areas.

Diversified Rural Community

Minnetrista has also been designated as a Diversified Rural Community. These communities are the sparsely developed parts of the region that host the widest variety of farm and non-farm land uses. They include a mix of a limited amount of large-lot residential and clustered housing, agriculture, and facilities and services requiring a rural location. Currently, lands in the Diversified Rural Communities are not needed for urban development, but should be preserved for post-2040 development. Therefore, only limited growth is forecasted for this specific planning area.

Agricultural Area

Part of the City has been designated as an Agricultural Area. These areas are large contiguous land areas planned and zoned to maintain agriculture as the primary land use. The Council supports local efforts to preserve agricultural lands by forecasting small amounts of household and employment growth for Agricultural Areas and by strictly limiting its investments in regional infrastructure in these areas. Investments in regional infrastructure, such as roads, wastewater treatment, and parks and open space, will be for rural levels of service consistent with the intent to maintain agriculture.


Minnetrista Comprehensive Plan
Figure 1-3:
Community Designations
Minnetrista, MN
Minnetrista Boundary
Lakes
Community Designations
Agricultural
Diversified Rural
Emerging Suburban Edge
N
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3,500
Feet
WSB
Cx Yoke Lake
Whaletail Lake
Dutch Lake
Lake Minnetonka

FORECASTS FOR GROWTH

The Metropolitan Council has forecasted population, household number, and employment growth at the regional, county, and municipal levels. The Met Council forecasts are expressed in the *2030 Regional Development Framework*. The following table illustrates the forecasts that the Metropolitan Council has indicated for the City of Minnetrista:

Metropolitan Forecasts: Minnetrista 2010 - 2040			
Year	**Population**	**Households**	**Employment**
2010	6,384	2,176	665
2020	8,000	2,900	720
2030	9,800	3,870	870
2040	12,000	5,000	1,020
Source: U.S. Census; Metropolitan Council *Thrive 2040 MSP Forecasts* (July 8, 2015)			

The City of Minnetrista contains existing and planned developments, served by more than one wastewater treatment method. Because of this, the forecasts have been separated into two separate tables: one for the sewered areas and one for the unsewered areas of growth.

The *Water Resources Management Policy Plan - Appendix A* provides growth forecasts for municipalities served by the regional wastewater system. These numbers, which are broken down by total population, household, and employment, serve as the basis for decisions regarding the regional wastewater (sewer) system.

Forecasts in Sewered and Unsewered Areas: Minnetrista 2000 - 2040 Sources: *U.S. Census; Metropolitan Council *Thrive 2020 Water Resources Policy Plan (May 20, 2015)*						
	2000*	**2010**	**2020**	**2030**	**2040**	**Change 2010-2040**
Total Population	**4,358**	**6,384**	**8,000**	**9,800**	**12,000**	**88%**
Sewered	N/A	4,770	5,950	7,400	9,250	
Unsewered	N/A	1,614	2,050	2,400	2,750	
Total Households	**1,505**	**2,176**	**2,900**	**3,870**	**5,000**	**130%**
Sewered	N/A	1,626	2,150	2,920	3,850	
Unsewered	N/A	550	750	950	1,150	
Total Employment	**379**	**665**	**720**	**870**	**1,020**	**53%**
Sewered	N/A	360	390	530	680	
Unsewered	N/A	305	330	340	340	

Separating these areas assists municipalities with planning for both urban and rural land uses. The forecast for the sewered area is the basis for planning land uses at urban density levels served by public facilities. The forecast for the unsewered area is the basis for maintaining agricultural uses or rural character while allowing some growth.

It is vital that the City recognize their forecasts as the Metropolitan Council translates the forecasts into regional infrastructure needs for roads and highways, transit service, wastewater infrastructure, water supply, and parks. The forecasts also become the basis for the City to plan for its water, wastewater, roads, and parks.

The Comprehensive Plan shall demonstrate congruence among these key systemic elements:

- Forecasted growth;
- Planned land use and growth policies;
- Residential and employment densities; and
- Infrastructure plans.

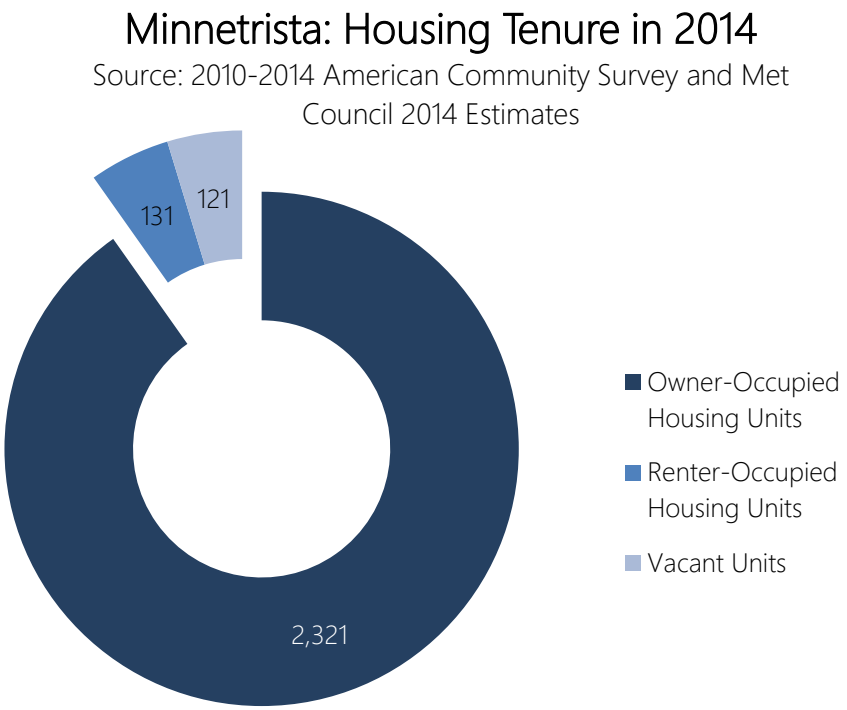
HOUSING PLAN

ASSESSMENT OF EXISTING HOUSING STOCK

The following includes an assessment of the current housing stock within the City of Minnetrista. It includes information on the tenure of occupants; the number, type, and age of housing units; and housing costs. The remainder of the Housing Plan addresses affordable housing needs, goals and policies of the City, and an implementation section identifying ways to address the City's housing needs.

Tenure of Occupied Housing Units

The following graph illustrates the number of renter-occupied and owner-occupied housing units in Minnetrista in 2010. There were a total of 2,176 occupied housing units in Minnetrista, and 2,037 of them were owner-occupied, which was 94 percent. Only 6 percent of the occupied housing units were renter-occupied.



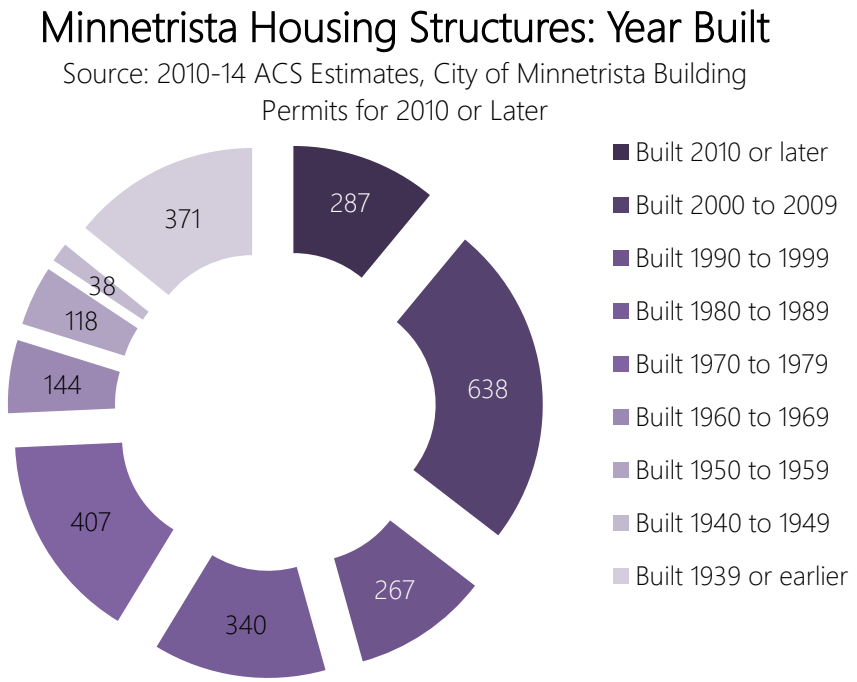
Housing Type

In 2014, 95 percent of Minnetrista's 2,287 housing units were single-family homes. The following table illustrates the change in the number of occupied housing units by type and in the City of Minnetrista from 2000 and 2014.

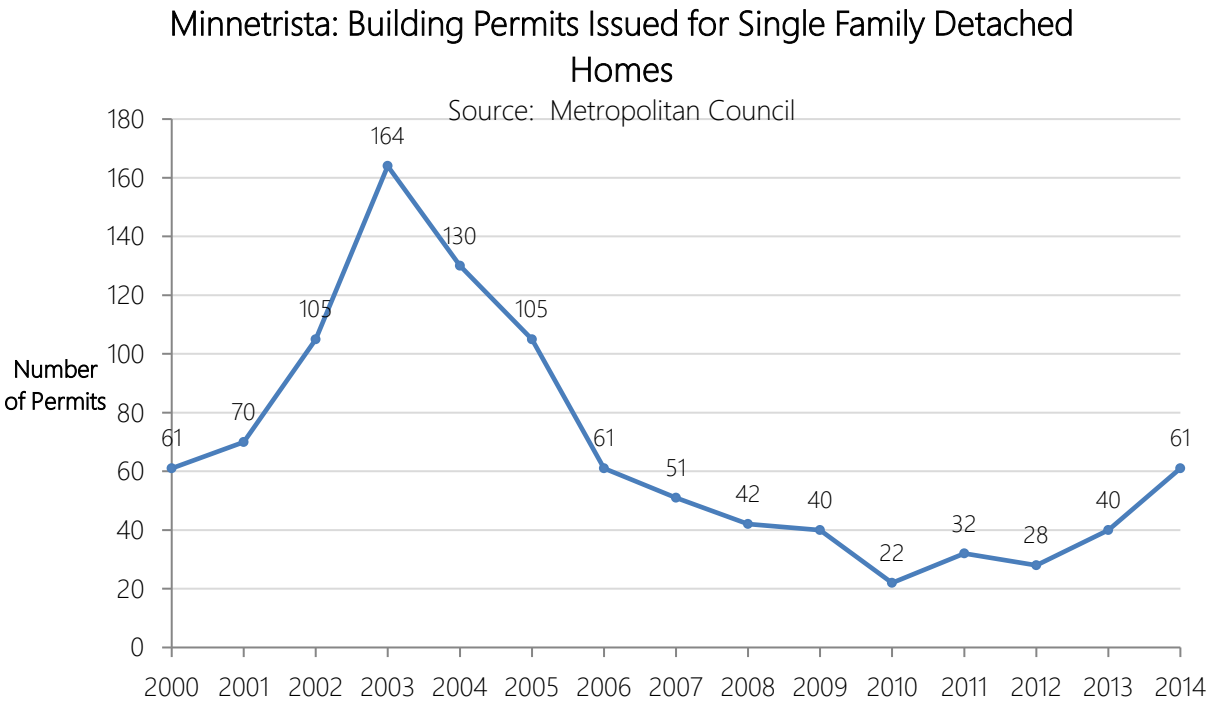
Table 2.1 - Minnetrista: Occupied Housing Units Type			
Source: 2000 U.S. Census and 2010-2014 American Community Survey Estimates			
	2000	**2014 Estimate**	**% change**
Single family, detached	1502	2,138	42%
Single family, attached	30	45	50%
Duplexes, triplexes and quad	30	0	-100%
Multifamily (20 or more units)	0	52	N/A
Manufactured homes	7	52	643%
Other units	0	0	N/A
Total	**1569**	**2287**	**46%**

Age of Housing Units

Based on the 2014 American Community Survey, approximately 29 percent of the housing structures in Minnetrista were constructed in 2000 or later. Only 18 percent of housing structures were built prior to 1950.



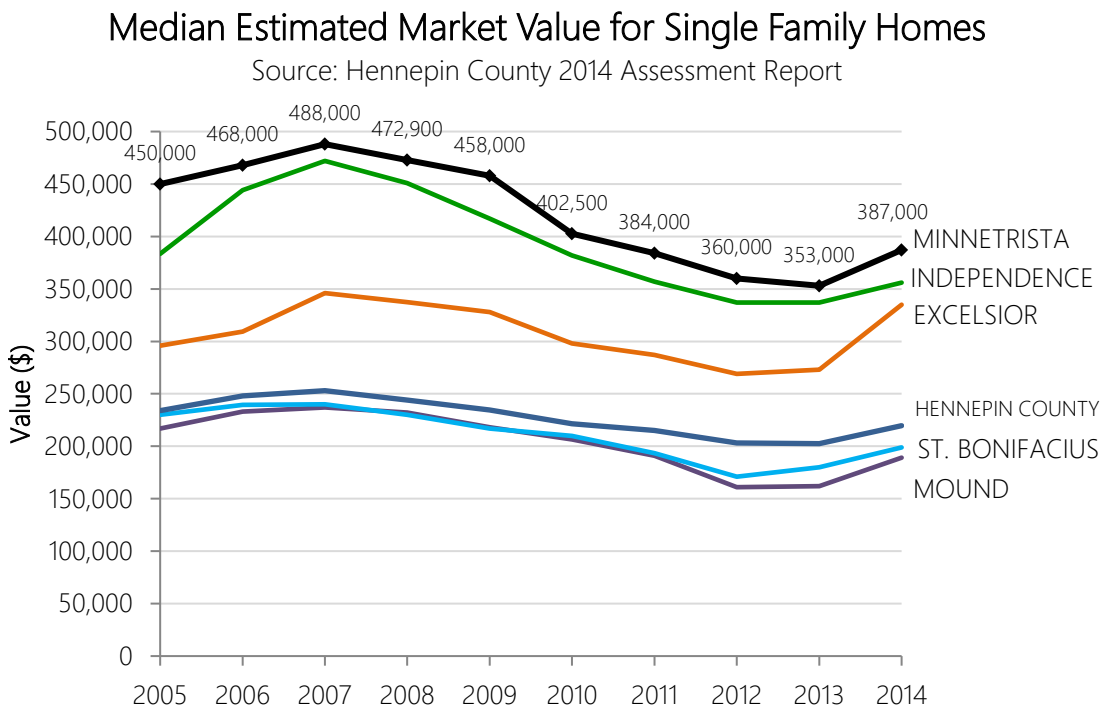
Looking at building permits issued for single family homes in Minnetrista since 2000, a clear spike in issued permits in the mid-2000s was followed by a sharp decline in the latter part of the decade. Since 2010, single family home permit issuance has risen again to pre-recession levels.



Median Estimated Market Value for Single Family Homes

The following line graph illustrates the median estimated market value for single family homes in Minnetrista, surrounding communities, and Hennepin County from 2005 through 2014. The information is from the Hennepin County Assessor's Office. The estimated market value is what the assessor estimates is what a property would likely sell for on the open, competitive market. The actual estimated market values for Minnetrista and its surrounding communities, and all of Hennepin County have been indicated on the line graph.

As the graph illustrates, estimated market values for all communities declined after 2007, with values beginning to recover in 2012. Minnetrista has had the highest median estimated market value in comparison with the surrounding communities and Hennepin County since 2005 and continuing through 2014. In 2005, Minnetrista's estimated median market value was $450,000. Estimated median market value reached a low of $353,000 in 2013 but in 2014 the median market value had risen to $387,000. The chart shows that Excelsior is converging on an estimated value close to that of Minnetrista and Independence. The City of Mound has remained on the lowest side of the estimated market value in comparison with the other communities and Hennepin County. In 2005, Mound's estimated market value was approximately $217,000, and in 2014, it was approximately, $189,000.

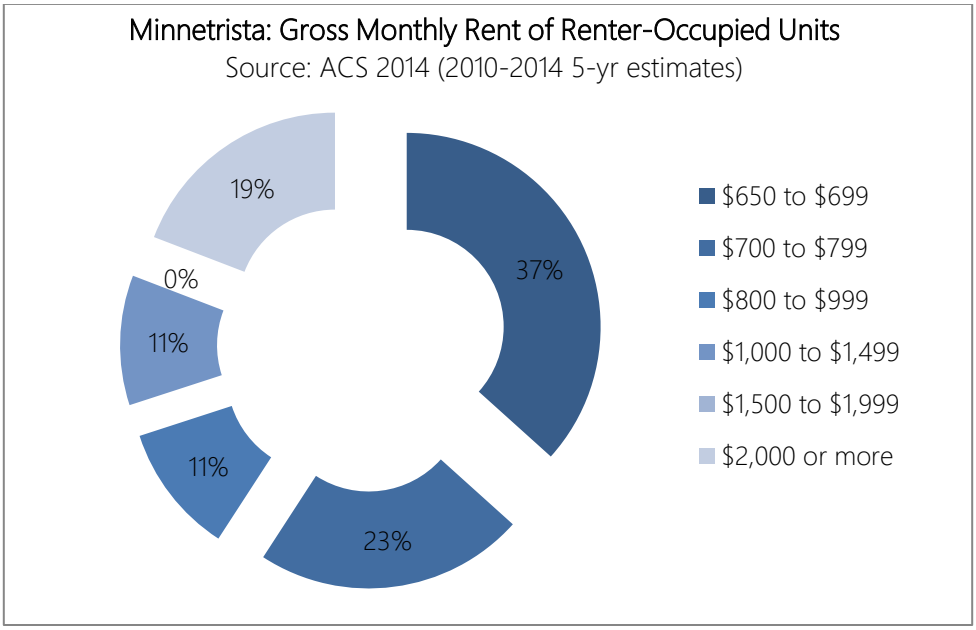


While Minnetrista's estimated median home values have paralleled overall county trends, they remained significantly higher than the Hennepin County average. In 2014, the estimated median value of a home in Minnetrista was 76 percent higher than the overall Hennepin County value.

Gross Rent

There are very few rental units in the City of Minnetrista. Although in 2010 Minnetrista had nearly doubled the number of rental units available since 2000, rental units still form only 6 percent of the total housing unit share in the city. The following graphic shows the gross rent for specified renter-occupied units in the City as of 2014.

The median monthly gross rent in Minnetrista was $758 in 2014, according to the American Community Survey. The graphic shows a split trend in gross rent costs for rental units in Minnetrista, with 37 percent of renters paying $650 to $699 per month in gross rent but nearly 20 percent of renters paying more than $2,000 per month in rent.



Existing Affordable Housing Need

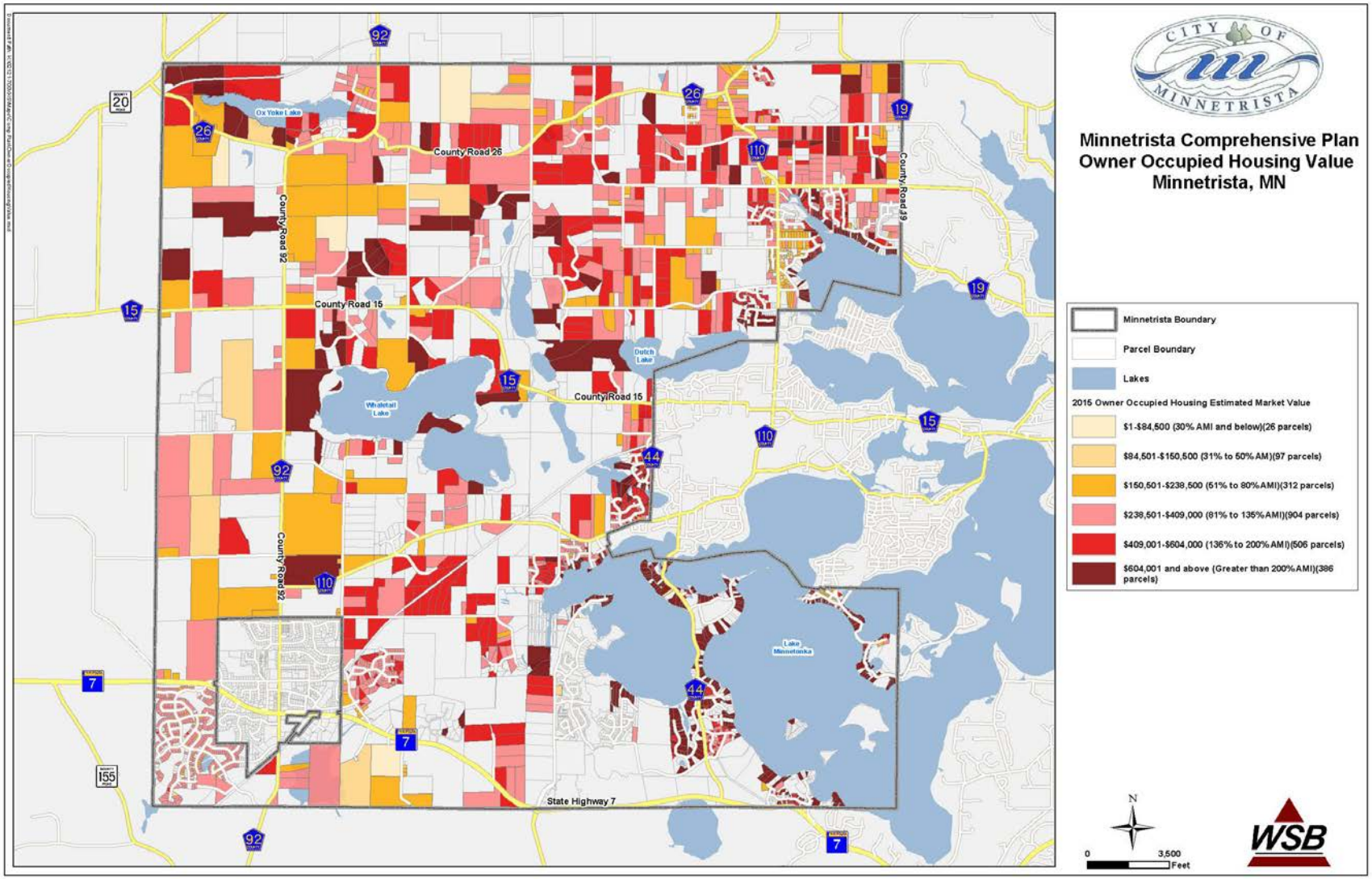
The Metropolitan Council has published a report that presents a new forecast of the affordable housing needs in the metropolitan area for 2021-2030. Communicating forecasted affordable housing need numbers is the first step in helping communities determine the housing goals and objectives to be included in the housing element of their Comprehensive Plan.

The following table illustrates the assessed values of owner-occupied housing units in Minnetrista. Values are differentiated above and below the 80% Area Median Income of $240,000.

Table 2.2 - Affordability of Owner Occupied Housing – 2015

Source: Hennepin County Assessor Office

AMI	Housing Value	Parcels
30% and below	$1 to $84,500	26
31% to 50%	$84,501 to $150,500	97
51% to 80%	$150,01 to $238,500	312
81% to 135%	$238,501 to $409,000	904
136% to 200%	$409,001 to $604,000	506
200% and greater	$604,001 and above	386


Minnetrista Comprehensive Plan
Owner Occupied Housing Value
Minnetrista, MN
Minnetrista Boundary
Parcel Boundary
Lakes
2015 Owner Occupied Housing Estimated Market Value
$1-$84,500 (30% AMI and below)(26 parcels)
$84,501-$150,500 (31% to 50% AM)(97 parcels)
$150,501-$238,500 (51% to 80% AMI)(312 parcels)
$238,501-$409,000 (81% to 135% AMI)(904 parcels)
$409,001-$604,000 (136% to 200% AMI)(506 parcels)
$604,001 and above (Greater than 200% AMI)(386 parcels)
County Road 26
County Road 92
County Road 15
County Road 39
State Highway 7
Ox Yoke Lake
Whaletail Lake
Dutch Lake
Lake Minnetonka
N
0
3,500
Feet
WSB

Currently, Minnetrista has a total of 242 households that are spending over 30% of their incomes on housing costs. These households are considered "cost burdened". The table below breaks down the total cost burdened households into three Area Median Income (AMI) bands: at or below 30%, 31% to 50%, and 51% to 80%. As shown in the table, Minnetrista's affordable housing needs lies heavily in the "At or Below 30% AMI" band. To address these needs, the Metropolitan Council has determined the current number of affordable households, and the number of additional households to be created by year 2030. There are currently no publicly subsidized housing units in Minnetrista.

TABLE 2.3 - 2015 AFFORDABLE HOUSING UNITS

Affordability	Owner Occupied[1]	Rental	Total[2]
30% AMI and Below	26	0	26
30% to 50% AMI	97	41	138
50% to 80% AMI	312	0	288
Source 1: Hennepin County 2015			
Source 2: Metropolitan Council 2015 Housing Stock Estimates			

TABLE 2.4 - 2015 COST BURDENED HOUSEHOLDS & AFFORDABLE HOUSING NEED ALLOCATION

AMI Percentage	Cost Burdened Households[1]	Current Affordable Housing Units[2]
30% AMI and Below	242	16
30% to 50% AMI	43	138
50% to 80% AMI	91	288
Total	**540**	**916**
Source: [1]U.S. Department of Housing and Urban Development 2009-2013 Comprehensive Housing Affordability Strategy [2]Metropolitan Council		
AMI = Area Median Income		

TABLE 2.5 – 2015 AFFORDABLE INCOME LIMITS

Affordability	Income Limits
30% AMI and Below	$26,000
30% to 50% AMI	$43,300
50% to 80% AMI	$65,800
Source: Metropolitan Council	

TABLE 2.6 – 2015 HOUSEHOLD INCOME

Income Range	Households
$24,999 and Below	173
$25,000 - $44,999	90
$45,000 - $74,999	394
$75,00 and Above	1,658
Source: U.S. Census Bureau 2011-2015 American Community Survey	

While the Census Bureau does not report household incomes in the ranges identical to the affordable income limits of the Metropolitan Council, Table 2.6 represents an approximation of the number of Minnetrista households that fall within the three AMI ranges. On a pro-rated basis, there is 173 households with incomes at 30% and below of AMI, 85 households with incomes between 30% and 50% of AMI, and 325 households with incomes between 50% and 80% of AMI.

DISCREPANCIES WITHIN THE AFFORDABLE HOUSING UNIT AND HOUSEHOLD INCOME DATA

There are four sources of affordable housing and household income data, the U.S. Department of Housing and Urban Development (HUD) 2009-2013 Comprehensive Housing Affordability Strategy (CHAS), the U.S. Census Bureau 2011-2015 American Community Survey, the Metropolitan Council, and Hennepin County. The HUD CHAS says that it derives its information from the non-public American Community Survey data for the year 2013, while the remaining source information is for the year 2015. There are two large discrepancy in the data: the Hennepin County Owner-Occupied property values versus the Metropolitan Housing Stock Estimates; and the cost burdened households with incomes at 30% AMI and below versus the household incomes from the 2011-2015 American Community Survey.

The Hennepin County assessment data shows that there are 26 homesteaded properties with a property value of less than $84,500 (30% AMI) and 312 homesteaded properties with a property value of less than $238,500 (80% AMI). The Metropolitan Council states that there is 16 housing units affordable to households within incomes at or below 30% AMI (10 units less than Hennepin County) and the Metropolitan Council states that there is 288 housing units affordable to households within incomes between 50% and 80% of AMI (24 units less than Hennepin County). This discrepancy may be even greater is there are any rental units in Minnetrista charging rents affordable to either the households within incomes at or below 30% or households within incomes between 50% and 80% of AMI.

The HUD CHAS data states that were 242 households within incomes at or below 30% AMI that were cost burdened in 2013 while the American Community Survey states that there were 173 households making incomes of $24,999 or less and that there are no households making between $25,000 and $29,999 in 2015. This creates a discrepancy that there are 69 more households within incomes at or below 30% Ami that were cost burdened than there are households within incomes at or below 30% AMI. This discrepancy may be because 2013 was within the end of the great recession while 2015 was the start of the economic recovery after the recession.

EXISTING COST BURDENED HOUSEHOLD AND THE EXISTING AFFORDABLE HOUSING STOCK

Using the Hennepin County and American Community Survey data, there are only 26 housing units affordable to households within incomes at or below 30% while there are 173 households within incomes at or below 30% AMI. Should these residents desire to stay within Minnetrista, and they are not able to increase their income, additional affordable units will need to be constructed. Affordable units for households within incomes at or below 30% AMI are typically multiple family units that receive State and/or Federal subsidies to reach and maintain that level of affordability. Minnetrista has this land guided for High Density Residential (HDR) located between the Dakota County Rail Regional Trail and County Road 92. The State and/or Federal government will need to have the funds necessary available at the time that this land is developed to actually create these units that are affordable at below 30% AMI.

There are approximately 90 households with incomes between 30% and 50% AMI and there are 138 housing units available that are affordable to households with between 30% and 50% AMI. While there are 43 cost burdened households with incomes between 30% and 50% AMI, there are more units available than households in that income bracket. There is no need for additional affordable housing units affordable to existing households with incomes between 30% and 50% AMI.

There are approximately 325 households with incomes between 50% and 80% AMI and there are only 288 housing units available that are affordable to households with between 50% and 80% AMI. This deficiency can explain the 91 cost burdened households with incomes between 50% and 80% AMI. Affordable units for households within incomes between 50% and 80% AMI are typically townhome units. Minnetrista has already approved townhomes units within the preliminary plat for Woodland Cove and have land guided for Medium Density Residential (MDR) to the west of Kings Point Road and north of Minnesota Highway 7.

Addressing the Affordable Housing Need

The Metropolitan Council has two affordable housing requirements for cities developing a housing element in the comprehensive plan:

1. Acknowledge your community's share of the region's need for affordable housing at three levels of affordability: <30% AMI, 31-50% AMI, and 51-80% AMI.
2. Guide residential land at densities sufficient to create opportunities for affordable housing using one of the following options:

- Option 1: Guide sufficient land at minimum residential densities of 8 units/acre to support your community's total allocation of affordable housing need for 2021 – 2030.
- Option 2: Guide sufficient land at minimum residential densities of:
    a. 12 units/acre to address your communities allocation of affordable housing need at <50% AMI. This combines your community's allocation at <30% AMI and 31-50% AMI.
    b. 6 units/acre to address your community's allocation.

After considering both Metropolitan Council options, the 2040 Comprehensive Plan Steering Committee decided that the densities and housing developments allocated in Option 2 would fit the character of Minnetrista neighborhoods and most adequately address the housing affordability needs.

The table below illustrated the number of housing units the Metropolitan Council's minimum density requirements would produce in the 2021-2030 timeframe, and how many units foreseen average densities will produce. As shown, this plan's figures surpass the Metropolitan Council's minimums by 145 total units. Refer to the table below for further details.

Affordable Housing Density & Unit Production			
Land Use Categories at Affordable Densities (≥6 du/acre)	**Net Developable Acres from 2021-2030 decade**	**Density (minimum)**	**Affordable Unit Potential**
Residential Medium	14.30	6 du/acre	86
Residential High	13.3	12 du/acre	160
Woodland Cove (2021-2030)			
Residential High	N/A (platted)	12 du/acre	111
TOTAL			**357 units**
Land use and density is described in detail in Chapter 3 of this plan. Refer to table 3.6 for the most comprehensive information regarding acreages, land use descriptions, density ranges, and staging.			

The following table illustrates how this plan meets the Metropolitan Council's minimum required number of units by AMI category.

2021-2030 Affordable Housing Allocation			
Density	**Affordable Housing Allocation**	**Housing meeting 0% - 50% AMI Requirement**	**Housing meeting 51% - 80% AMI Requirement**
Residential Medium (6-12 du/acre, meets 51-80% AMI)	55 units	N/A	86 units
Residential High (≥12 du/acre, meets >50% AMI)	263 units (187 units for at or below 30% AMI plus 76 units for 31% to 50% AMI)	271 units	N/A

HOUSING GOALS AND POLICIES

Goals, policies, and programs shall be identified to assist the City of Minnetrista in decision-making regarding the preservation of its current housing stock and the development of new units. Goals and policies typically address development and redevelopment expectations, housing maintenance and preservation, and density and diversity of housing type.

Implementation

In order for Minnetrista to meets its goals and policies pertaining to housing, and especially to accommodate the projected needs of affordable housing units, the City must

establish an implementation program. Numerous efforts are available for Minnetrista to employ in order to facilitate the construction of affordable housing and to expand local housing options.

Programs

Numerous programs are available to help the City meet its housing goals and policies. The City shall consider utilizing certain programs such as fee waivers and/or adjustments to facilitate affordability. In addition, the City may also consider encouraging and working with potential developers who plan to use federal low income housing tax credits to do affordable rental housing. Other options include: affordable housing assistance or development and preservation programs available through the local, county, state, and federal government. The City may consider including the following in its housing maintenance or enforcement code.

Minnesota Housing Consolidated Request for Proposals: The Minnesota Housing Finance Agency provides a once annually request for proposal (RFP) where affordable housing developers can apply for funding to construct affordable housing as well as to preserve and rehabilitate existing affordable housing. Minnetrista will consider encouraging developers to apply to the Consolidated RFP to preserve and/or rehabilitate existing affordable housing for those Minnetrista residents in need and to provide new housing between 2021 and 2030 to provide affordable housing for future residents. The RFP is a useful tool to support the development of rental housing units affordable at 50% AMI or below.

Community Development Block Grants (CDBG): The U.S. Department of Housing and Urban Development (HUD) provides CDBG funds to communities with over 45,000 residents for the use of providing and maintaining affordable housing. Hennepin County administers these CDBG funds for the City of Minnetrista. Minnetrista encourages the Hennepin County to use CDBG funds to provide affordable housing for those Minnetrista residents in need whenever the CDBG funds are available. Minnetrista will consider applying for CBDG funding on behalf of the developer when a housing project qualifies for CDBG funds and the project complies with the other objectives of the Comprehensive Plan. CDBG is a useful tool to preserve both rental and ownership units affordable at 80% AMI and below.

HOME Funds: The HOME Investment Partnerships Program (HOME) is a flexible federal grant program that allows Hennepin County to fund affordable housing activities for very low and low-income families or individuals, homeless families, and persons with special needs. Minnetrista encourages the Hennepin County to use HOME funds to provide affordable housing for those Minnetrista residents in need whenever the HOME funds are available. Minnetrista will consider applying for HOME funding on behalf of the developer when a housing project qualifies for HOME funds and the project complies with the other objectives of the Comprehensive Plan. HOME funds are a useful tool for both the preservation and development of both rental and ownership units affordable at 50% AMI and below.

Affordable Housing Incentive Funds (AHIF): The AHIF operates under the Hennepin County HRA. This loan program funds the development of affordable housing units for very low-income households. Minnetrista encourages the Hennepin County HRA to use AHIF funds to provide affordable housing for those Minnetrista residents in need whenever the AHIF funds are available. Minnetrista will consider applying for AHIF funding on behalf of the developer when a housing project qualifies for AHIF funds and the project complies with the other objectives of the Comprehensive Plan. AHIF is a useful tool to develop rental units affordable at 30% AMI and below.

Neighborhood Stabilization Program (NSP) Grants: The NSP was established by HUD for the purpose of stabilizing communities that have suffered from foreclosures and abandonment. The focus of this program is the purchase, rehabilitation and resale of foreclosed and abandoned properties. The NSP operates under the Hennepin County HRA. Currently there are no NSP funds available in Hennepin County, but Minnetrista supports the continuation of the NSP program should funding become available again in the future. NSP funds were a useful tool to preserve ownership units affordable at 80% AMI and below.

Homebuyer Assistance Programs: Homebuyer assistance programs funded directly by Hennepin County HRA are currently not available. Minnetrista will encourage residents to contact the Minnesota Homeownership Center regarding homebuyer assistance programs that are currently available. Minnetrista encourages the Hennepin County HRA to consider funding a homebuyer assistance program. Homebuyer assistance funds are a useful tool to preserve ownership units affordable at 80% AMI and below.

Repair and Rehabilitation Support: The Community Action Partnership of Suburban Hennepin (CAPSH) provides home repair and rehabilitation assistance to Minnetrista residents. Minnetrista encourages CAPSH to continue its assistance program and that the Hennepin County HRA continues to provide funding to CAPSH. Repair and rehabilitation support is a useful tool to preserve ownership units affordable at 80% AMI and below.

Foreclosure Prevention: The Community Action Partnership of Suburban Hennepin (CAPSH) provides foreclosure counseling to Minnetrista residents. WeCAN (Western Communities Action Network) provides one-time mortgage payment assistance to eligible households in need. Minnetrista encourages CAPSH and WeCAN to continue providing these services and that the Hennepin County HRA continues to provide funding to CAPSH. Foreclosure prevention funds are a useful tool to preserve ownership units affordable at 80% AMI and below.

Energy Assistance: The Community Action Partnership of Suburban Hennepin (CAPSH) administers the energy assistance program for Minnetrista residents. Minnetrista encourages CAPSH to continue its energy assistance program and that the Hennepin County HRA continues to provide funding to CAPSH. Energy assistance is a useful tool to preserve both rental and ownership units affordable at 80% AMI and below.

Rental Assistance: WeCAN (Western Communities Action Network) provides one-time emergency rental and utility assistance to eligible households in need. Minnetrista appreciates this program and encourages WeCAN to continue providing this service to local households and families in need. Rental assistance is a useful tool to preserve rental units affordable at 80% AMI and below.

Livable Communities Grants: Minnetrista is currently not a participating community in the Metropolitan Council's Livable Community Act (LCA) programs. Minnetrista should consider enrolling in the LCA program so that Minnetrista could apply for livable communities grant on behalf of developers who are provide level of affordable housing and the guaranteed length of affordability that generates a public benefit greater than the resources required to apply for and administer the livable community grants. The LCA program currently requires annual reporting that would require City staff's time to complete. Currently, Minnetrista will not enroll in the LCA program due to this unreimbursed staff time investment. Minnetrista staff shall evaluate annually if the benefit to enrolling in the LCA program can be justified and support when considered with the other responsibilities that are required by City staff's workload and the likelihood of projects within Minnetrista succeeding in the LCA grant process. LCA grants are a useful tool for the development of both rental and ownership units affordable at 80% AMI and below.

Local Fair Housing Policy: The Hennepin County HRA, which administers affordable housing funding in Minnetrista, has adopted a fair housing policy. Minnetrista encourages the Hennepin County HRA to continue the implementation of its fair housing policy. The City of Minnetrista currently has neither an active HRA nor the staff capacity to manage local fair housing administration. If the City elects to form an HRA and develops adequate staff capacity to manage significant housing programming, Minnetrista will revisit the option to develop a local fair housing policy. Local fair housing policy is a useful tool for the preservation of both rental units affordable at 80% AMI and below.

Land Trusts: A land trust achieves affordable home ownership by the resident by the house on a property, but the trust owns the land under the house therefore reducing the amount of the mortgage. The advantage of a land trust is that the trust can control the future sale of the property to ensure that affordability can be maintained and have the ability to scatter the land trust sites throughout the community. The disadvantage of a land trust is that it will take significant financial resources to purchase the land rights and those resources are never recovered during the period that the property remains affordable. Minnetrista may evaluate if joining the West Hennepin Affordable Housing Land Trust (WHAHLT) is the most efficient way to use its resources to provide affordable housing. Minnetrista will consider applying for CDBG funds on behalf of WHAHLT if the land trust is the best use of that year's CDBG funding and WHAHLT staff assists in the preparation of the application. A land trust can be a useful tool for both the development and preservation of ownership units affordable at 80% AMI and below.

Site Assembly and/or Acquisition: Cities have the authority to acquire properties for housing through a number of mechanisms including through transfer of tax-forfeit properties from Hennepin County or through outright purchase. Minnetrista will monitor and consider acquisition of properties that can be assembled and developed into a public good project, including the production of affordable housing or maintenance of existing affordable housing. Such a strategy could be used to allow the City to put out specific RFP requirements to developers in order to achieve a project that includes housing affordability, specifically that meet thresholds for 50 percent AMI and below for rental housing and 80 percent AMI and below for ownership.

Rental License and Inspection Program: Cities can implement rental licenses and inspections to protect the health, safety, and welfare of residents living in rental property, as well as to provide a mechanism for a city to maintain property values and ensure the quality of the community's housing supply. Minnetrista has only 131 rental units representing only 5% of the total housing units within the community. Minnetrista will not implement a rental licensing and inspection program at this time because the limit number of units does not justify the investment in the program. Minnetrista will re-evaluate the rental licensing and inspection program as the number of rental units within the community increases.

Fiscal Devices

Fiscal devices, such as revenue bonds, tax increment financing, or tax abatement can be used to help ease the construction and availability of affordable housing in the City of Minnetrista.

Development Authorities: Minnetrista does not have its own Housing and Redevelopment Authority (HRA) and depends on the Hennepin County HRA for affordable housing and redevelopment services. Minnetrista encourages the Hennepin County HRA to construct, finance and/or partner with private developers to provide affordable housing for those Minnetrista residents in need. Minnetrista will not create its own development authority. Development authorities are a useful tool to support the development of both rental and ownership housing units affordable at 50% AMI or below.

Housing Bonds: Minnesota State Statute allows HRAs the ability to issue housing bonds to provide affordable housing. Minnetrista encourages the Hennepin County HRA to issue housing bonds to provide affordable housing for those Minnetrista residents in need. Minnetrista will not issue bonds for housing separate from the tax increment financing process described below. Housing bonds are a useful tool to support the development of both rental and ownership housing units affordable at 50% AMI or below.

Tax Abatement: Cities may issue bonds to be used to support the construction of affordable housing and use a portion of the property tax received (tax abatement) from the development to finance these bonds. This removes this property taxes revenue from paying for the services needed for this property, its residents and the community in general. Tax abatement requires each taxing authority to approve their own tax

abatement separately which decreases the likelihood that all the taxing authorities will approve the abatement. The City would rather use TIF as an affordable housing finance tool because of its use of the increment from all of the taxing authorities and therefore Minnetrista will not use tax abatement to finance housing. Tax abatement is a useful tool to support the development of both rental and ownership housing units affordable at 80% AMI or below.

Tax Increment Financing: Cities may create a housing district to create a tax increment financing (TIF) district. The TIF bonds issued on this district are to be used to support the construction of affordable housing and entire property taxes received above the original tax value (increment) from the development to finance these bonds. This removes this property taxes revenue from paying for the services needed for this property, its residents and the community in general. Minnetrista will consider the use of TIF for long-term, high-quality affordable housing during the period of 2021-2030. The City will consider developing a TIF policy within 18 months of the approval of the Comprehensive Plan by the Metropolitan Council to determine when the level of affordable housing and the guaranteed length of affordability to provide a public benefit great enough to justify the use of TIF. TIF is a useful tool to support the development of both rental and ownership housing units affordable at 50% AMI or below.

Official Controls

Official controls and land use regulation can be used to assist in the construction of affordable housing units. Controls and regulations can also be used to simplify the process of expanding local housing options also.

Fee Waivers or Adjustments: Cities may waive or reduce fees to reduce the cost of construction of affordable housing. Conversely, State rules require that the fee that a City charges be related to the cost of providing the services for which the fee is collected. This waiver or reduction could create a deficiency in the funding for services which would be required the use of general funds to resolve. Minnetrista will consider the use of fee waivers or adjustments for long-term, high-quality affordable housing during the period of 2021-2030. Fee waivers or adjustments are a useful tool to support the development of both rental and ownership housing units affordable at 80% AMI or below.

Zoning and Subdivision Policies: The City has the ability to adjust its zoning and subdivision regulations through a planned unit development (PUD). Zoning and subdivision regulation are created in part to mitigate the impacts that a development may have on adjoining properties. When considering a PUD for affordable housing, the City should determine when the level of affordable housing and the guaranteed length of affordability provide a public benefit great enough to justify the potential impacts that would result from a deviation in the zoning or subdivision regulations. Minnetrista will consider the use of zoning and subdivision ordinance deviations through the use of PUD for long-term, high-quality affordable housing during the period of 2021-2030. PUD is a useful tool to support the development of both rental and ownership housing units affordable at 80% AMI or below.

4(d) Tax Program: Rental properties may receive a property tax break provided that the property has income and rent restricted units serving households at 60% AMI and below. Minnetrista will consider using 4d tax incentives to further promote the creation and preservation of affordable multifamily housing upon the adoption of the Comprehensive Plan during the period of 2021-2030. 4(d) tax incentives are a useful tool to support the development of rental housing units affordable at 50% AMI or below.

Housing Goals and Objectives

Minnetrista adopted the following vision statement that pertains to housing goals and policies:

> **Visioning Principal**: *Minnetrista is attractive to families seeking single family homes with yards allowing families to gather and play. As family members age, alternative housing styles should be considered allowing residents to remain in Minnetrista throughout their lives, while supporting the efforts of seniors to live independently, and to be able to attract extended family members to remain involved in the community.*

This vision statement articulates the need for lifecycle housing options in the community. Lifecycle housing means housing that is accessible, affordable, or adaptable to people at all different stages of life, from youth to old age. Attracting extended family to live in Minnetrista requires having housing options that are appropriate and reasonable not only for families but also for young adult children, elderly parents, and single adult relatives seeking to live in the community.

To achieve this vision, Minnetrista supports the following housing goals.

Goal 1: The City supports the development of subdivisions with a variety of housing types.

Variation in housing types, sizes, and styles will help to better achieve an intergenerational community that supports households and individuals at various stages of life.

- Evaluate the use and flexibility allowed within Planned Unit Developments (PUDs) to support long-term affordable housing.

Goal 2: The City supports housing options for cost-burdened households, particularly in locations that are in close proximity to services and retail opportunities.

According to the Metropolitan Council's assessment, nearly 15 percent of Minnetrista households are considered housing cost-burdened, and nearly two thirds of those cost-

burdened households are making at or below 50 percent of the Area Median Income. The majority of Minnetrista's affordable housing need allocation is aimed at household incomes below the 50 percent AMI threshold. There is a need for more affordable units in the city, and it is unlikely that all of the affordable housing needs will be met through development of owner-occupied housing units. The City has targeted areas like the triangle between County Road 92 and the Dakota Rail Regional Trail as well as an area within the Woodland Cove development and adjacent to Kings Point Road, as appropriate locations to encourage higher-density affordable housing development within the community.

Goal 3: The City supports senior housing options.

As Minnetrista residents age, their current housing options may become ill-suited to their needs. In recognition of the fact that senior residents have unique requirements and may desire be in Minnetrista to remain close to family and a community that they appreciate, the City supports providing more high-amenity senior housing options for older residents.

Goal 4: The City will support helping people stay in the homes they have in order to remain in the community they enjoy.

There are established programs that help households manage the financial burden of homeownership and maintain a high quality of housing through grants and loans.

Goal 5: The City supports housing for people during all stages of their lives.

Minnetrista is predominately developed with single family housing. Trends indicate that extended families desire to live near each other, but not necessarily in the same home. The City supports development of a variety of housing options so that young adults can afford to move out of their parent's home and stay in Minnetrista; empty nesters have smaller ownership opportunities to free up the single-family housing for new families; and allow housing opportunities for grandparents to live near their children and grandchildren.

Table 2.7 - Affordable Housing Tools

Housing Goals	Development Authorities (Hennepin Cty)	Housing Bonds (Hennepin Cty)	Tax Abatement	Tax Increment Finance	MN Housing Consolidated RFP	CDBG grants (Hennepin Cty)	HOME funds (Hennepin Cty)	Aff. Housing Incentive Funds (Hennepin Cty)	NSP Funds (Hennepin Cty)	Homebuyer assistance programs (Hennepin Cty)	Repair & Rehab Support	Foreclosure prevention	Energy Assistance	Rental Assistance	Livable Communities grant (Metropolitan Council)	Local Fair Housing Policy	Fee waivers or adjustments	Zoning and subdivision policies	4(d) tax program	Land trusts	Site Assembly and Acquisition
The City supports the development of subdivisions with a variety of housing types.															X			X			X
The City supports housing options for cost-burdened households, particularly in locations that are in close proximity to services and retail opportunities.	X	X		X	X										X		X	X	X	X	
The City supports senior housing options.	X	X		X	X									X	X						X
The City will support helping people stay in the homes they have in order to remain in the community they enjoy.						X				X	X	X	X	X	X			X			
The City supports housing for people during all stages of their lives.	X	X		X	X					X	X						X	X	X	X	X

LAND USE PLAN

The basic intent of the comprehensive planning process is to provide a well-founded and coordinated decision-making framework to guide both public and private development and community improvements. In this regard, this document represents the development framework to guide land use decisions for the City of Minnetrista.

Based upon the foundation established by the policy plan, this section provides a framework to guide and direct future land development within the City of Minnetrista. The Land Use Plan is a narrative and graphic description that provides the background and rationale for land use designations as represented on the Proposed Land Use Map.

METROPOLITAN COUNCIL COMMUNITY DESIGNATIONS & STRATEGIES

The Metropolitan Council has devised strategies and plans for each community to ensure that growth is accommodated, including Planning Area Designations, System Plans, and Net Density Calculations.

Minnetrista has been classified as three different community designation types by the Metropolitan Council in its *Thrive 2040* regional development framework: Emerging Suburban Edge, Diversified Rural, and Agricultural. The Metropolitan Council has identified policies, strategies, and specific roles for communities to take in planning for their orderly and efficient land use. Integrating these strategies and policies into the Comprehensive Plan shall ensure that land use patterns accommodate growth and make efficient use of existing and planned infrastructure.

The following are the Community Roles to carry out the Orderly and Efficient Land Use Policies outlined by the Metropolitan Council for each of Minnetrista's three community designations.

Emerging Suburban Edge

<u>Orderly and Efficient Land Use Policies</u>

- Plan and stage development for forecasted growth through 2040 and beyond at overall average net densities of at least 3-5 dwelling units per acre in the community. Target higher-intensity developments in areas with better access to regional sewer and

transportation infrastructure, connections to local commercial activity centers, transit facilities, and recreational amenities.

- Identify and protect an adequate supply of land to support growth for future development beyond 2040, with regard to agricultural viability and natural and historic resources preservation.
- Incorporate best management practices for stormwater management and natural resources conservation and restoration in planning processes.
- Plan for local infrastructure needs including those needed to support future growth.

Diversified Rural

Orderly and Efficient Land Use Policies

- Plan for growth not to exceed forecasts and in patterns that do not exceed 4 units per 40 acres.
- Preserve areas where post-2040 growth can be provided with cost-effective and efficient urban infrastructure.
- Manage land uses to prevent the premature demand for extension of urban services, and so that existing service levels (such as on-site wastewater management, gravel, and other local roads) will meet service needs.

Agricultural

Orderly and Efficient Land Use Policies

- Limit residential development and adopt zoning ordinances and/or other official controls to maintain residential densities no greater than 1 housing unit per 40 acres.
- Support enrollment in the Agricultural Preserves and Green Acres programs to preserve prime agricultural soils and agricultural land uses.
- Maintain agricultural land uses through at least 2040 as a primary long-term use to preserve prime agricultural lands and to preserve land for efficient expansion of post-2040 regional infrastructure where appropriate.
- Manage land uses to prevent the premature demand for extension of urban services, and so that existing service levels (such as on-site wastewater management, gravel, and other local roads) will meet service needs.
- Develop and implement strategies for protecting farmlands, such as exclusive agricultural zoning, agricultural security districts, and lower residential densities such as 1 housing unit per 80 acres.

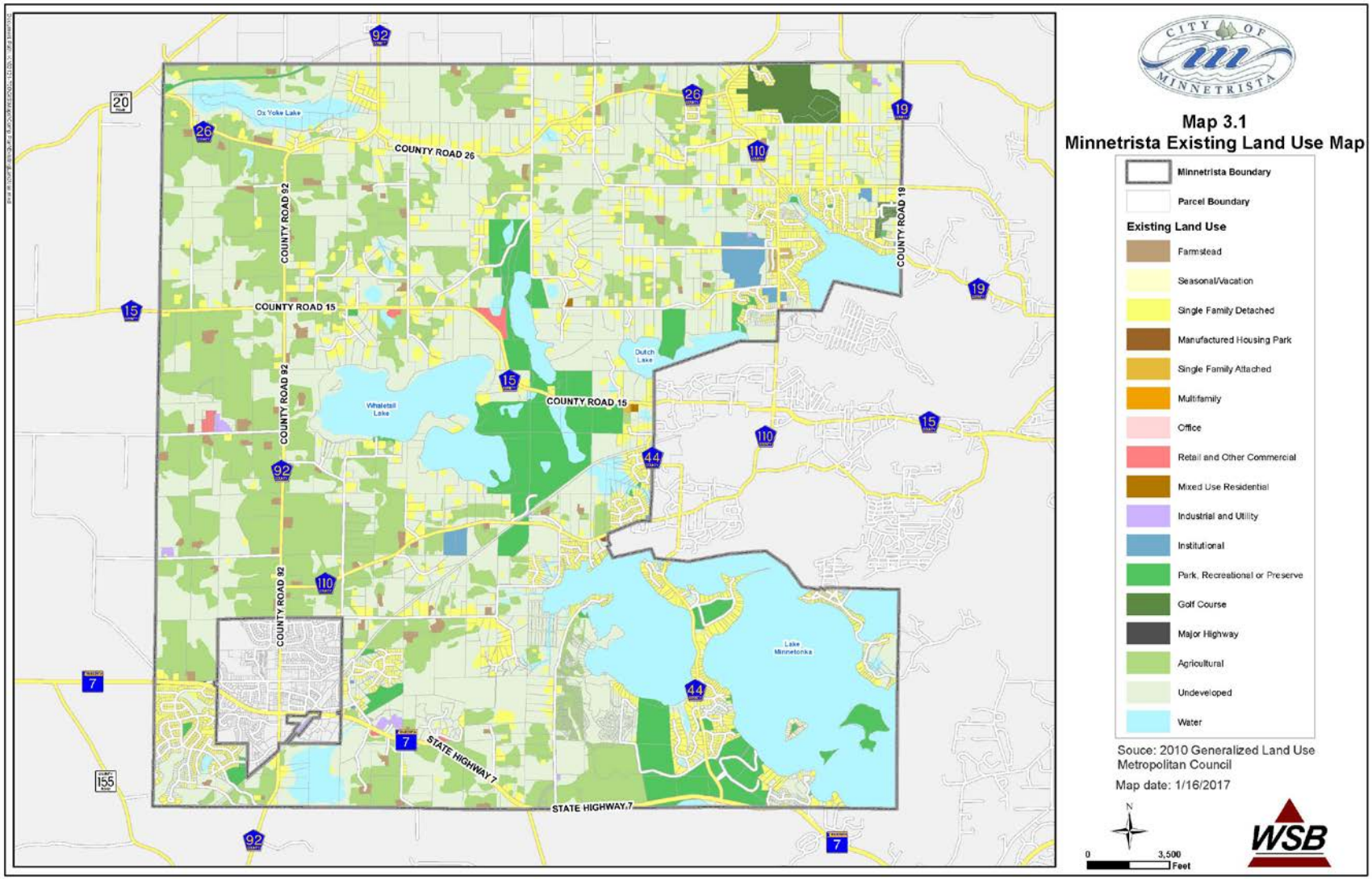
EXISTING LAND USE

Existing land use can be thought of as what actually exists on the ground at the present time, regardless what has been planned or what zoning regulations exist. The most accurate depiction of what land uses currently exist in Minnetrista comes from the Metropolitan Council's 2010 Generalized Land Use map, which uses a combination of aerial photography, county parcel data and community "ground truthing" to provide current land use types by acreage.

The table below shows the existing land use types in Minnetrista based on the 2010 Generalized Land Use criteria. The vast majority of Minnetrista's land falls into the category of agricultural or undeveloped uses. Residential uses and open water each make up about 15 percent of Minnetrista's land by area, and park and recreational land is seven percent of the total area of the City. Given the predominance of land uses associated with open and natural landscapes in Minnetrista, it is unsurprising that the City's vision statements reflect a desire to maintain and promote open space and a "rural feel."

Table 3.1 Existing Land Use, from 2010 Generalized Land Use

Land Use Type	Total Acres	Percent
Residential Total	**2,852**	**14.4%**
Single Family Detached	2,614	13.2%
Farmstead	218	1.1%
Single Family Attached	19	<1%
Manufactured Housing Parks	2	<1%
Multifamily	<1 acre	<1%
Commercial Total	**45**	**<1%**
Retail and Other Commercial	45	<1%
Office	<1 acre	<1%
Industrial Total	**39**	**<1%**
Industrial and Utility	39	<1%
Institutional Total	**139**	**<1%**
Park and Recreational	**1,390**	**7.0%**
Park, Recreational or Preserve	1,194	6.0%
Golf Course	197	1.0%
Mixed Use Total	**7**	**<1%**
Mixed Use Residential	7	<1
Major Roadways	**76**	**<1%**
Agricultural and Undeveloped Total	**11,957**	**60.4%**
Agriculture	4,683	23.7%
Undeveloped Land	7,274	36.7%
Open Water	**3,276**	**16.5%**
Total	**19,801**	


Map 3.1
Minnetrista Existing Land Use Map
Minnetrista Boundary
Parcel Boundary
Existing Land Use
Farmstead
Seasonal/Vacation
Single Family Detached
Manufactured Housing Park
Single Family Attached
Multifamily
Office
Retail and Other Commercial
Mixed Use Residential
Industrial and Utility
Institutional
Park, Recreational or Preserve
Golf Course
Major Highway
Agricultural
Undeveloped
Water
Souce: 2010 Generalized Land Use
Metropolitan Council
Map date: 1/16/2017
N
0
3,500
Feet
WSB
COUNTY ROAD 26
COUNTY ROAD 92
COUNTY ROAD 15
COUNTY ROAD 19
STATE HIGHWAY 7
Ox Yoke Lake
Whaletail Lake
Dutch Lake
Lake Minnetonka

FUTURE LAND USE

The Future Land Use Plan is a conceptual illustration of how future development will be distributed as Minnetrista grows over the next 20 to 30 years. The future land use plan must accommodate projected growth in population and households, and should reflect the community's vision for the future. The 2040 Future Land uses defined by this plan fulfill both of these requirements. The 2040 Future Land Use plan guides sufficient land to accommodate projected population changes while meeting the density requirements of each of its three community designations given by the Metropolitan Council.

Many of the city's current land use policies served as a starting point in this plan update, with some modifications made to the land use designations to better reflect the current community vision and preferences for housing development types and densities. This is especially true of the residential land use districts, which underwent some amendments in their guided density ranges in this plan to reflect the desire housing outcomes of the community.

Some residential land use designations were removed from future land use consideration; no new land is guided for Low-Medium (3 – 5 units per acre) or Medium-High (6 – 8 units per acre) residential land uses in the 2040 plan, and the designations only remain to accommodate existing developments. The Medium-High land use category from the 2030 plan has been absorbed into the density range of Residential Medium with this plan update. The Low-Medium residential category remains on the future land use map to accommodate existing developments, but is no longer used to guide any new residential areas for 2040. This choice is a reflection of discussions in which the consensus was that this land use category produces housing styles that are not commonly developed or preferred in the community.

Table 3.2 Comparing 2030 and 2040 Residential Land Use designations by guided density

Residential Land Use Designation	2030 Density	2040 Density
Residential Low	2-3 units/acre	1.15 – 4 units/acre
Residential Low-Medium	3-5 units/acre	*Limited to areas guided in 2030 plan*
Residential Medium	2.5-3.5 units/acre	6 – 12 units/acre min
Residential Medium-High	6-8 units/acre	*Limited to areas developed within 2030 plan; all vacant areas in this density range guided as "Residential Medium"*
Residential High	8-10 units/acre	12 – 30 units/acre min
Mixed Residential (Woodland Cove)	3.66 units/acre	3.66 units/acre

Significant changes were made to the Urban Reserve land use designation in this plan update, reflecting the desire to prioritize those areas for future urban development that are either already large parcels or are most likely to be assembled in the future for development because of their size, value or proximity to existing services. Several areas that were previously designated Urban Reserve have been re-guided for Rural land uses in this update, particularly those areas adjacent to St. Bonifacius and the area east of County Road 110 and north of County Road 151. Conversely, some areas that were previously designated rural (largely along the Highway 7 corridor) have now been categorized as Urban Reserve. The 2040 Future Land Use plan also guides new areas along Highway 7 for Retail Commercial land uses.

The table below summarizes the 2040 Future Land Use categories and their associated acreages.

Table 3.3 Comparing 2030 and 2040 planned land use acreage by designation

Planned Future Land Use Designations	2030 Planned land uses (2008 Comprehensive Plan)		2040 Planned land uses (2018 Comprehensive Plan)	
	Gross Acreage	% of Total	Gross Acreage	% of Total
Rural	7,484	37.8%	6,950	35%
Permanent Agriculture	3,749	18.9%	3,908	20%
Lakes	3,270	16.5%	2902	15%
Residential Low	1,265	6.4%	1,556	7.9%
Park, Public, Semi Public	1,247	6.3%	1,429	7.2%
Urban Reserve	1,118	5.6%	1,270	6.4%
ROW	737	3.7%	865	4.4%
Mixed Residential	492	2.5%	492	2.5%
Retail-Commercial	62	0.3%	122	0.6%
Residential Low-Medium	184	0.9%	114	0.6%
Residential Medium	88	0.4%	88	0.4%
Residential High	57	0.3%	57	0.3%
Restricted Industrial	48	0.2%	48	0.2%
Total	**19,801**		**19,801**	

Whereas Table 3.3 compares 2030 planned land uses with 2040 planned land uses, Table 3.4 shows 2040 planned land uses by development staging time period (i.e. MUSA). This table reports gross acreages by land use category.

Table 3.4 2040 Planned Land Uses by Development Staging period

	Gross Acreage			
Land Use Category	**2030 MUSA**	**2040 MUSA**	**Non-MUSA**	**Grand Total**
Mixed Residential	491.83			**492**
Park, Public, Semi Public	585.30		843.62	**1,429**
Permanent Agriculture			3908.83	**3,908**
Residential High	16.50	40.50		**57**
Residential Low	1441.39	114.60		**1,556**
Residential Low-Medium	114.39			**114**
Residential Medium	58.33	29.26		**88**
Restricted Industrial			47.57	**48**
Retail-Commercial	85.72	35.26	0.66	**122**
ROW	314.50	6.31	543.90	**865**
Rural	20.33		6929.77	**6,950**
Urban Reserve	3.27		1267.46	**1,270**
Lakes	2100.00		802.00	**2,902**
Grand Total	**5,224**	**233**	**14,344**	**19,801**

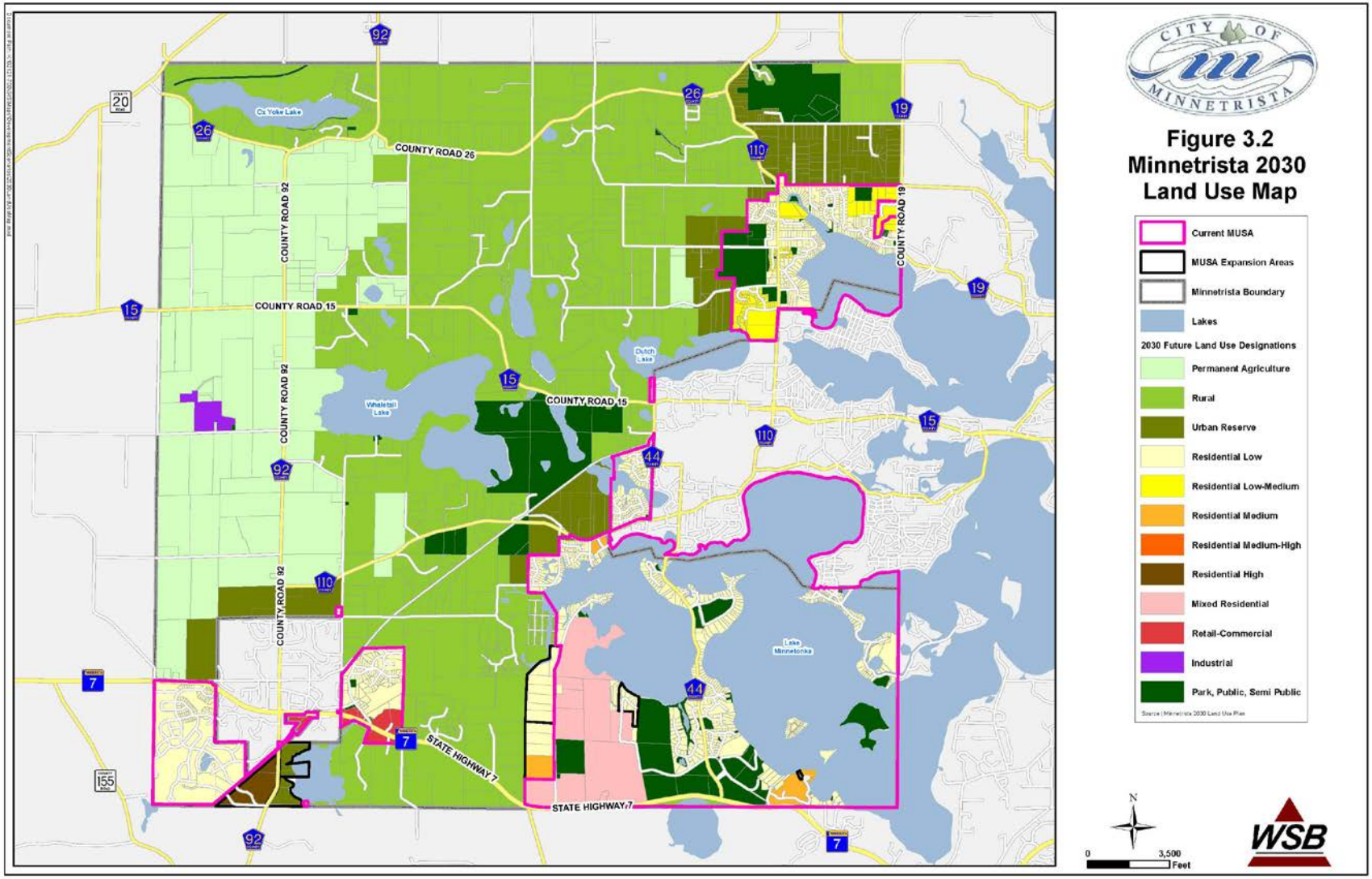


Figure 3.2
Minnetrista 2030
Land Use Map
Current MUSA
MUSA Expansion Areas
Minnetrista Boundary
Lakes
2030 Future Land Use Designations
Permanent Agriculture
Rural
Urban Reserve
Residential Low
Residential Low-Medium
Residential Medium
Residential Medium-High
Residential High
Mixed Residential
Retail-Commercial
Industrial
Park, Public, Semi Public
COUNTY ROAD 26
COUNTY ROAD 92
COUNTY ROAD 15
COUNTY ROAD 19
STATE HIGHWAY 7
Ox Yoke Lake
Whaletail Lake
Dutch Lake
Lake Minnetonka
N
0
3,500
Feet
WSB

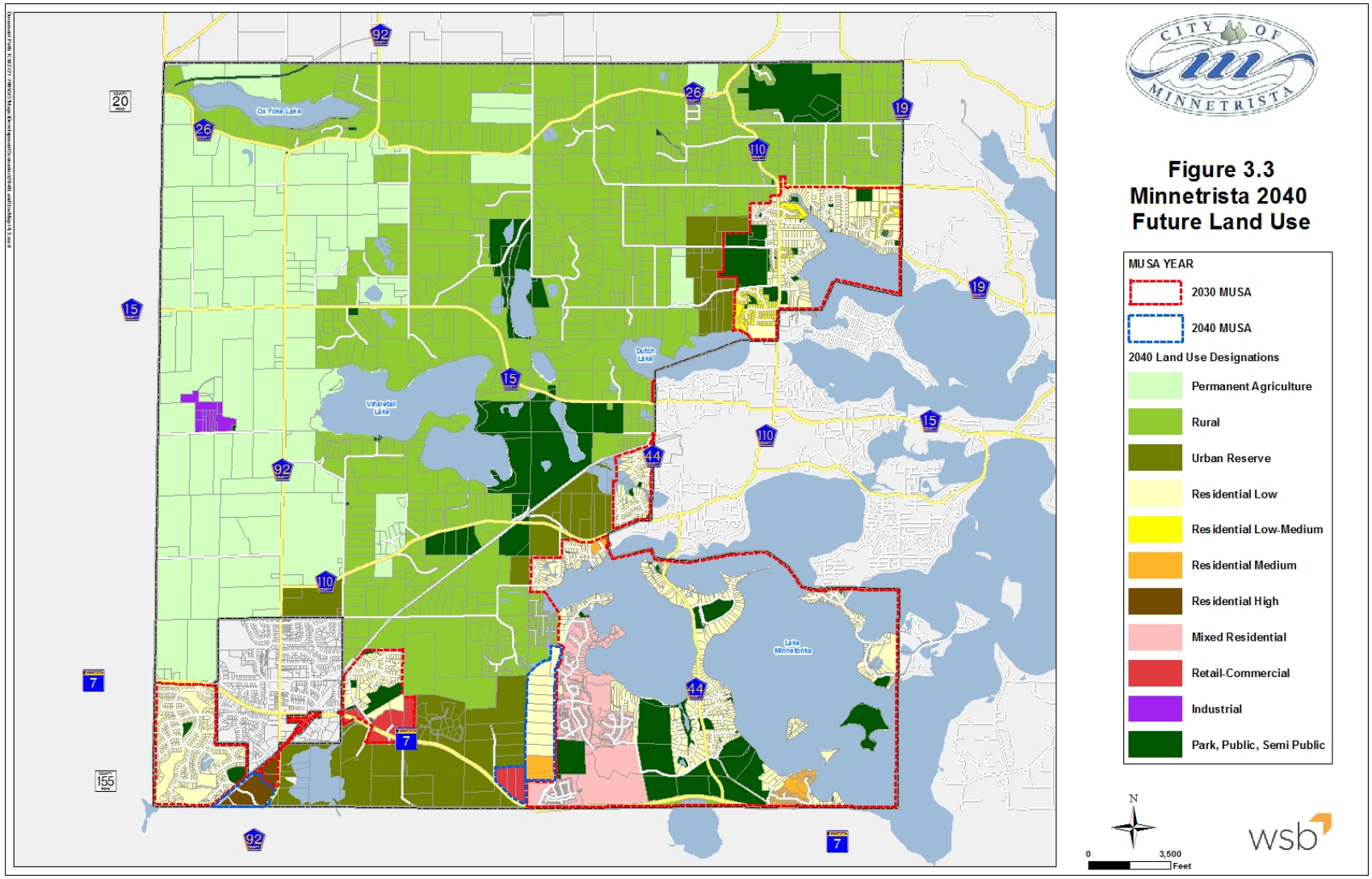


Figure 3.3
Minnetrista 2040
Future Land Use
MUSA YEAR
2030 MUSA
2040 MUSA
2040 Land Use Designations
Permanent Agriculture
Rural
Urban Reserve
Residential Low
Residential Low-Medium
Residential Medium
Residential High
Mixed Residential
Retail-Commercial
Industrial
Park, Public, Semi Public
N
0
3,500
Feet
wsb
Ox Yoke Lake
Vilhelmina Lake
Dutch Lake
Lake Minnetonka

Achieving Density and Forecast Goals for 2040

Determination of Developable Land

One of the first steps in developing 2040 land use guidance and meeting 2040 growth expectations is to analyze what land in Minnetrista is available for development or most likely to redevelop. Land availability for 2040 residential land uses was determined by looking at undeveloped or underdeveloped parcels of sufficient size or value to warrant the potential for development or subdivision. Using 2030 planned land uses as a starting point, the following criteria were used to determine gross acreage for undeveloped or underdeveloped parcels:

a. Any parcel over 0.5 net acres with a building value less than $10,000 and without a Park, Public, Semi-Public land use designation.

b. Any parcel between 2.5 and 15 net acres with a building value less than $250,000.

c. Any parcel over 15 net acres with a Permanent Agriculture, Rural, Urban Reserve, Residential Low, Residential Low-Medium, Residential Medium, Residential Medium High or Residential High land use designation.

Looking only at under or undeveloped land uses within the MUSA, water and wetlands were netted out of the gross total developable acreage to arrive at the net developable acreage for each land use. These areas became the basis for guiding 2040 residential land uses to meet forecasted population and household increases. For the 2040 plan, areas guided for Low-Medium residential development were collapsed into Low density residential areas to reflect the community's interest in minimizing the style of residential development produced by a Low-Medium land use.

Table 3.5 Net Developable Acreage for 2040 residential land uses

Residential Land Use Designations	Gross **Total** Acreage	Gross **Developable** Acreage	Water Acreage	**Net Developable Acreage**
Residential Low	1,556	266	52	214
Residential Medium	88	44	1	43
Residential High	57	57	13	44

In *Thrive MSP 2040*, the Metropolitan Council indicates that Emerging Suburban Edge communities should plan for residential densities of at least 3 to 5 units per acre. The residential land uses guided for 2040 plus the developments platted since 2010 but still unbuilt (and expected to be fully built by 2020) achieve an overall minimum community density of 3.8 units per acre, shown in Table 3.6. Further discussion of the information contained in Table 3.6 will continue in the following section.

Table 3.6: Summary of Developable Land and Forecasted Units by Land Use category, Development Decade (MUSA), and Density Threshold

	Net Developable Acres			Density Range (du/acre)				Units (Minimum)			Units (Midpoint)		
Land Use Type	**2011 - 2020**	**2021-2030**	**2031-2040**	**Min**	**Avg**	**Max**	Yield %	**2011 - 2020**	**2021-2030**	**2031-2040**	**2011 - 2020**	**2021-2030**	**2031-2040**
Residential Land Use Districts (MUSA)													
Residential Low		126.4	87.3	1.15	2		100%	0	145	100	0	253	175
Residential Medium		14.3	28.8	6	7.5		100%	0	86	173	0	107	216
Residential High		13.3	30.7	12	15		100%	0	160	368	0	200	461
Additional Developable Land (MUSA)													
Woodland Cove* (Mixed Residential)													
Low and Medium Density	234.6	178.6						545[a]	415		545	415	
High Density		6.4							111			111	
Other platted unbuilt* (low density)	45.7							112			112		
TOTAL DEVELOPABLE RESIDENTIAL (MUSA)	**280.3**	**339.0**	**152.8**					**657**	**917**	**641**	**657**	**1,086**	**852**
**Total platted acreage for Woodland Cove and other platted unbuilt lots is 278 acres*													
Overall Average Community Density (total minimum units/total developable 2021-2030 and 2031-2040 MUSA acres)	**3.2 du/acre**												
Non-MUSA Developable Land													
Urban Reserve	--	367	367			0.1	100%					37	37
Rural	--	1,521	1,521			0.1	100%					152	152
Permanent Agriculture	--	1,565	1,565			0.025	100%					39	39
TOTAL DEVELOPABLE (NON-MUSA)	**0**	**3,453**	**3,453**								**0**	**228**	**228**

[a] 254 Low Density and 62 Medium Density Residences have been issued building permits within Woodland Cove by 12/31/2018.

Net Developable Acres were determined by:

i. Parcels within the 2020, 2030, or 2040 MUSA

ii. No parcel owned by a public entity, an institutional use, or a homeowner's association

iii. Any parcel over 0.5 net acres with a building value less than $10,000

iv. Any parcel between 2.5 and 15 net acres with a building value less than $250,000

v. Any parcel over 15 net acres

Residential Growth from 2011-2020

To meet the Metropolitan Council's growth forecast for 2040, residential development that has occurred since 2010 is factored into the calculation. Woodland Cove is a very significant residential development that was platted in 2011. Table 3.6 shows that there are 545 platted Woodland Cove lots that are expected to be built by 2020, and 526 platted Woodland Cove lots that are expected to be built between 2021 – 2030. Four additional post-2010 preliminarily platted developments will add 112 more residential lots in the 2011 – 2020 timeframe. Of these residential developments platted after 2010, the units fall into the following density ranges: 761 Low Density units, 311 Medium Density units, and 111 High Density units.

Overall Average Community Density

In *Thrive MSP 2040*, the Metropolitan Council indicates that Emerging Suburban Edge communities should plan for residential densities of at least 3 to 5 units per acre. The residential land uses guided for 2040 plus the developments platted since 2010 but still unbuilt (and expected to be fully built by 2020) achieve an overall minimum community density of 3.2 units per acre. This was calculated by summing the total expected units from developable land using the minimum end of the density range and the total unbuilt platted lots from after 2010 and dividing by the net acreage associated with these developable areas and platted lots.

Residential Development Outside of the MUSA

In areas outside of the MUSA, there are several land use designations that allow unsewered residential development to occur. Residential uses are permitted in the Permanent Agriculture district at 1 unit per 40 acres, and in the Rural and Urban Reserve districts 1 unit per 10 acres. There is sufficient undeveloped land acreage in each of these categories to account for the expected increase of an additional 600 unsewered households in Minnetrista by 2040. Table 3.6 shows the expected development potential in the Urban Reserve, Rural and Agriculture land use districts between 2010 and 2040, totaling 456 new unsewered units. The allowed densities in each of these districts align with the minimum densities dictated by the Metropolitan Council's Community Designations of Agriculture and Diversified Rural. There are a number of Permanent Agriculture parcels within the Diversified Rural community designation that are currently in the Agriculture Preserve program. If these parcels withdraw from the Agriculture Preserve, then they could be amended to Rural and increase the number of unsewered units.

Development Staging

Table 3.6 shows the expected staging of new development by decade, indicating the acreage and the units expected for each 10-year period (2011-2020, 2021-2030, and 2031-2040). This expected development staging aligns with the 2030 and 2040 MUSA boundaries shown on the 2040 MUSA Staging Map (Map 3.4). Inside the MUSA, using the *average* value in the density range, there are 657 units expected in the 2011-2020 decade, 1,086 units expected in the 2021-2030 decade, and 851 units expected in the 2031-2040 decade.

Meeting the Forecasted 2040 Population Growth

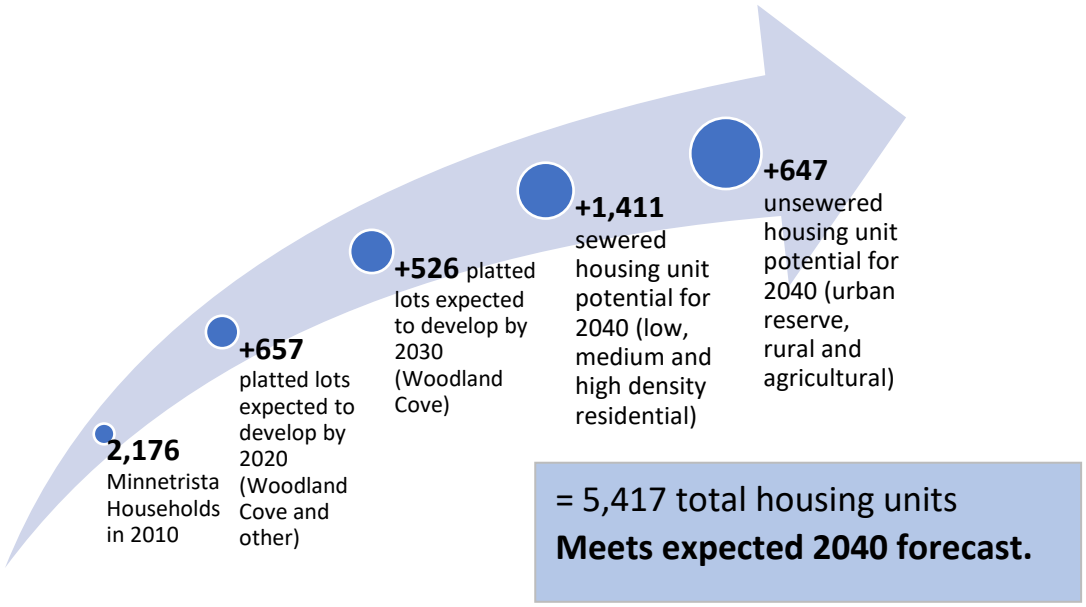
The 2040 population projections for Minnetrista indicate that the City can expect a projected addition of 2,824 households by the year 2040, to reach 5,000 households by 2040.

Table 3.7 Metropolitan Council Minnetrista Forecast for 2040

Metropolitan Forecasts: Minnetrista 2010 – 2040			
Year	**Population**	**Households**	**Employment**
2010	6,384	2,176	665
2020	8,000	2,900	720
2030	9,800	3,870	870
2040	12,000	5,000	1,020
Source: U.S. Census; Metropolitan Council *Thrive MSP 2040 Forecasts* (July 8, 2015)			

The planned 2040 land uses adequately plan for this projected increase in households in all districts that accommodate residential land uses, including both sewered residential uses inside the MUSA (calculated from the average value in the density range) and unsewered residential uses in areas outside of the MUSA. **Figure 3-1** below illustrates where the forecasted growth is expected to come from and demonstrates how the future land use plan can meet Minnetrista's growth forecast for 2040.

Figure 3-1: Minnetrista meets the Metropolitan Council's 2040 Growth Forecast



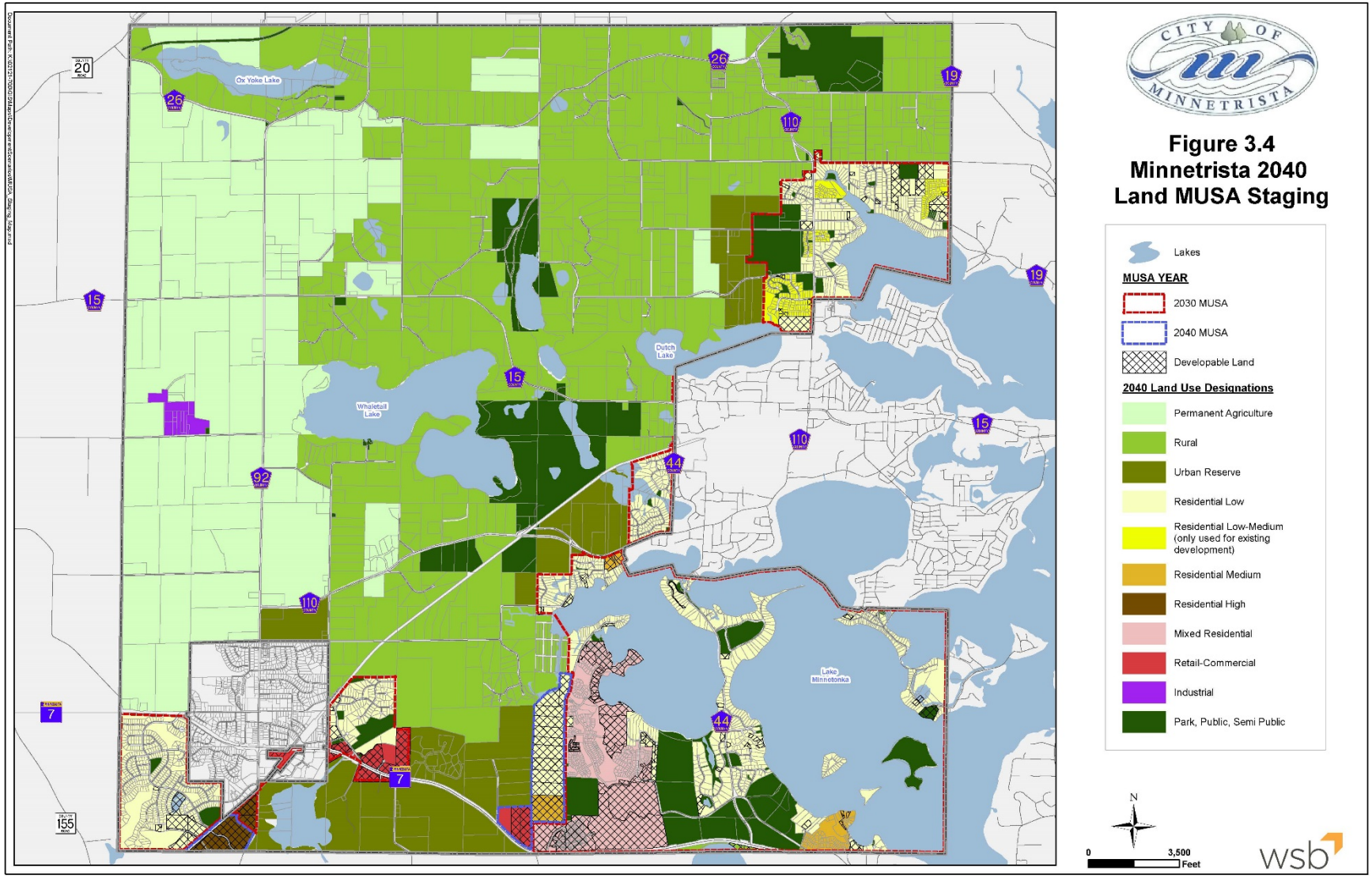


Figure 3.4
Minnetrista 2040
Land MUSA Staging
Lakes
MUSA YEAR
2030 MUSA
2040 MUSA
Developable Land
2040 Land Use Designations
Permanent Agriculture
Rural
Urban Reserve
Residential Low
Residential Low-Medium (only used for existing development)
Residential Medium
Residential High
Mixed Residential
Retail-Commercial
Industrial
Park, Public, Semi Public
Ox Yoke Lake
Whaletail Lake
Dutch Lake
Lake Minnetonka
N
0
3,500
Feet
wsb

LAND USE DESIGNATION DESCRIPTIONS

Residential Low

Purpose	Low Density Residential housing is the predominant land use by area within the MUSA boundary, and the primary use is detached single family homes suitable for family housing.
Location Criteria	Inside the MUSA.
Minimum Requirements for Development	Low Density Residential subdivisions are expected to be provided with the full urban infrastructure, such as sidewalks, neighborhood parks, and streets with good access and interconnectivity.
Utilities	Municipal water and sanitary sewer are required
Typical Uses	Detached single family homes; conservation or cluster subdivisions; churches; elementary and secondary schools; public parks and open space; private recreation spaces.
Density	The Low Density Residential designation is anticipated for a range of densities between 1.15 and 4.0 units per acre
Appropriate Zoning	The R-2 zoning district will be the primary zoning designation.
Limited Secondary Zoning	R-1 zoning may be considered where the outcome encourages development that preserves natural features and/or open space, or serves a transitional function to long-term lower-density land uses.

Residential Low-Medium

Purpose	Low-Medium Density Residential housing is a 2030 Comprehensive Plan district intended for small-lot single family home development. There are no new areas of Minnetrista that have been guided under this land use district.
Location Criteria	Inside the MUSA
Minimum Requirements for Development	No new housing will be developed under this land use guidance in the 2040 Land Use Plan.
Utilities	Municipal water and sanitary sewer are required
Typical Uses	Detached single family homes on smaller lots; churches; elementary and secondary schools; public parks and open space; private recreation spaces.
Density	The Low-Medium Density Residential designation is anticipated for a range of densities between 3.0 and 5.0 units per acre
Appropriate Zoning	The R-1 zoning district will be the primary zoning designation.
Limited Secondary Zoning	R-2 zoning may be considered where the outcome encourages development that preserves natural features and/or open space, or serves a transitional function to long-term lower-density land uses.

Residential Medium

Purpose	Within this category, the predominant housing types will be townhomes and lower density multifamily housing. Single family detached homes may be considered where conditions favor this style of development. It is expected that some housing under this land use category will meet the housing affordability needs of families, couples, seniors and other residents who choose to live in this community and either cannot or would not prefer to live in single family homes. This land use promotes housing affordability for households living at 51-80% AMI.
Location Criteria	Inside the MUSA.
Minimum Requirements for Development	Medium Density Residential subdivisions are expected to be provided with the full urban infrastructure, such as sidewalks, neighborhood parks, and streets with good access and interconnectivity.
Utilities	Municipal water and sanitary sewer are required
Typical Uses	Townhomes; duplexes; and multiplex buildings; churches; elementary and secondary schools; public parks and open space; private recreation spaces.
Density	The Medium Density Residential designation is anticipated for a range of densities between 6.0 and 12.0 units per acre.
Appropriate Zoning	The R-3 zoning district will be the primary zoning designation.
Limited Secondary Zoning	N/A

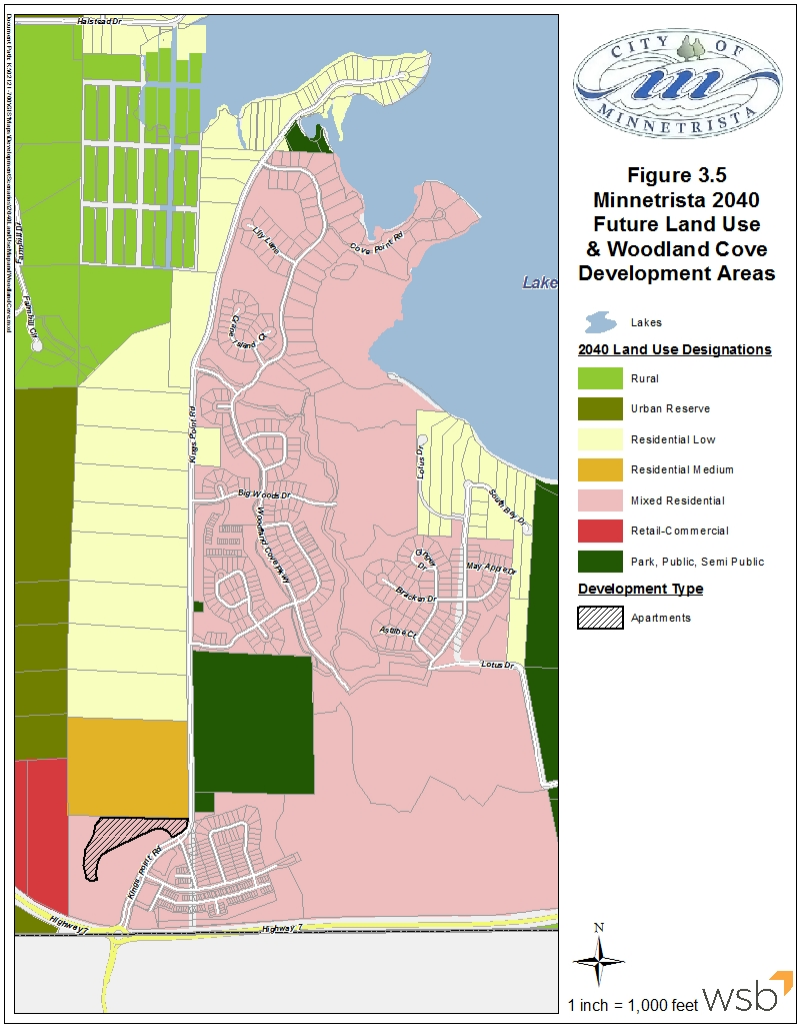
Residential High

Purpose	Residential High land uses will lead to apartment-style housing that ensure that the life-cycle housing needs of the community are met. The residential housing that develops under this land use category may be senior housing developments to accommodate the aging members of the community. It may also meet affordable housing criteria, offering rental opportunities to graduates or younger community members who would otherwise look elsewhere for housing.
Location Criteria	Inside the MUSA.
Minimum Requirements for Development	High Density Residential housing should be developed with common or shared recreational spaces and amenities in mind, so that residents may enjoy these benefits in the absence of a private yard space. High Density developments are expected to be provided with the full urban infrastructure, such as sidewalks, neighborhood parks, and streets with good access and interconnectivity.

Utilities	Municipal water and sanitary sewer are required
Typical Uses	Apartments and multiplex buildings with shared amenities; senior housing units; assisted living developments; churches; elementary and secondary schools; public parks and open space. Townhomes and rowhomes would be acceptable provided the overall housing mix achieves the overall density criteria.
Density	The High Density Residential designation is anticipated for a range of densities from 12 to 30 units per acre. To achieve the upper end of this density range it is expected that development will incorporate underground or structured parking to meet the parking requirement.
Appropriate Zoning	The R-5 zoning district will be the primary zoning designation. The R-5 zoning district will require updates following the adoption of this plan in order to accommodate the Residential High land use designation.
Limited Secondary Zoning	The R-3 zoning district may be used provided the overall housing mix achieves the overall density criteria.

Mixed, Residential Land Use This district is intended to accommodate a variety of different housing types, styles, and also a limited amount of neighborhood level commercial development, in appropriate areas. Any commercial in this district should be located along transportation corridors and be limited to 10 acres. The purpose of this district is to allow for some flexibility within areas guided for this land use to accommodate a master planned community that would be zoned planned unit development. There is one area of the city guided for this, known as the Woodland Cove property. Woodland Cove met the 2006 comprehensive plan requirement of providing 1,071 total units, but did so under a PUD agreement which provided flexibility in terms of lot sizes and allowed housing styles. The Woodland Cove development, approved in 2011, accounts for 1,071 of the platted and/or built housing since 2010.

In 2021, there will be 530 housing units remaining to be constructed in Woodland Cove. Of those 530 housing units, 111 units will be apartments. The 111 apartments will be developed on 6.37 acres for a minimum density of 17 units/acre. Woodland Cove contributes 111 units to the 31-50% and <30% AMI affordable housing bands in Minnetrista's 2021-2030 affordable housing allocation. The existing Woodland Cove density is 2.55 units/net acre (1,071 units/419.6 acres).



The location of the 111 apartments included in the 2011 approval is shown on Figure 3.5. The City commits to maintaining a minimum of 111 high density residential units constructed with a minimum density of at least 12 units per acre within the Woodland Cove development, but the exact location and layout may change without a Comprehensive Plan amendment. The allowable density within the Mixed, Residential land use designation is between 2.55 and 3.00 units per net acre. Increasing the total number of units beyond 1,259 will require a Comprehensive Plan amendment.

Commercial

Purpose	The City of Minnetrista has historically limited commercial development in an effort to support the commercial centers in St. Bonifacius and Mound. However, the City does recognize the need for maintaining a degree of commercial development within the City itself. Commercial land uses in the Plan area shown to concentrate along the Highway 7 corridor east of St. Bonifacius and west of Woodland Cove's commercial area.
Location Criteria	Adjacent to Highway 7
Minimum Requirements for Development	Sufficient access from Highway 7; meets intersection spacing requirements; provision of turn lanes, if required; provision of cross-access agreements with neighboring commercial properties.
Utilities	Sewer and water connection.
Typical Uses	Retail commercial
Density	Building lot coverage will not exceed 35 percent of total lot area.
Appropriate Zoning	C-2 Highway Commercial District
Limited Secondary Zoning	C-3 Shopping Center Commercial District, if a unified retail commercial development plan has been proposed for a larger site.

This area would appear to be best utilized for a commercial district to support a broad variety of commercial uses in a pattern of more traditional building-forward design.

The commercial land use designation is a broad category, including everything from office and general retail use to showroom, auto sales and service, and other large facilities. Because of the concentration of commercial along the Highway 7 corridor, aesthetic and architectural issues are important in order to ensure that the commercial areas of the City create a positive presentation to visiting traffic. Future re-designation of land uses in the Highway 7 corridor to commercial may be considered by the City Council as urban residential development increases the number of potential customers in the area provided the development is orderly, safe, necessary, and will not negatively impact the traffic patterns in the area.

Industrial

The industrial land use category is a broad category as well, encompassing some businesses that create objectionable noise, visual unsightliness, truck traffic, dust and fumes, and many other

impacts that do not mix well with any other uses. Other industrial uses are more office and low volume traffic generators with few visible physical impacts. The City's land use plan does not anticipate the expansion of industrial uses in the community. Due to limited Trunk Highway exposure for the transportation needs of this land use, and the competitive need for commercial and higher density residential area, the Highway 7 corridor is not viewed as best planned for industrial uses, and other areas of the community lack the transportation infrastructure desired by most industrial business. The only site currently designated for this land use is the former Nike Air Base, located on Nike Road and surrounded entirely by Permanent Agricultural uses which serves to isolate the area from potentially incompatible land uses. This single industrial development occurs within the P-I Planned Industrial zoning district. Building lot coverage for industrial development will not exceed 35 percent of total lot area.

Rural

Purpose	These areas will retain a traditional rural atmosphere by retaining large lot sizes. This land will preserve valuable environmental resources and will not be developed at urban densities. This is the largest guided land use in Minnetrista by area.
Location Criteria	Outside of the MUSA
Minimum Requirements for Development	Public Right of Way to serve each developable parcel.
Utilities	Private well and septic system.
Typical Uses	Recreation; public or private open space; environmental preserve; wetlands, woodlands, lakes, or steep slopes; large lot residential; churches; schools.
Density	1 unit per 10 acres
Appropriate Zoning	A – Agriculture District [Consider creating a Rural Residential district designation]
Limited Secondary Zoning	Planned Unit Developments may be considered in this area with additional densities as allowed by the Minnetrista Zoning Ordinance and may be beneficial in preserving the plentiful natural resources in this area.

The area designated as Rural is the predominant land use category in the central portion of this City. Due in large part to the traditional large parcel sizes, strong public interest in maintaining a rural atmosphere, and numerous valuable environmental resources this area is prohibited from

future urbanization. The Rural category encompasses a number of different land use types, but is primarily intended to preserve land from urban development. Some of these areas are recreational in nature, and others are environmentally difficult to develop due to woodlands, greenway preservation, wetlands, lakes, and steep slopes. The majority of the land on the City's land use map with this designation is intended to be preserved for rural use for the foreseeable future.

Permanent Agriculture

Purpose	The City of Minnetrista has a rich agricultural heritage. With the Permanent Agriculture land use designation, the City intends to preserve this heritage and the associated large lots and open spaces.
Location Criteria	Community Designation of "Agriculture"
Minimum Requirements for Development	Public Right of Way to serve each developable parcel.
Utilities	Private well and septic system.
Typical Uses	Churches; Agricultural structures and/or buildings; Row crop and/or livestock farming.
Density	1 unit per 40 acres
Appropriate Zoning	AP – Agricultural Preservation
Limited Secondary Zoning	A – Agriculture District

Urban Reserve

Purpose	The plan also identifies areas as urban reserve. These are the areas traditionally identified in planning documents by the City of Minnetrista as future urban areas. As such, it is important to preserve these areas by using interim agriculture land uses and similar densities as Rural land uses. This designation does not guarantee future urban development rights but rather allows the City to preserve a requisite amount of land as a developing area. Development in the Urban Reserve should be able to accommodate future subdivision in the event of MUSA expansion.
Location Criteria	Outside the MUSA but adjacent to or in close proximity to existing services. Due to Minnetrista's three separate utility systems, public

	infrastructure may be installed within the Urban Reserve prior to MUSA expansion.
Minimum Requirements for Development	Development should be designed so that it can be further subdivided in the event that the MUSA is expanded.
Utilities	Municipal water and sanitary sewer are not required
Typical Uses	Single family homes; hobby farms; churches; public buildings; recreational open spaces; schools.
Density	The Urban Reserve land use designation is anticipated for a density of one unit per 10 acres. No PUD may be approved in an Urban Reserve area that precludes the ability of the City to develop the area at urban densities in the future.
Appropriate Zoning	SDD – Staged Development District
Limited Secondary Zoning	R-1 Residential Low may be an appropriate zoning designation for some portions of Urban Reserve.

Public

The Public designation is for areas identified as park, public, and semi-public uses throughout the City of Minnetrista. These may include local and regional parks, schools, religious uses, designated open space used for a public or recreational purpose, and other similar uses. There are no specific Location Criteria or requirements for this use; the land may or may not be owned by a public entity.

LAND USE GOALS AND OBJECTIVES

Visioning Principal 1: *Minnetrista strives to maintain its rural character including preserving areas for farmland while protecting and improving natural resources, such as lakes, streams and wetlands, as perpetual open space.*

Goal 1: Residential subdivision design must preserve important natural features and promote Minnetrista as a distinct location from its suburban neighbors.

- Developers must prioritize subdivision designs which preserve farmlands, wetlands, natural lakes and other natural features.
- Design of new subdivisions must include characteristics and/or amenities which establish a rural character and feel.
- New development must take care to preserve views of rural landscapes, not just proximity. View sheds to be considered should include both views of the

development from approaching roadways, as well as views from the development out to adjoining open spaces or natural features.

- Multiple family housing design should pay special attention to land use and site planning, encouraging an overall impression of openness and green space.

Goal 2: Existing rural-residential development, especially development which is below the urban density threshold, will be permitted to re-develop at higher densities where infrastructure is available, including sanitary sewer, water, and public street access. This policy is intended to permit, but not require, such areas to re-subdivide. However, the maintenance of open space and views will continue to apply in such cases, and property owners shall demonstrate how their development plan protects the valued neighborhood character.

Goal 3: Rural residential resubdivision will be considered case by case, utilizing the open space goals and other policies of the Comprehensive Plan. The City believes that in most cases, the existing residential character in rural residential neighborhoods is the long-term best use for such areas, and zoning regulations should be written to reflect this policy.

Visioning Principal 2: *Current commercial needs are met within the communities of Mound and St. Bonifacius. Restaurants and small scale retail including groceries and local businesses along MN Hwy 7 should be considered as additional residential development warrants further commercial development.*

Goal 1: Commercial development shall be concentrated in designated locations, rather than allowed to extend unimpeded throughout the community. The application of this policy creates a core location for future commercial uses adjacent to the Minnetrista - St. Bonifacius boundary, along the Trunk Highway 7 corridor.

- The primary locations identified in this policy, and on the land use plan map, are intended to contain the spread of commercial development and high intensity uses from encroaching into the predominantly low density and rural areas.
- Commercial development should reflect quality of design. The City should consider specific zoning regulations that identify architectural styles and site planning components that support this policy objective.
- A key component of the commercial corridor will be the ability to mix higher density residential and commercial uses while maintaining extensive components of open space that are visible from Highway 7.
- The restrictions on land use created by traffic congestion in the Highway 7 corridor may require the dedication of right-of-way or easements to allow for the future improvement of Highway 7, and commercial development shall be required to be designed in such a way as to minimize traffic impacts.

Goal 2: Creative approaches to the use of land, both in and outside of the higher density Highway 7 corridor, will be required. The City seeks to avoid the characteristics of suburban sprawl by seeking only development that reflects Minnetrista's open space identity.

- Adopted design standards for street and building design will be implemented to enhance the physical environment in the City.
- New commercial development will be required to integrate architecture and site planning techniques that are reflective of the City's open space character.
- Site planning that minimizes the use of large, unbroken parking lots will be required. Commercial developments will be required to hide parking areas and place buildings in such a way that the buildings are emphasized to passing traffic.
- Building architecture should be the predominant site identifier, rather than freestanding signage. The City will value the utilization of low-profile monument signage where freestanding signs are to be considered.

Visioning Principal 3: *Minnetrista is attractive to families seeking single family homes with yards allowing families to gather and play. As family members age, alternative housing styles should be considered allowing residents to remain in Minnetrista throughout their lives, while supporting the efforts of seniors to live independently, and to be able to attract extended family members to remain involved in the community*

Goal 1: The City supports land use and zoning policy that reflects lifecycle housing goals while maintaining the open space character of the city.

- Minnetrista residential land use districts reflect density ranges that allow for both large-lot single family home development and a range of higher-density housing options.
- The City will evaluate its zoning code to reflect an alignment with land use policy that reduces the density of single family housing and increases the density and amenities provided with multi-family housing.
- New residential subdivisions, especially those utilizing a PUD design process, will be evaluated as to their variety and diversity of housing materials, colors, architectural styles and details, and other factors.
- Multiple family developments will be thoughtfully designed in order to incorporate these larger buildings harmoniously into the areas where they will be located.
- Areas available for single family development must address transportation impacts beyond the provision of direct local streets. Since the majority of new growth will extend into undeveloped land, the proposed development must pay careful attention to the extension of the local street pattern.
- Lower density single family housing zones shall be implemented adjacent to areas of significantly valuable natural resources or adjacent to properties planned for long-term rural or agricultural uses.

Visioning Principal 4: *Minnetrista's resident's well-being is supported by entities and organizations beyond that provided by City services. Communication and coordination with school districts and other organizations to provide opportunities for partnerships that provide better and more efficient services, including community gathering spaces. Any partnership must maintain Minnetrista's overall rural character and lifestyle.*

Goal 1: The City will maintain open communication with neighboring and overlapping agencies and jurisdictions.

- The City will discuss opportunities with the school districts particularly regarding school facility expansions and joint recreational opportunities.
- Opportunities for cost efficient and timely infrastructure improvements should be explored with neighboring communities, particularly for petitioning for regional or State funding for regional or State infrastructure.

Visioning Principal 5: *Minnetrista values its public safety staff and its ability to provide a safe and secure community through its excellent training and engagement with residents.*

Goal 1: Traffic count projections and planned growth along Highway 7 indicate the need for roadway expansion. Minnetrista will work closely with neighboring jurisdictions and agencies to manage Highway 7 improvements. It is imperative that all development along Highway 7 can integrate with existing traffic generation in a safe, effective, and efficient manner. Access limitations and other considerations may require the development of a traffic study.

RESOURCE PROTECTION PLAN

State law requires that local Comprehensive Plans address the protection of historical sites, solar access, and aggregate deposits. The Metropolitan Council has developed a specific policy regarding protection of aggregate deposits, but not for historical preservation or solar access.

HISTORIC PRESERVATION

Minnesota Statute 473.859, Subd. 2[b] requires a historic preservation element in each Comprehensive Plan update. The City has many unique historic sites located within its boundaries. It is the City of Minnetrista's policy to preserve historic amenities to the furthest extent practical. The City has worked in coordination with the State Archaeologists Office and other agencies to ensure all applicable standards are met.

According to City of Minnetrista records, the following are historic sites within the City:

1) Native American Burial Site – A site located on a peninsula that extends into Whale Tail Lake.

2) Native American Burial Site – This site includes three domed mounds on a high promontory overlooking the eastern shore of Whaletail Lake.

3) Native American Burial Site – This site is on a high promontory between the east side of County Road 44 and Hardscrabble Road south of property owned by the Nature Conservancy.

4) Baker Mound Group – A cluster of burial mounds located in the narrow strip of land between Halstead Bay and the upper lake. It is sometimes also referred to as the Halstead Mounds. The mounds were surveyed as far back as 1883.

5) Native American Burial Site – This site is located near the top of the wooded hill in the Lake Minnetonka Regional Park in the area east of Old County Road 44.

6) Native American Burial Site – This site is located north of Highway 7 and west of County Road 44.

7) Merriman Cemetery – Located overlooking Ox Yoke Lake, this historic cemetery is maintained by the City of Minnetrista as part of the park system.

8) Minnetrista First Baptist Church Cemetery – A cemetery dating back to the 1860's, when Minnetrista First Baptist Church was located nearby. The church retains ownership and continues to operate and maintain the cemetery.

9) City of Mound Cemetery – Dating back to the 1880's, this cemetery is partially in both the Cities of Minnetrista and Mound. It is maintained by the City of Mound.

10) Fairview Cemetery – This cemetery is a 10.3 acre site owned by the Fairview Cemetery Association, which operates and maintains the site. It dates back to 1883.

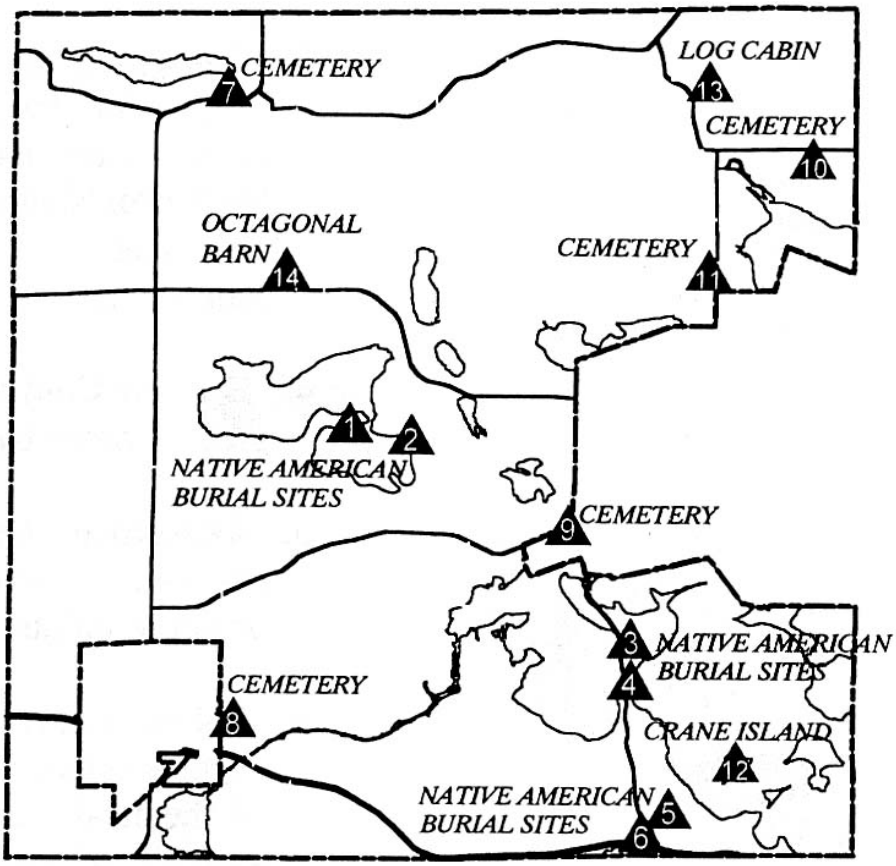
11) Our Lady of the Lake Cemetery – This cemetery is owned and operated by the Our Lady of the Lake church, located in Mound. The 8-acre cemetery dates back to 1942.

12) Crane Island Historic District – A unique community of historic summer cottages founded in 1907. The district is on the National Register of Historic Places.

13) Log Cabin – A cabin located in the northeast portion of the City, built in 1850, is perhaps the City's oldest home. The 2.5 acre site is located on the top of a hill, at an elevation of 1,000 feet.

14) Octagonal Barn – A unique octagonal style barn built in 1917 and located on Deer Creek Road.

Historic Sites - Figure 3.6



Source: City of Minnetrista, Thibault and Associates

SOLAR ENERGY POTENTIAL

The Metropolitan Land Planning Act requires that the Comprehensive Plan shall contain "an element for the protection and development of access to direct sunlight for solar energy systems." The following elements are included in the 2040 Comprehensive Plan Update:

- A calculation of Minnetrista's solar resource, along with a Solar Suitability Analysis Map.
- A policy or policies relating to the development of access to direct sunlight for solar energy systems.
- Strategies needed to implement the policy or policies.

Gross and Rooftop Solar Resource Calculations

The gross solar potential and gross solar rooftop potential are expressed in megawatt hours per year (Mwh/yr), and these estimates are based on the solar map for Minnetrista. These values represent gross totals; in other words, they are not intended to demonstrate the amount of solar likely to develop within Minnetrista. Instead, the calculations estimate the total potential resource before removing areas unsuitable for solar development or factors related to solar energy efficiency.

The gross solar generation potential and the gross solar rooftop generation potential for Minnetrista are estimates of how much electricity could be generated using existing technology and assumptions on the efficiency of conversion. The conversion efficiency of 10% is based on benchmarking analyses for converting the Solar Suitability Map data to actual production, and solar industry standards used for site- level solar assessment.

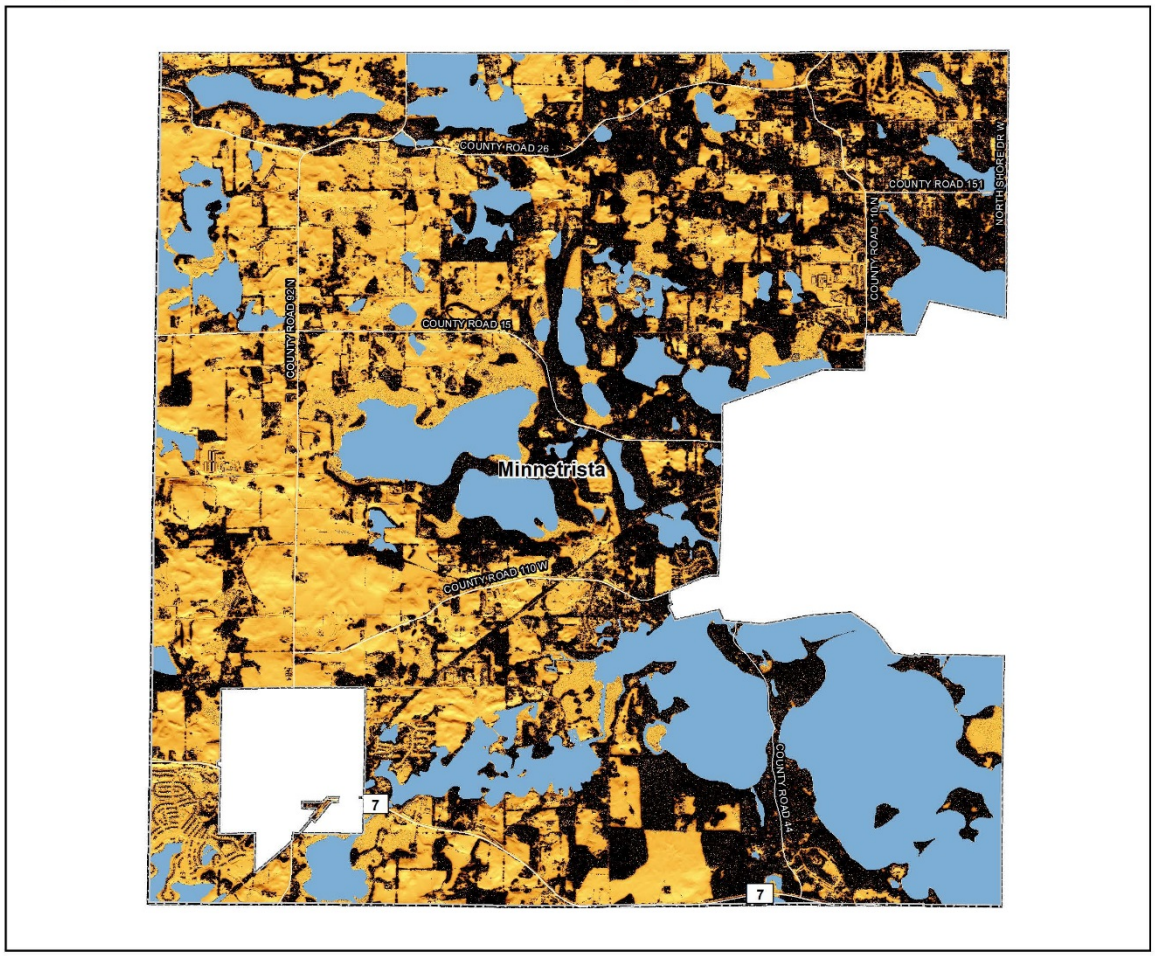
Minnetrista community solar resource totals are shown in the table below:

Community	Gross Potential (Mwh/yr)	Rooftop Potential (Mwh/yr)	Gross Generation Potential (Mwh/yr)	Rooftop Generation Potential (Mwh/yr)
Minnetrista	41,298,353	440,096	4,129,835	44,009

In general, a conservative assumption for panel generation is to use 10% efficiency for conversion of total insolation into electric generation. These solar resource calculations provide an approximation of each community's solar resource. This baseline information can provide the opportunity for a more extensive, community-specific analysis of solar development potential for both solar gardens and rooftop or accessory use installations. For most communities, the rooftop generation potential is equivalent to between 30% and 60% of the community's total electric energy consumption. The rooftop generation potential does not consider ownership, financial barriers, or building-specific structural limitations.

Figure 3.7

Gross Solar Potential
City of Minnetrista, Hennepin County



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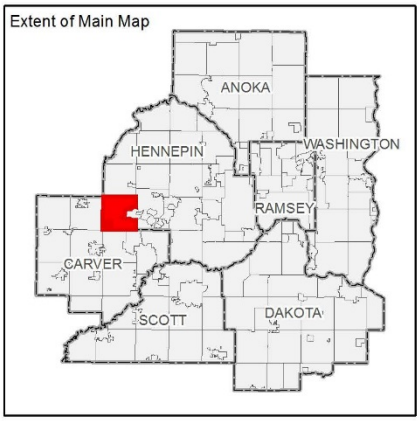


0 0.5 1 2 3 4
Miles

Gross Solar Potential
(Watt-hours per Year)

High : 1278189

Low : 900001

Solar Potential under 900,000 watt-hours per year
County Boundaries
City and Township Boundaries
Wetlands and Open Water Features

Source: University of Minnesota U-Spatial Statewide Solar Raster.

SOLAR ACCESS PROTECTION

Minnesota Statute 473.859, Subd. 2[b] requires an element for the protection and development of access to direct sunlight for solar energy systems. The basic elements of solar access are proper building orientation (essentially a south facing building access) and maintaining that orientation in an unobstructed state. Unobstructed solar access is a function of height, location, and placement of adjacent structures, trees, and other obstructions.

The City of Minnetrista recognized the importance in protecting its solar access. The key to this objective is to work with the applicants or developers at the beginning of a project to ensure that the lot and street locations maximize the amount of solar exposure on paved surfaces in winter and ensure that solar energy collectors are not obstructed. In a grid pattern, homes with frontages on east/west streets are most advantageous because south facing buildings are maximized in this configuration. Curvilinear streets reduce the possibility for solar access because of the increased amount of positions for building footprints.

AGGREGATE RESOURCES

In 1984, Minnesota Statute 84.94 was enacted to protect aggregate resources; to promote orderly and environmentally sound development; to spread the burden of development; and to introduce aggregate resource protection into local comprehensive planning and land use controls. The *Thrive MSP 2040* includes a policy that encourages local and regional entities to work together to reclaim, conserve, protect, and enhance the region's natural resources. Aggregate resources (sand, gravel, and rock) have been identified as resources vital to the region.

The *Aggregate Resources Inventory of the Seven-County Metropolitan Area, Minnesota* is a joint report of the Minnesota Geological Survey and the Metropolitan Council. According to the map showing the distribution of aggregate materials in the seven-county metropolitan area, there are a few small areas that contain natural aggregate (sand and gravel that are not meeting the current industry standards. One of the small areas is located directly to the southwest of the City of Mound; another is located south of the City of Mound; and another to the northeast of the City of St. Bonifacius. These are very small pockets are identified as Grantsburg ice contact, according to the map created by the University of Minnesota titled, "Map of Primary Aggregate Resources.

The City acknowledges that inherent conflicts may occur between the need for extracting aggregate resources and the rights of private property owners to develop their land. Where appropriate, the City will consider the preservation and protection of aggregate resources assuring that land use compatibility is given the utmost consideration.

Land Use Planning and Ordinance Regulations

Minnetrista does not permit mining or extraction in any of its zoning districts. In both the Agriculture and Permanent Agricultural Districts, the zoning code permits "Any other use, as deemed appropriate by city council." However, mining and extraction uses are antithetical to the spirit and purpose of both Districts, which both list protecting these lands from encroachment by non-agricultural activities.

Chapter 4: Transportation

Introduction

The City of Minnetrista's transportation system generally operates well today. The City's multimodal transportation system includes facilities for vehicles, walking, and bicycling. Facilities are operated by a number of agencies, including the City of Minnetrista, Hennepin County, the Minnesota Department of Transportation (MnDOT), Three Rivers Park District, and the Minnesota Department of Natural Resources (DNR).

This transportation chapter has been prepared in compliance with state statutes and applicable Metropolitan Council guidelines. As part of this Plan, the City has reviewed existing and future conditions for each mode and identified safety, operations, and network improvements that will be important to address over the 2040 planning horizon. The City has also developed goals, objectives, and strategies to preserve and improve the transportation system.

This transportation plan includes the following information:

1. Summary of Regional Strategies
2. Existing Roadway System
3. 2040 Traffic Forecasts and Roadway Network System
4. Existing and Planned Non-Motorized Transportation Network
5. Freight Network
6. Transit
7. Aviation
8. Goals, Objectives and Multimodal Strategies
9. Proposed Short and Long Range Roadway Projects
10. Public Comments
11. Conclusion and Next Steps

Transportation Glossary

CIP: Capital Improvement Plan – five year plan for capital investments in the transportation system and in other capital assets owned by the City (equipment, buildings, etc.).

CR: County Road – county-owned roadway that does not receive State funding.

Critical Crash Rate: Statistical indicator of a safety problem at a location. If crash rates at a location are above the critical crash rate, it indicates that the location has a crash rate that is statistically significant compared to similar roadways.

CSAH: County State Aid Highway – county-owned roadway that receives State Aid funding.

MnDOT: Minnesota Department of Transportation.

RBTN: Regional Bicycle Transportation Network – existing and planned regional bicycle network established by the Metropolitan Council.

TH: Trunk Highway – State highway owned and operated by MnDOT.

TPP: Transportation Policy Plan – Regional transportation plan for the Twin Cities metropolitan region, developed by the Metropolitan Council.

1. Summary of Regional Strategies

This Plan has been prepared to be consistent with the regional transportation strategies outlined in the Metropolitan Council 2040 Transportation Policy Plan (TPP). Similar to this Plan, the TPP evaluates the existing transportation system, identifies transportation challenges to the region, and sets regional goals, objectives, and priorities to meet the transportation needs of current residents while accommodating the region's anticipated growth. The TPP also guides local agencies in coordinating land use and transportation and establishes regional performance measures and targets.

The TPP is guided by the following goals:

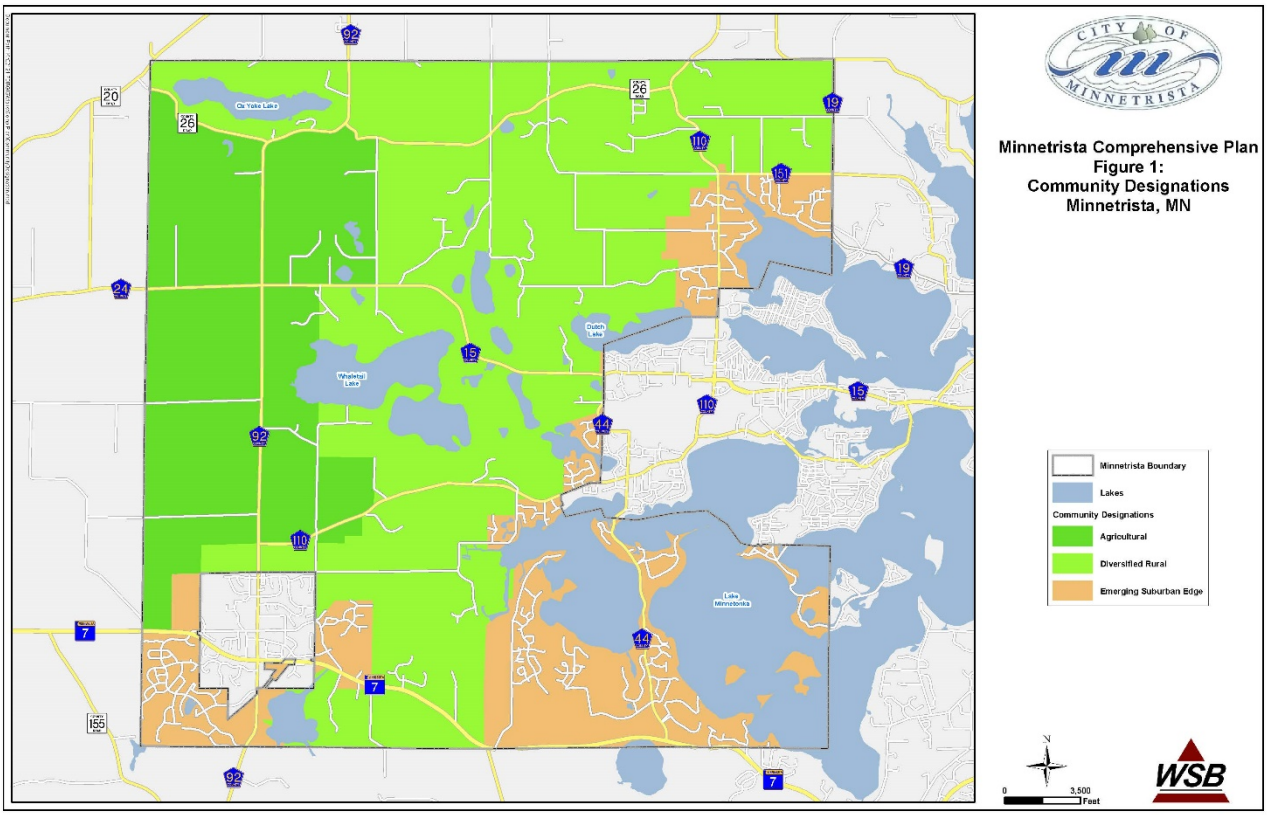
- **Transportation system stewardship:** Sustainable investments in the transportation system are protected by strategically preserving, maintaining, and operating system assets.
- **Safety and Security:** The regional transportation system is safe and secure for all users.
- **Access to Destinations:** People and businesses prosper by using a reliable, affordable, and efficient multimodal transportation system that connects them to destinations throughout the region and beyond.
- **Competitive Economy:** The regional transportation system supports the economic competitiveness, vitality, and prosperity of the region and State.
- **Healthy Environment:** The regional transportation system advances equity and contributes to communities' livability and sustainability while protecting the natural, cultural, and developed environments.
- **Leveraging Transportation Investment to Guide Land Use:** The region leverages transportation investments to guide land use and development patterns that advance the regional vision of stewardship, prosperity, livability, equity, and sustainability.

Funding is a key constraint that is acknowledged in the TPP. Current transportation revenue will not meet the region's transportation needs through 2040. As a result, the TPP includes two long-term investment scenarios: a fiscally-constrained scenario under current revenue, and an increased revenue scenario that identifies priorities should additional transportation funding become available.

Under the current revenue scenario, the TPP is focused on operations and maintenance of the existing transportation system. Investments in highway mobility and access are limited to those that address multiple TPP goals and objectives. The increased revenue scenario would allow additional investments in operations and maintenance, as well as regional mobility, access, safety, and bicycle/pedestrian improvements. However, congestion cannot be greatly reduced under even the increased revenue scenario. Under both scenarios, proposed investments are focused on areas of the metro with the greatest existing and future challenges and anticipated growth.

As shown in **Figure 1**, the Metropolitan Council classifies Minnetrista under the community designations of Emerging Suburban Edge, Diversified Rural, and Agricultural. Based on *Thrive MSP 2040*, Emerging Suburban Edge areas are expected to plan for forecasted population and household growth at average densities of at least three to five units per acre for new development and redevelopment. Diversified Rural communities are expected to plan for growth not to exceed forecasts and in patterns that do not exceed four units per 40 acres. Agricultural areas are planned and zoned for long-term agricultural use, and are expected to limit residential development to no greater than one housing unit per 40 acres. Diversified Rural or Agricultural communities are also expected to manage land uses to prevent the premature demand for extension of urban services, and so that existing service levels will meet service needs.

Figure 1
Community Designations



2. Existing Roadway System

The sections below provide information about the existing roadway system in Minnetrista, including existing number of lanes, existing roadway jurisdiction, existing functional classification, existing traffic, existing safety, and access management. This chapter also includes summary recommendations from recent plans and corridor studies.

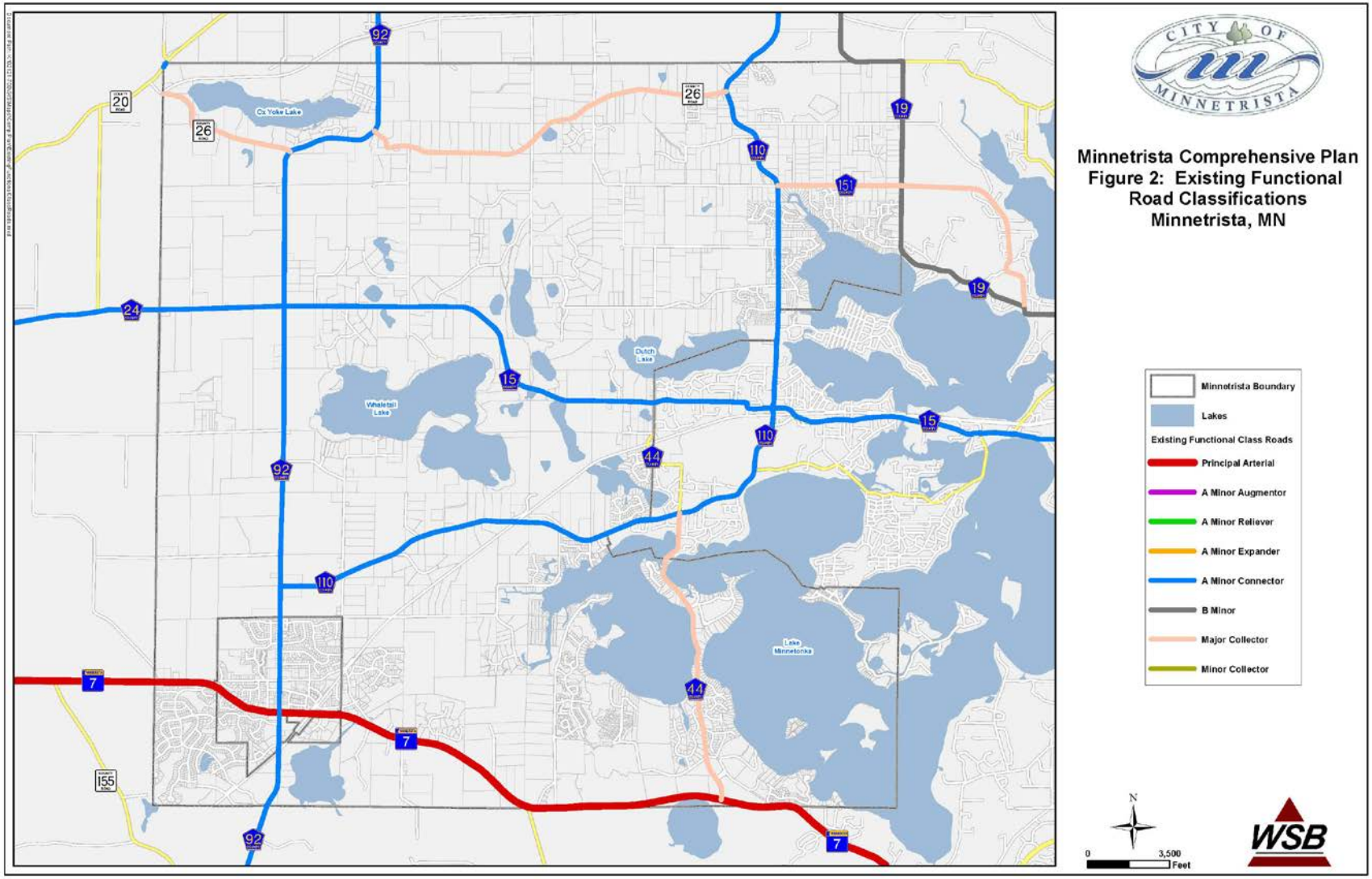
2.1. Functional Classification

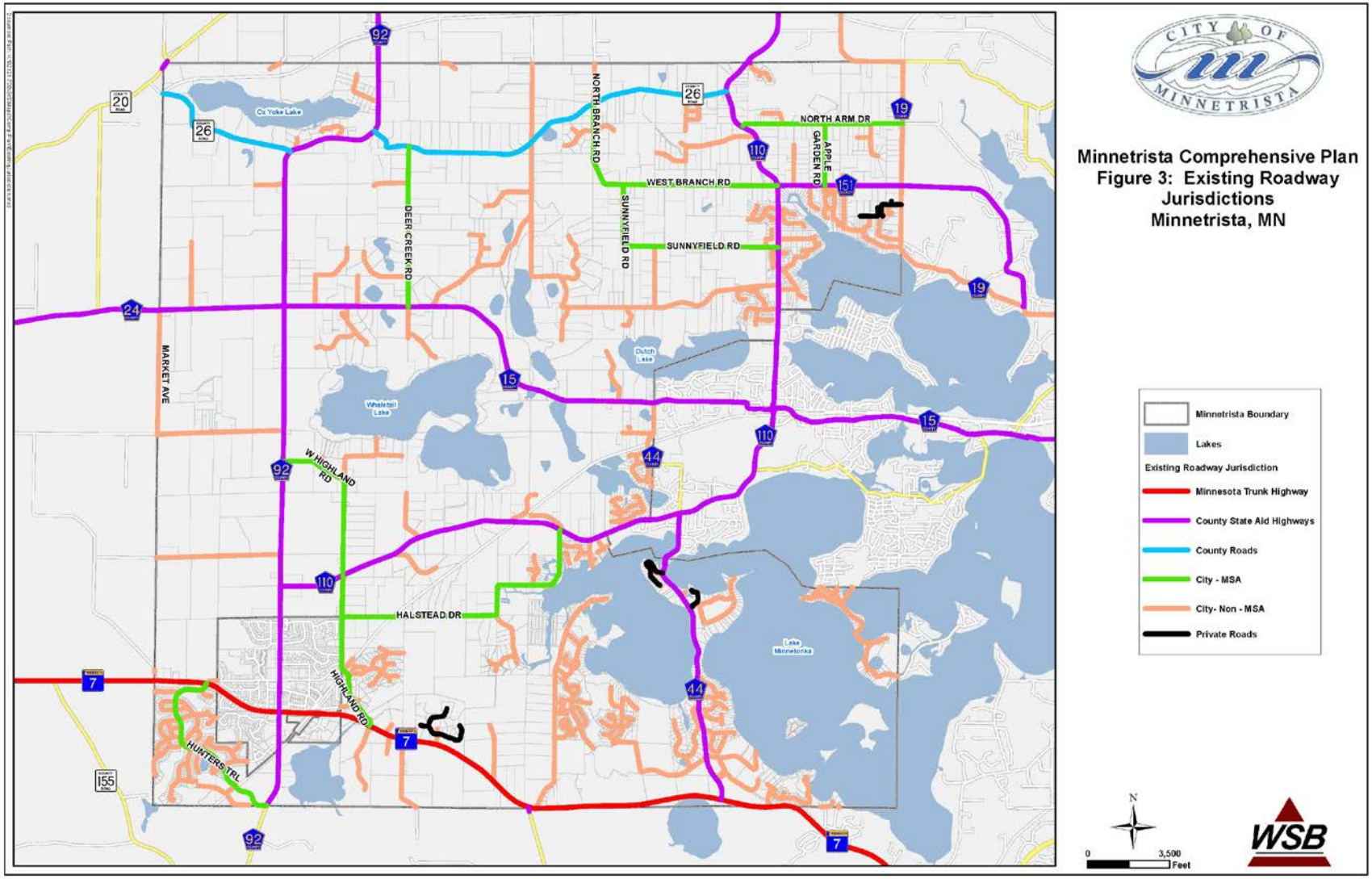
The functional classification system groups roadways into classes based on roadway function and purpose. Functional classification is based on both transportation and land use characteristics, including roadway speeds, access to adjacent land, connection to important land uses, and the length of trips taken on the roadway.

The **functional classification system** organizes a roadway and street network that distributes traffic from local neighborhood streets to collector roadways, then to minor arterials and ultimately the principal arterial system. Roads are placed into categories based on the degree to which they provide access to adjacent land and mobility for through traffic. Functional classification gives an indication of the relative hierarchy of roadways in the transportation network.

Image: MnDOT

Four classes of roadways are included in the seven-county metropolitan area functional classification system: principal arterials, minor arterials, collector streets, and local streets. **Figure 2** shows the existing functional classification of each road in the City of Minnetrista and **Figure 3** shows existing roadway jurisdiction. The following sections describe each functional class in greater detail and indicate which roadways fall into each classification.


Minnetrista Comprehensive Plan
Figure 2: Existing Functional Road Classifications
Minnetrista, MN
Minnetrista Boundary
Lakes
Existing Functional Class Roads
Principal Arterial
A Minor Augmentor
A Minor Reliever
A Minor Expander
A Minor Connector
B Minor
Major Collector
Minor Collector
Ox Yoke Lake
Dutch Lake
Whaletail Lake
Lake Minnetonka
N
0
3,500
Feet
WSB


Minnetrista Comprehensive Plan
Figure 3: Existing Roadway Jurisdictions
Minnetrista, MN
Minnetrista Boundary
Lakes
Existing Roadway Jurisdiction
Minnesota Trunk Highway
County State Aid Highways
County Roads
City - MSA
City- Non - MSA
Private Roads
NORTH ARM DR
WEST BRANCH RD
SUNNYFIELD RD
NORTH BRANCH RD
APPLE GARDEN RD
DEER CREEK RD
MARKET AVE
W HIGHLAND RD
HALSTEAD DR
HIGHLAND RD
HUNTERS TRL
Ox Yoke Lake
Whaletail Lake
Dutch Lake
Lake Minnetonka
N
0
3,500
Feet
WSB

2.1.1. Principal Arterials

Principal arterials are roadways that provide the greatest level of mobility and access control. Within the metropolitan area, the great majority of principal arterials are under MnDOT jurisdiction. Principal arterials are typically Interstate highways or other state or US freeways or expressways. These facilities are intended to serve trips greater than eight miles and express transit trips. Spacing of principal arterials varies within developing areas of the metropolitan area. Typically these facilities are spaced between two and six miles apart. These facilities connect regional business and commercial concentrations, transportation terminals, and large institutions within the metropolitan area. Principal arterials also connect to other cities, regions, and states outside of the metropolitan area.

Principal arterials are intended to maintain average speeds of 40 mph during peak traffic periods. To maintain mobility and speeds on principal arterials, land access and transportation system connections are limited. There is little to no direct land access from principal arterials. Intersections are limited to interstate freeways, other principal arterials, and "A" Minor arterials. Intersections are spaced approximately one to two miles apart.

Within the City of Minnetrista, there is one existing principal arterial. MnDOT Trunk Highway (TH) 7 passes through the southern portion of the City. To the east of Minnetrista, TH 7 provides connections to a number of cities, including the western Minneapolis suburbs of Minnetonka, Hopkins, and St. Louis Park. To the west, TH 7 continues across the state and passes through the communities of Hutchinson and Montevideo. The 2040 Transportation Policy Plan does not propose any additional principal arterials within the City.

2.1.2. Minor Arterials

Minor arterials maintain a focus on mobility, but provide more land access than principal arterials. Within the City of Minnetrista, all minor arterials are under the jurisdiction of Hennepin County. Minor arterials are intended to serve trips of four to eight miles in length. Within developing areas of the metro, these facilities are spaced between one and two miles apart. Minor arterials connect cities and towns within the region and link to regional business and commercial concentrations. Access points along minor arterials are generally at-grade and typically controlled with signals or stop signs.

During peak traffic, minor arterials in developing areas are intended to maintain 30 mph average speeds. As a result, transportation system connections are limited to interstate freeways, other principal arterials, other minor arterials, collectors, and some local streets. Land access is limited to concentrations of commercial and industrial land uses. The Metropolitan Council has established a system of "A" Minor and "B" Minor arterials. "A" Minor arterials are eligible for federal funding administered by the Metropolitan Council.

The Metropolitan Council has further split "A" Minor arterials into four types, described below:

- Relievers: Arterials located parallel to congested principal arterials. The purpose of "A" Minor Relievers is to provide additional capacity in congested corridors.

- Augmenters: Arterials that supplement the principal arterials system within urban centers and urban communities.
- Expanders: Arterials that supplement principal arterials in less-densely developed areas of the metro area.
- Connectors: Arterials that provide connections between rural towns and connect rural areas with the principal arterial system.

There are four "A" Minor Connectors within the City:

"A" Minor Connectors:

- Hennepin County State Aid Highway (CSAH) 15
- Hennepin CSAH 92
- Hennepin CSAH 110
- Hennepin CSAH 6

"B" Minor arterials have a similar focus on mobility above land access. These roadways connect major traffic generators in the region. "B" Minor arterials are not eligible for federal funding. "B" Minor arterials within the City include the following:

- Hennepin CSAH 19

No additional minor arterials are proposed within the City.

2.1.3. Major and Minor Collectors

Major and minor collector roadways provide linkages to larger developments and community amenities. They generally do not link communities to one another. Collector roadways generally favor access to the system over mobility, but try to balance the two competing needs. Collector roadways are generally lower speed than the principal or minor arterial routes. Collector roadways are often owned and operated by cities; however, within the City of Minnetrista, Hennepin County owns and operates each of the existing collector roadways. Collectors are intended to serve trips of one to four miles in length. Collectors link minor arterials, other collectors, and local streets.

Major collectors typically serve higher density residential areas and concentrations of commercial and industrial land uses. These facilities tend to serve longer trips than minor collectors. Major collectors within the City include the following:

- CSAH 44
- CSAH 151
- County Road (CR) 26

There are no roadways currently designated as minor collectors within the City, and the 2040 Transportation Policy Plan does not propose any additional collector roadways within the City.

2.1.4. Local Roadways

The primary function of local roadways is land access. Local roadways connect individual land parcels with other local roadways and collectors. Trips on local roadways are typically under two miles. Speeds on local roadways are typically low. Longer trips are facilitated by local roadway connections to the collector and arterial systems. Local roadways are under the jurisdiction of the City of Minnetrista. Local roadways are all roadways that are not arterials or collectors.

2.1.5. Planned Functional Classification

Several functional classification changes are recommended in response to changes in traffic patterns, development patterns, and increased population in the City. Planned functional classification changes are listed below.

Change from a local street to minor collector:

- Hunters Trail from CSAH 92 to TH 7
- Highland Road from TH 7 to West Highland Road
- West Highland Road from Highland Road to CSAH 92
- Trista Lane East from CSAH 92 to Highland Road
- Halstead Drive from Highland Road to CSAH 110
- Deer Creek Road from CSAH 15 to CR 26
- Game Farm Road North and Game Farm Road East from CR 26 to CSAH 110
- North Branch Road and West Branch Road from CR 26 to CSAH 110
- Sunnyfield Road North and Sunnyfield Road East from West Branch Road to CSAH 110
- Apple Garden Road from CSAH 151 to North Arm Drive
- North Arm Drive from CSAH 110 to CSAH 19

A note on transportation plan strategies:

Throughout this Plan, locations associated with numbered mode-specific strategies are identified on corresponding maps. These strategies are listed and described in further detail in **Table 9.**

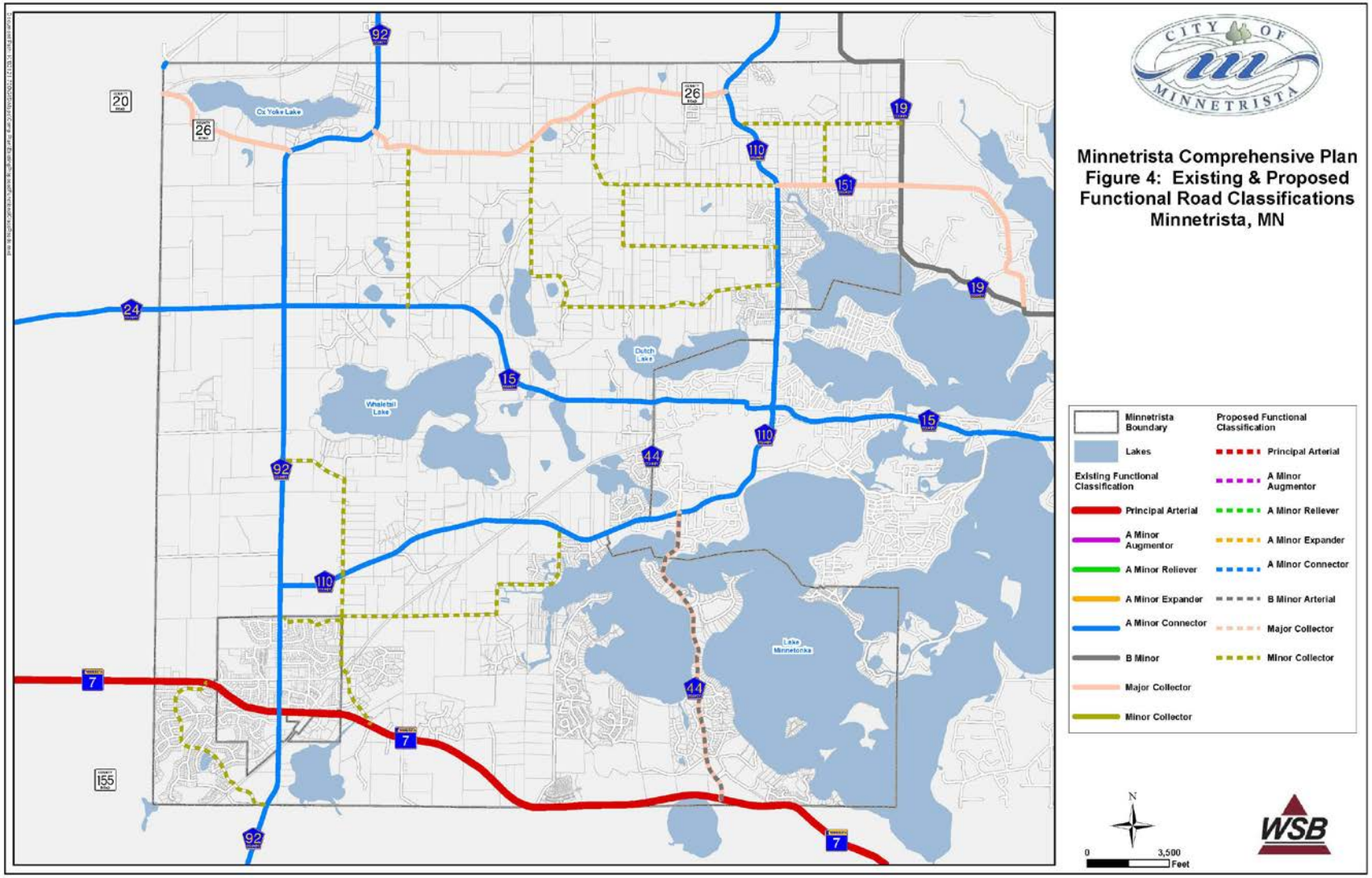
Change from a major collector to "B" minor arterial:

- CSAH 44 from TH 7 to CSAH 110 (in the City of Mound)

Additionally, two jurisdictional transfers are under consideration. CR 26 has been proposed as a potential turnback to the City, as has CSAH 44 between TH 7 and CSAH 110. The City of Minnetrista should proactively communicate any concerns to the County regarding a potential turn-back of the existing CR 26 and CSAH 44 to a Minnetrista City street.

Two road segments are also proposed to be added as Municipal State Aid Street (MSAS) routes: Kingswood Road between CSAH 15 and Game Farm Road and Blair Road between Game Farm Road and Sunnyfield Road.

Figure 4 provides a map illustrating the existing and planned functional classification for the City of Minnetrista.


Minnetrista Comprehensive Plan
Figure 4: Existing & Proposed Functional Road Classifications
Minnetrista, MN
Minnetrista Boundary
Lakes
Existing Functional Classification
Principal Arterial
A Minor Augmentor
A Minor Reliever
A Minor Expander
A Minor Connector
B Minor
Major Collector
Minor Collector
Proposed Functional Classification
Principal Arterial
A Minor Augmentor
A Minor Reliever
A Minor Expander
A Minor Connector
B Minor Arterial
Major Collector
Minor Collector
Cr Yoke Lake
Dutch Lake
Whaletail Lake
Lake Minnetonka
N
0
3,500
Feet
WSB

2.2. Existing Roadway Capacity and Safety

Roadway capacity and roadway safety are two key indicators of how well the roadway system is meeting the City's transportation needs. The sections below provide information to better understand capacity and safety issues within Minnetrista.

2.2.1. Existing Roadway Capacity

A roadway's capacity indicates how many vehicles may use a roadway before it experiences congestion. Capacity is largely dependent upon the number of lanes. **Table 1** below lists planning-level thresholds that indicate a roadway's capacity. Additional variation (more or less capacity) on an individual segment is influenced by a number of factors including: amount of access, type of access, peak hour percent of traffic, directional split of traffic, truck percent, opportunities to pass, and amount of turning traffic, the availability of dedicated turn lanes, parking availability, intersection spacing, signal timing and a variety of other factors.

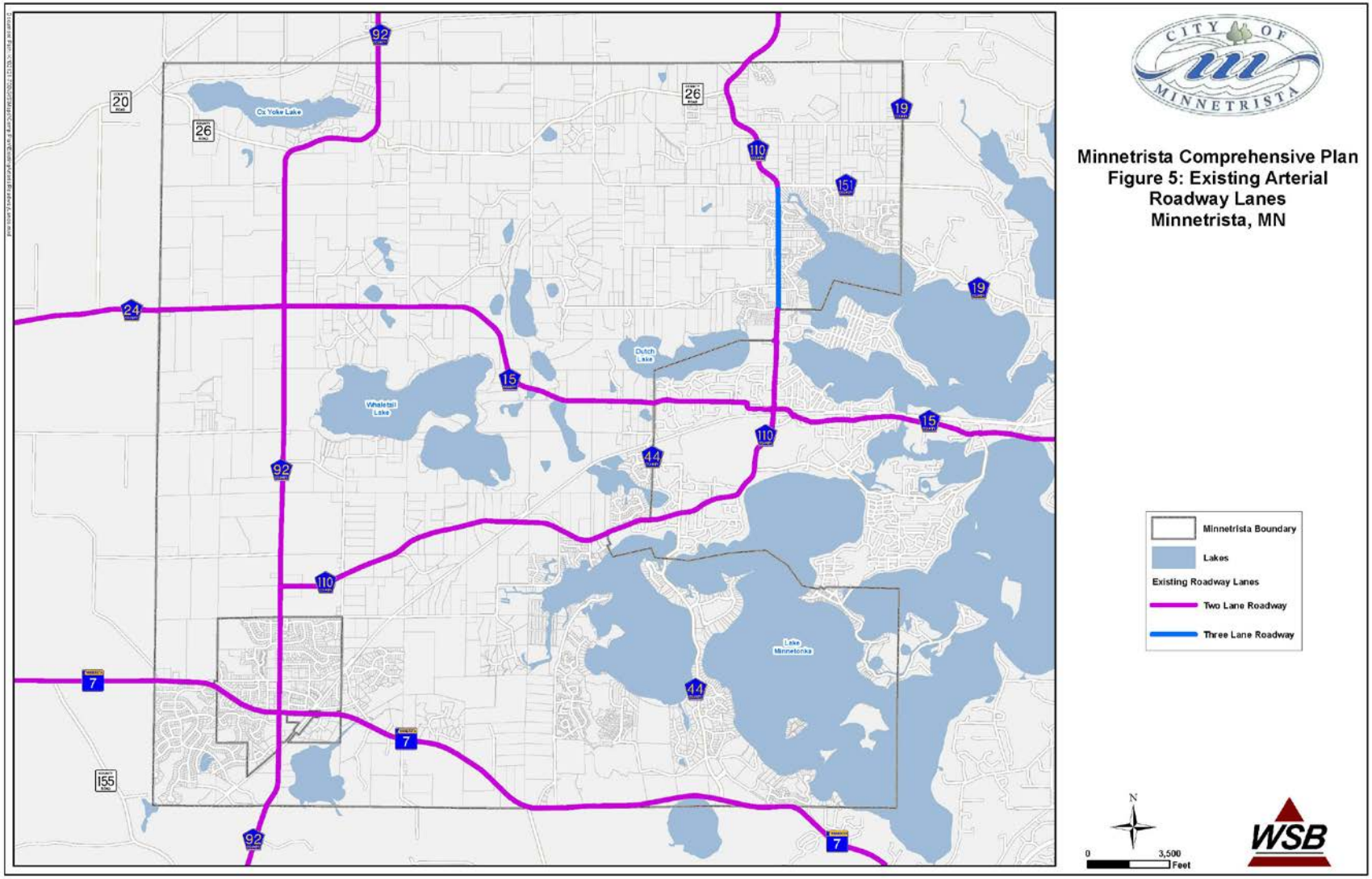
Table 1: Planning-level Roadway Capacity

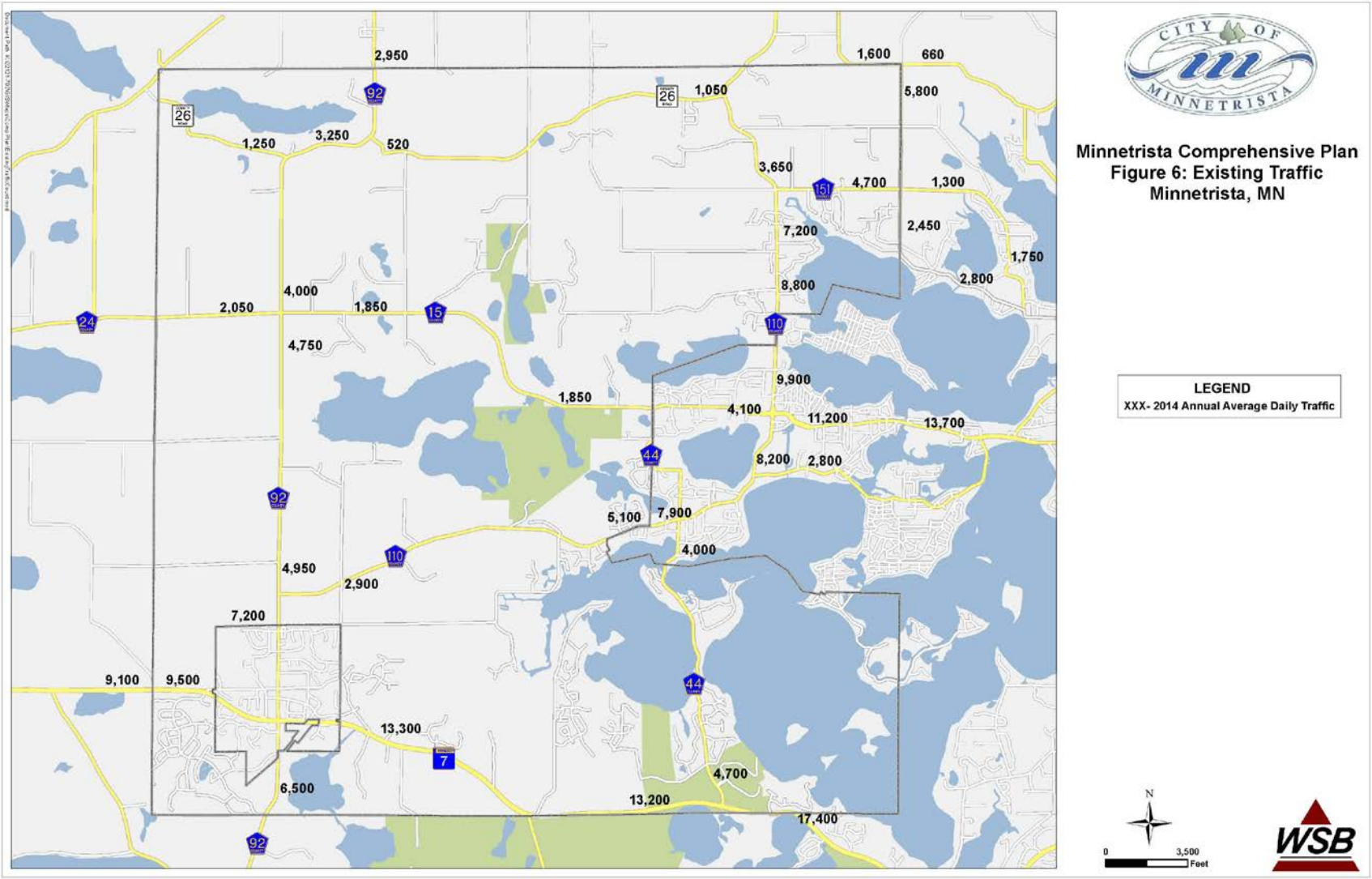
Roadway Type	Maximum Daily Traffic (two-way)
Two-lane, undivided – urban	8,000 – 10,000 vehicles
Two-lane, undivided – rural	14,000 – 15,000 vehicles
Three-lane – urban	14,000 – 17,000 vehicles
Four-lane undivided – urban	18,000 – 22,000 vehicles
Four-lane divided – urban	28,000 – 32,000 vehicles
Four-lane divided – rural	32,000 – 36,000 vehicles

2.2.2. Existing Capacity Problems on Arterial Roads

At the planning level, capacity problems are identified by comparing the existing number of lanes with current traffic volumes. **Table 2** and **Figure 5** illustrate the existing number of lanes on arterial roadways within the City. **Figure 6** illustrates existing traffic volumes on Principal Arterial, A-Minor Arterial and other significant roadways within the City.

As shown in the table, nearly all of the arterials within the City have two lanes. The lone exception is CSAH 110, which transitions between two and three lanes in the northeastern portion of the City (one travel lane in each direction with a center two-way left-turn lane). TH 7 is a two-lane undivided principal arterial with a rural design through the City. As shown in **Table 1**, its capacity is approximately 14,000–15,000 vehicles per day. TH 7 is currently above capacity east of CSAH 44 and is approaching capacity west of CSAH 44. This indicates that this roadway may be experiencing some levels of congestion during peak travel periods.


Minnetrista Comprehensive Plan
Figure 5: Existing Arterial Roadway Lanes
Minnetrista, MN
Minnetrista Boundary
Lakes
Existing Roadway Lanes
Two Lane Roadway
Three Lane Roadway
Ox Yoke Lake
Whaletail Lake
Dutch Lake
Lake Minnetonka
0
3,500
Feet
N


Minnetrista Comprehensive Plan
Figure 6: Existing Traffic
Minnetrista, MN
LEGEND
XXX- 2014 Annual Average Daily Traffic
CITY OF MINNETRISTA
2,950
1,600
660
5,800
1,050
1,250
3,250
520
3,650
4,700
1,300
7,200
2,450
1,750
2,800
8,800
4,000
2,050
1,850
4,750
9,900
1,850
4,100
11,200
13,700
8,200
2,800
5,100
7,900
4,000
4,950
2,900
7,200
9,100
9,500
13,300
4,700
6,500
13,200
17,400
N
0
3,500
Feet
WSB

Aside from TH 7, the other arterial roadways are rural undivided roadways. As described above in **Table 1**, these roadways have a planning-level capacity of 14,000–15,000 vehicles. These two-lane roadways within the City are currently under capacity and are not experiencing major congestion issues.

Table 2: Existing Number of Lanes on Arterial Roads

Functional Classification	Roadway Name	Location	Number of Lanes
Principal Arterial	TH 7	Carver-Hennepin County Line to western Minnetrista-St. Bonifacius border; eastern Minnetrista-St. Bonifacius border to Minnetrista-Victoria border	2
"A" Minor Connector	Hennepin CSAH 15	Carver-Hennepin County Line to Minnetrista-Mound border	2
	Hennepin CSAH 92	Carver-Hennepin County Line to Minnetrista-Independence border	2
	Hennepin CSAH 110	CSAH 92 to western Minnetrista-Mound border; northern Minnetrista-Mound border to Minnetrista-Independence border	2-3
	Hennepin CSAH 6 (Watertown Road)	Carver-Hennepin County Line to Minnetrista-Independence border	2
"B" Minor Arterial	Hennepin CSAH 19 (North Shore Drive)	Minnetrista-Orono border to Minnetrista-Independence border	2

2.2.3. Existing Safety and Operational Issues

Coordination with City and County officials has indicated that there are a number of intersections with design and/or geometric issues, including:

- CSAH 92 and CSAH 15
- CR 26 and CSAH 92 (east junction)
- CR 26 and Game Farm Road
- CR 26 and CSAH 110
- CSAH 151 and Clarence Avenue
- TH 7 and Merrywood Lane (note: not a county intersection)
- TH 7 and CSAH 92 (in the City of St. Bonifacius)
- CSAH 44 and CSAH 110 (in the City of Mound)
- Kingswood Road and CSAH 15

- Kingswood Road and Game Farm Road
- CSAH 151 and Maple Crest Drive

In addition to these intersections, there are a number of locations where potential improvements such as the addition of turn lanes have been discussed to improve safety and operations. These locations include:

- CSAH 44 near Hardscrabble Circle
- CSAH 44 at Lotus Drive
- CSAH 92 near Hennepin County-Carver County Line
- CSAH 110 at Halstead Drive

2.3. Access Management

The purpose of access management is to provide adequate access to adjacent land development while maintaining acceptable traffic flow on higher level roadways. Access management consists of carefully controlling the spacing and design of public street intersections and private access points to the public roadway system. Because they are designed for higher speed, longer distance trips, arterials generally have restricted access, while local streets can accommodate much greater access. Collector roadways fall in between arterials and local roadways regarding the amount of access that is permitted.

The agency with jurisdiction over a roadway sets access management guidelines. Access to TH 7 must meet MnDOT access management guidelines. See **Tables 3.1** and **3.2** for MnDOT Access Management Guidelines.

Hennepin County has established access management guidelines for urban (areas within the 20-year MUSA boundary) and rural areas (areas outside the MUSA boundary). Hennepin County access management guidelines are displayed in **Table 4**. Hennepin County requires permits for new driveway access to county roads and when land uses change at a site adjacent to a county road. Hennepin County typically requires that new access points meet its guidelines; however, the county can make exceptions to the guidelines with sufficient justification.

The City of Minnetrista also has access management guidelines for City streets, as displayed in **Table 5**. The City uses these guidelines when permitting new access to City streets.

It should be noted that there are existing access points that do not meet City, County, and MnDOT access spacing guidelines. In many cases these access points were established prior to agency access spacing guidelines. In other cases the agency has granted an exception to the existing guidelines. As roadways are reconstructed, each of these agencies generally works to modify and/or relocate access points that do not meet current access spacing guidelines. When redevelopment occurs, each of the agencies shall generally work to modify and/or relocate access points to meet current access spacing guidelines.

Table 3.1 – Summary of Recommended Street Spacing for IRCs

Category	Area or Facility Type	Typical Functional Class	Public Street Spacing		Signal Spacing
			Primary Full-Movement Intersection	Secondary Intersection	
1	**High Priority Interregional Corridors & Interstate System (IRCs)**				
1F	Interstate Freeway	Principal Arterials	Interchange Access Only		⊘
1AF	Non-Interstate Freeway		Interchange Access Only (see Section 3.2.7 for interim spacing)		See Section 3.2.5 for Signalization on Interregional Corridors
1A	Rural		1 mile	1/2 mile	
1B	Urban/Urbanizing		1/2 mile	1/4 mile	
1C	Urban Core		300-660 feet dependent upon block length		
2	**Medium Priority Interregional Corridors**				
2AF	Non-Interstate Freeway	Principal Arterials	Interchange Access Only (See Section 3.2.7 for interim spacing)		See Section 3.2.5 for Signalization on Interregional Corridors
2A	Rural		1 mile	1/2 mile	
2B	Urban/Urbanizing		1/2 mile	1/4 mile	
2C	Urban Core		300-660 feet, dependent upon block length		¼ mile
3	**Regional Corridors**				
3AF	Non-Interstate Freeway	Principal and Minor Arterials	Interchange Access Only (see Section 3.2.7 for interim spacing)		Interim
3A	Rural		1 mile	1/2 mile	See Section 3.2.5
3B	Urban/Urbanizing		1/2 mile	1/4 mile	1/2 mile
3C	Urban Core		300-660 feet, dependent upon block length		1/4 mile

Table 3.2 – Summary of Recommended Street Spacing for Non-IRCs

Category	Area or Facility Type	Typical Functional Class	Public Street Spacing		Signal Spacing
			Primary Full-Movement Intersection	Secondary Intersection	
4	**Principal Arterials in the Twin Cities Metropolitan Area and Primary Regional Trade Centers (Non-IRCs)**				
4AF	Non-Interstate Freeway	Principal Arterials	Interchange Access Only (see Section 3.2.7 for interim spacing)		Interim
4A	Rural		1 mile	1/2 mile	See Section 3.2.5
4B	Urban/Urbanizing		1/2 mile	1/4 mile	1/2 mile
4C	Urban Core		300-660 feet dependent upon block length		1/4 mile
5	**Minor Arterials**				
5A	Rural	Minor Arterials	1/2 mile	1/4 mile	See Section 3.2.5
5B	Urban/Urbanizing		1/4 mile	1/8 mile	1/4 mile
5C	Urban Core		300-660 feet, dependent upon block length		1/4 mile
6	**Collectors**				
6A	Rural	Collectors	1/2 mile	1/4 mile	See Section 3.2.5
6B	Urban/Urbanizing		1/8 mile	Not Applicable	1/4 mile
6C	Urban Core		300-660 feet, dependent upon block length		1/8 mile
7	**Specific Area Access Management Plans**				
7	All	All	By adopted plan		

Table 4: Hennepin County Access Spacing Guidelines

Access Type	Movements Allowed	Rural Arterial			Urban and Urbanizing Arterial		
		Greater than 7,500 ADT	Less than 7,500 ADT	Collector	Undivided	Divided	Collector
Single family residential driveway or farm field entrance	Full movements allowed	1/4 mile (1,320 feet)	1/8 mile (660 feet)	1/8 mile (660 feet)	Not allowed	Not allowed	1/8 mile (660 feet)
	Limited access	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed	1/16 mile (330 feet)
Low Volume Driveway (less than or equal to 500 trips per day)	Full movements allowed	1/4 mile (1,320 feet)	1/8 mile (660 feet)	1/8 mile (660 feet)	Not allowed	Not allowed	1/8 mile (660 feet)
	Limited access	Not allowed	Not allowed	Not allowed	Not allowed	1/8 mile (660 feet)	1/16 mile (330 feet)
High Volume Driveway (greater than 500 trips per day)	Full movements allowed	1/4 mile (1,320 feet)	1/4 mile (1,320 feet)	1/8 mile (660 feet)	1/4 mile (1,320 feet)	1/4 mile (1,320 feet)	1/8 mile (660 feet)
	Limited access	Not allowed	Not allowed	Not allowed	Not allowed	1/8 mile (660 feet)	Not allowed
Low Volume Public Street (less than or equal to 2,500 ADT)	Full movements allowed	1/4 mile (1,320 feet)	1/4 mile (1,320 feet)	1/8 mile (660 feet)	1/4 mile (1,320 feet)	1/4 mile (1,320 feet)	1/8 mile (660 feet)
	Limited access	Not allowed	Not allowed	Not allowed	Not allowed	1/8 mile (660 feet)	Not allowed
High Volume Public Street (greater than 2,500 ADT)	Full movements allowed	1/2 mile (2,640 feet)	1/4 mile (1,320 feet)	1/4 mile (1,320 feet)	1/4 mile (1,320 feet)	1/4 mile (1,320 feet)	1/4 mile (1,320 feet)
	Limited access	Not allowed	Not allowed	Not allowed	Not allowed	1/8 mile (660 feet)	Not allowed

Table 5: City of Minnetrista Access Spacing Guidelines

Type of Access	Roadway Functional Classification	
	City Collector	Local
Residential Driveways	No Direct Access	As Required
Commercial Driveways	Based on: Speed, Traffic, Volume, Sight Distances, etc. (min. 200 ft.)	Based on: Speed, Traffic, Volume, Sight Distances, etc. (min. 100 ft.)
Low Volume Streets	Full Access – 1/8 mile	Full Access – 330 ft.
	Partial Access – 330 ft.	Partial Access 330 ft.
High Volume Streets (< 10,000 ADT)	Full Access – 1/8 mile	Full Access – 330 ft.
	Partial Access – 330 ft.	Partial Access – 330 ft.
Collector Streets	Full Access – 1/4 mile	Full Access – 1/8 mile
	Partial Access – 1/8 mile	Partial Access – 330 ft.

2.4. Recommendations from Other Plans and Studies

2.4.1. Trunk Highway 7 Corridor Study

In 1996, the TH 7 Corridor Coalition completed a study examining the TH 7 corridor from TH 41 in Excelsior to TH 15 in Hutchinson. The study was performed to address concerns of area residents and public officials regarding traffic operations, congestion, safety, and access control. Based on evaluation of then-current and forecasted traffic levels, several recommendations were made pertaining to Minnetrista, including the completed realignment of Kings Point Road/Carver CSAH 11 into a single intersection with TH 7 and installation of a traffic signal at CSAH 44. The corridor study also recommended monitoring future traffic growth and funding possibilities for reconstruction to four-lane divided expressway.

2.4.2. Hennepin County Transportation Plan

The 2011 update of the Hennepin County Transportation Plan included a map outlining a "general corridor for discussion" that would connect Minnetrista and Hassan Township, passing through the Cities of Independence and Greenfield. This corridor was identified as a location where future transportation issues will need to be evaluated but where no consensus has been reached regarding potential solutions. This corridor has not been studied in greater detail since the County plan update; however, it may remain part of the County plan moving forward, so the City will continue tracking its development.

2.4.3. Individual Development Proposals

As individual residential developments are proposed in Minnetrista, the City will continue to implement its established procedure for developer review, ensuring that any associated transportation improvements are designed in a manner consistent with the long-term interests of the City and its residents.

3. Future Roadway System

This section addresses future roadway improvement needs and roadway design guidelines.

3.1. Roadway Capacity – Traffic Forecasting

To determine future roadway capacity needs, year 2040 traffic forecasts were prepared using the Metropolitan Council travel demand model. The model was refined for application specifically for Minnetrista. The 2040 projections were compared against the assumed 2040 roadway network to see where roadway segment capacity deficiencies may result. The 2040 roadway network assumed for this analysis is the same as the current roadway network, as the City and County Capital Improvement Plans (CIPs) do not include any projects that add significant capacity to the roadway network.

While the travel demand model is a valuable tool for identifying future traffic based on the proposed land use impacts, it is not meant for use in detailed traffic operations studies. For a more accurate representation of the transportation impacts from specific developments, detailed traffic studies should be conducted to determine the operational impacts on adjacent roadways and intersections.

A central concept of travel demand forecasting is the use of Transportation Analysis Zones (TAZs). Each forecast study area, in this case the City of Minnetrista, is divided into a series of TAZs. Each TAZ has land use data which indicates trip generation and trip attraction including population, household, and employment data. **Figure 7** displays Metropolitan Council TAZs within Minnetrista.

The results of the Minnetrista modeling process are summarized on **Figure 8**, which displays Met Council 2040 projected average daily traffic volumes compared to the existing (2014) traffic volumes.

Table 6 provides a summary of existing and forecasted demographic growth by TAZ for the City of Minnetrista through the year 2040. It includes an allocation of forecasted residential and employment growth within the City by TAZ based on the Metropolitan Council forecasts and the Minnetrista Land Use Plan. Minnetrista population is forecasted to increase by nearly 6,000 residents by the year 2040, with households and employment increasing by approximately 2,800 and 1,200 respectively. Allocated demographic growth and associated land use was generally located in the southwestern portion of the community along TH 7. For more information about the demographic allocation and associated land use forecast, please refer to the Minnetrista Land Use Plan in **Chapter 3** of the Minnetrista Comprehensive Plan.

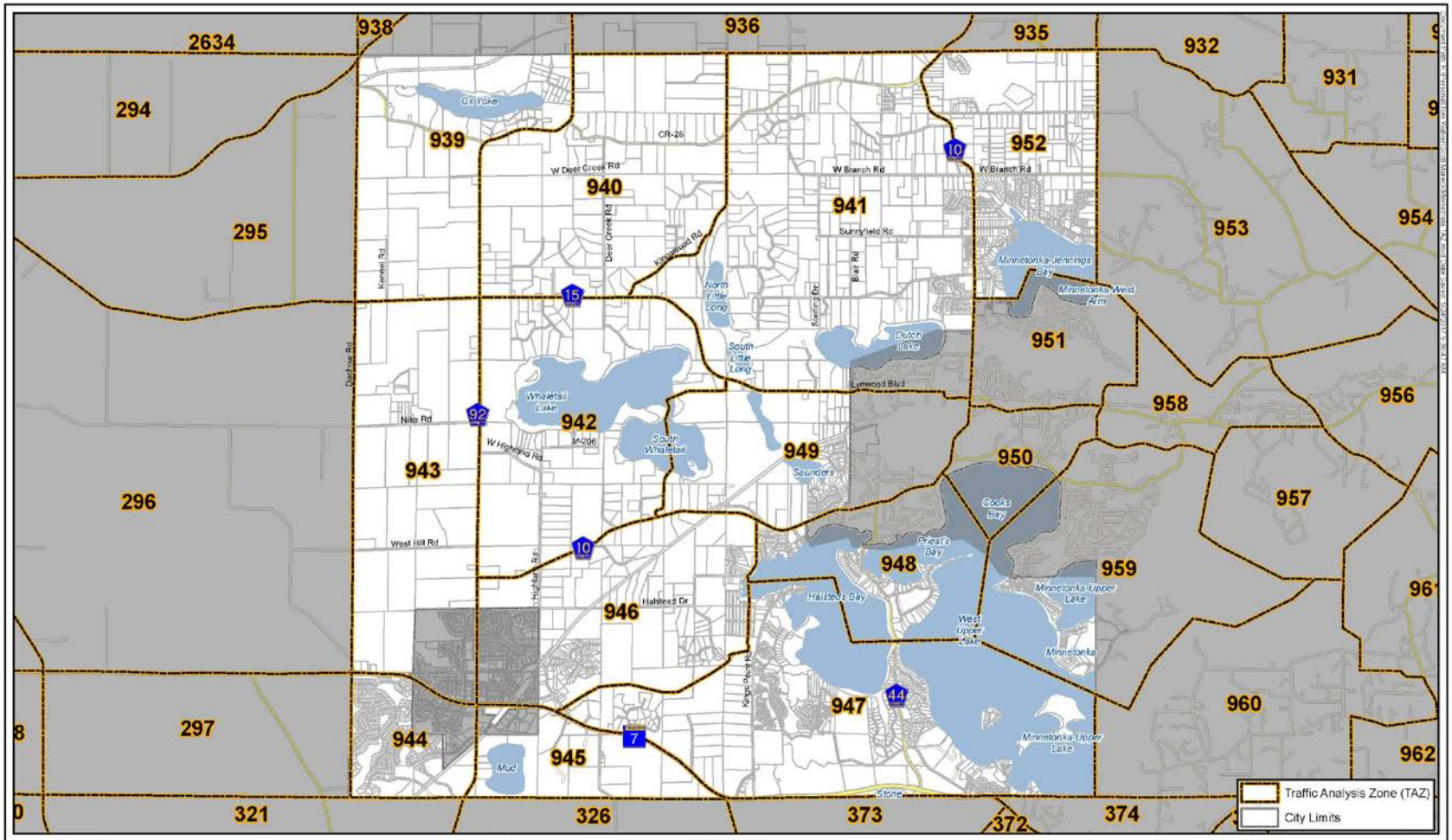


Figure: 7
Minnetrista Comprehensive Plan
Traffic Analysis Zones
Minnestrista, MN

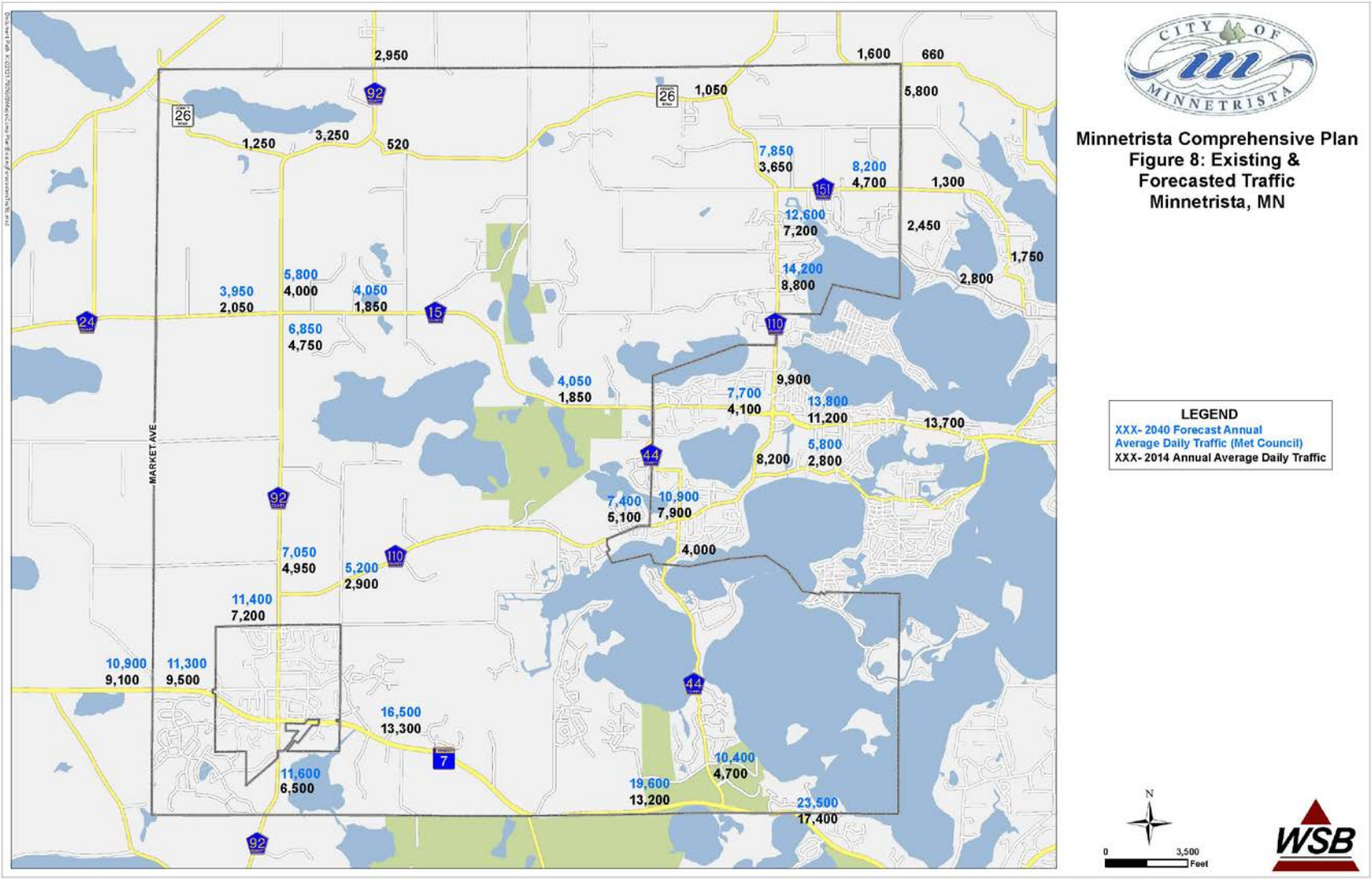

Minnetrista Comprehensive Plan
Figure 8: Existing & Forecasted Traffic
Minnetrista, MN
LEGEND
XXX- 2040 Forecast Annual Average Daily Traffic (Met Council)
XXX- 2014 Annual Average Daily Traffic
MARKET AVE
2,950
1,600
660
5,800
1,050
1,250
3,250
520
7,850
3,650
8,200
4,700
1,300
12,600
7,200
2,450
1,750
14,200
8,800
2,800
5,800
4,000
3,950
2,050
4,050
1,850
6,850
4,750
4,050
1,850
9,900
7,700
4,100
13,800
11,200
13,700
5,800
2,800
8,200
7,400
5,100
10,900
7,900
4,000
7,050
4,950
5,200
2,900
11,400
7,200
10,900
9,100
11,300
9,500
16,500
13,300
11,600
6,500
10,400
4,700
19,600
13,200
23,500
17,400
N
0
3,500
Feet
WSB

Table 6
Minnetrista 2040 Land Use Plan TAZ Growth Allocation

	2010 Census			2020 Forecast			2030 Forecast			2040 Forecast		
CURRENT TAZ	Population	Household	Empoyment	Population	Household	Empoyment	Population	Household	Empoyment	Population	Household	Empoyment
939*	145	50	40	138	50	41	127	50	41	120	50	41
940	246	89	18	246	89	26	225	89	26	214	89	26
941*	1,124	380	262	1,048	380	244	1,006	397	244	1,051	438	244
942	170	65	13	179	65	4	165	65	4	156	65	4
943*	74	30	51	83	30	22	76	30	22	72	30	22
944*	1,154	334	6	921	334	8	846	334	8	802	334	8
945*	43	15	1	41	15	2	38	15	12	36	15	22
946*	644	200	73	1,750	634	58	1,732	684	68	1,739	725	78
947	614	229	40	1,431	519	87	3,508	1,385	217	5,630	2,346	347
948*	350	134	8	370	134	17	349	138	17	350	146	17
949*	495	154	20	425	154	25	390	154	25	370	154	25
952	1,114	401	129	1,106	401	183	1,097	433	183	1,224	510	183
959*	211	95	3	262	95	3	241	96	3	236	98	3
2040 Land Use Plan Totals	6,384	2,176	664	8,000	2,900	720	9,800	3,870	870	12,000	5,000	1,020
Met Council Growth Allocation	6,384	2,176	664	8,000	2,900	720	9,800	3,870	870**	12,000	5,000	1,020**

* TAZ boundary and associated data lies partially outside City of Minnetrista

**Met Council caps for 2030 and 2040 employment growth agreed to by Met Council staff and are different from what is posted on Met Council website.

January 28, 2019

3.2. 2040 Future Roadway Capacity Improvement Needs

To identify the need for potential future capacity improvements, Met Council 2040 forecasts were compared to planning-level roadway capacities for Principal and A-Minor Arterial Roadways. Planning-level roadway capacities used for this analysis are illustrated in **Table 7** below. Based on this comparison, nearly all roadways in the City have adequate capacity to handle forecast 2040 traffic volumes with little to minimal congestion. These roadways are expected to function well with two lanes through the 2040 planning horizon.

Table 7: Planning-Level Roadway Capacity

Roadway Type	Maximum Daily Traffic (two-way)
Two-lane, undivided – urban	8,000 – 10,000 vehicles
Two-lane, undivided – rural	14,000 – 15,000 vehicles
Three-lane – urban	14,000 – 17,000 vehicles
Four-lane undivided – urban	18,000 – 22,000 vehicles
Four-lane divided – urban	28,000 – 32,000 vehicles
Four-lane divided – rural	32,000 – 36,000 vehicles

Based on these planning level roadway capacities, TH 7 east of St. Bonifacius is the only roadway in the City expected to exceed its capacity in 2040, with a forecasted volume of 23,500. TH 7 is currently a rural two-lane roadway east of St. Bonifacius with a planning-level capacity of 14,000 to 15,000 vehicles per day. Accordingly, motorists will likely experience some congestion along this segment of TH 7 during the 2040 planning horizon. However, due to funding constraints, Met Council and MnDOT do not currently have any capacity expansion plans for this segment of TH 7.

4. Existing and Planned Non-Motorized Transportation Network

This section addresses network needs for walking and bicycling within the City of Minnetrista. This section also addresses the needs of people using wheelchairs and assistive mobility devices such as mobility scooters, as they are considered pedestrians.

Enhancing the non-motorized elements of Minnetrista's transportation system is a key goal in terms of improving transportation sustainability in the City and in the region. This approach gives residents an alternative to driving, supports transportation options for people who do not have consistent access to a personal vehicle, and encourages healthy activities and lifestyles.

This section includes information on the existing non-motorized transportation network within Minnetrista, connections to land use planning, the planned local non-motorized transportation network, and the planned regional non-motorized transportation network. This section also includes recommendations for intersection improvements and design best practices.

4.1. Existing Non-Motorized Transportation Network

The non-motorized transportation network in Minnetrista is comprised primarily of a regional trail, a state trail, and several multi-use trails.

Sidewalks in Minnetrista are limited; however, there are sidewalks along a number of streets within more recently-developed residential areas, including the Hunters Crest Development, the Turtle Creek Development, and along Sunnybrook Drive and Sunnybrook Circle.

The Dakota Rail Regional Trail is an existing regional trail that is managed and maintained by the Three Rivers Park District. The trail follows an abandoned railroad corridor beginning at Lake Waconia and passing northeast through Minnetrista, St. Bonifacius, and Mound. The trail continues along the northern side of Lake Minnetonka until reaching Wayzata. The Luce Line State Trail is an existing state trail that is managed and maintained by the DNR. This trail, which also follows a former railroad, is 63 miles long and runs from Cosmos to Plymouth. In Minnetrista, the trail crosses through the far northwest corner of the City.

In addition to these trails, there are also shorter segments of multi-use trail in several areas of the City, including:

- the west side of CSAH 110 north of Mound;
- the south side of Sunnyfield Road near Mound Westonka High School;
- the north side of Game Farm Road near Hilltop Primary School;
- the north side of Halstead Drive near Lakeside Drive;
- the west of CSAH 44 through Gene Lehner Park;
- along CSAH 44 (Westedge Boulevard) and Saunders Lake Drive south of the Dakota Rail Trail;
- between the Dakota Rail Regional Trail and Eagle Nest Drive;

- along Hunters Trail between the Dakota Rail Regional Trail and TH 7; and
- around the recently constructed roundabout intersection at TH 7, Kings Point Road, and Carver CSAH 11.

There are a number of other trails within the Lake Minnetonka Regional Park and Gale Woods Farm, which are owned and maintained by the Three Rivers Park District.

In addition to these off-street bikeways, the Hennepin County Bicycle Plan also identifies a number of on-street bikeways within the City, including CSAH 92 north of St. Bonifacius, CSAH 110 (where an adjacent off-street trail is not provided), CSAH 151, and CSAH 44 south of Lotus Drive.

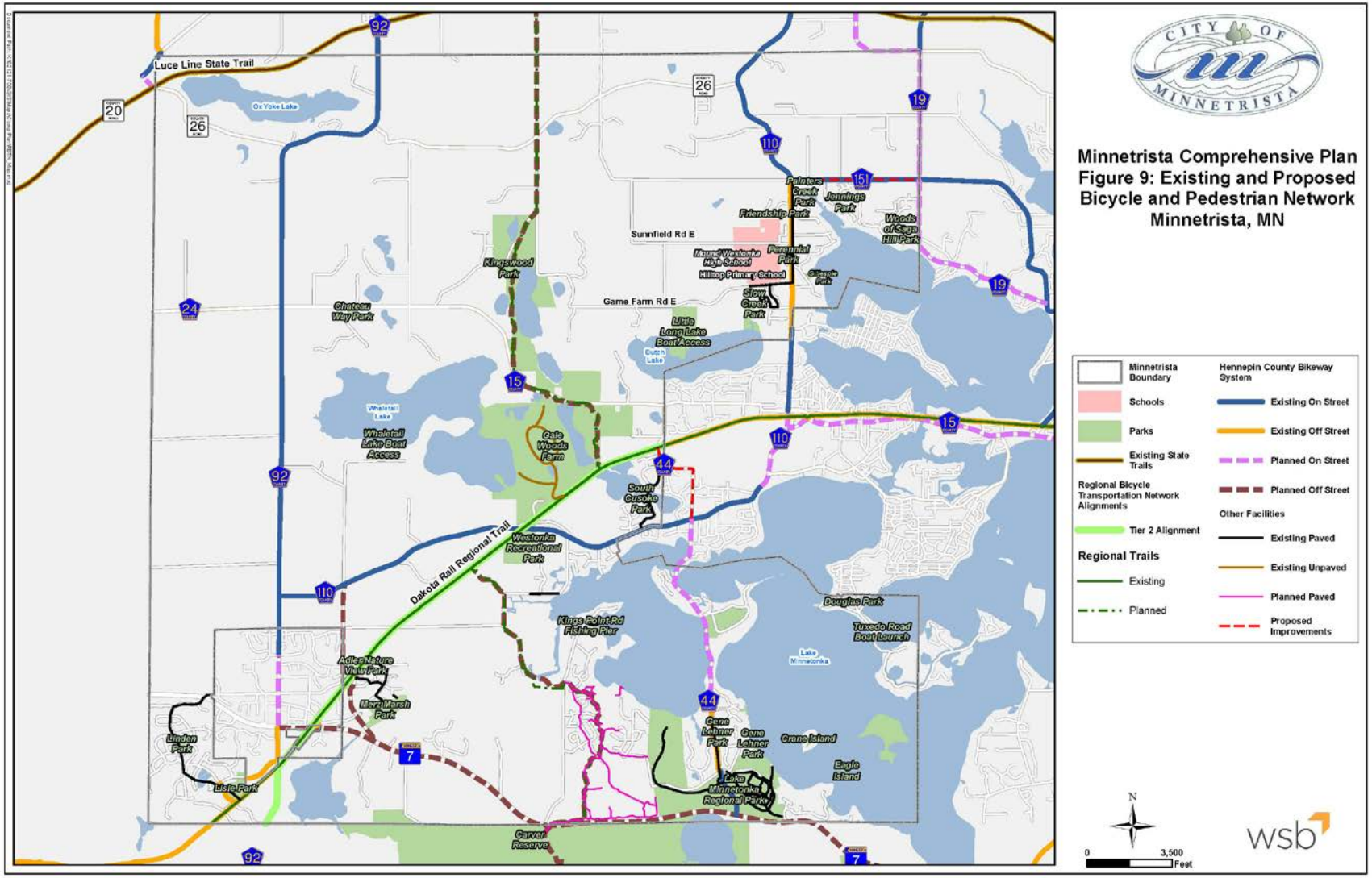
The existing and proposed non-motorized transportation network in Minnetrista is shown in **Figure 9.**

4.2. Connections to Land Use Planning

The City of Minnetrista has development patterns consistent with its designation as an Emerging Suburban Edge, Diversified Rural, and Agricultural community. Existing residential development is low density and commercial land uses are separated from residential land uses. This means that people walking and bicycling must cover greater distances to reach commercial areas from their homes. The development patterns in the City are better suited to bicycling than walking for transportation, due to the distance between residential and commercial areas of the City. There are also commercial and institutional destinations in St. Bonifacius and Mound that are within biking distances of many residences in Minnetrista, including Grandview Middle School and Westonka Library in Mound, City Park in St. Bonifacius, and commercial areas in the downtown areas of both communities.

There are currently limited facilities for walking and bicycling in the City, and these facilities serve recreational uses better than transportation uses. There is not currently a connected network in place to serve the needs of people bicycling and walking for transportation.

The City's land use planning and coordination with developers can help improve opportunities for walking and bicycling for transportation. The City can encourage mixed-use development that situates residents within a short walk of commercial destinations. The City can also work with developers to construct sidewalks and trails within developments. Additionally, the City can require pedestrian and bicycle connections in areas where the roadway network does not connect, such as cul-de-sac connector trails that provide shortcuts for people walking and bicycling.


Minnetrista Comprehensive Plan
Figure 9: Existing and Proposed Bicycle and Pedestrian Network
Minnetrista, MN
Minnetrista Boundary
Schools
Parks
Existing State Trails
Regional Bicycle Transportation Network Alignments
Tier 2 Alignment
Regional Trails
Existing
Planned
Hennepin County Bikeway System
Existing On Street
Existing Off Street
Planned On Street
Planned Off Street
Other Facilities
Existing Paved
Existing Unpaved
Planned Paved
Proposed Improvements
N
0
3,500
Feet
wsb
Luce Line State Trail
Ox Yoke Lake
Sunnfield Rd E
Game Farm Rd E
Dakota Rail Regional Trail
Lake Minnetonka
Lake Minnetonka Regional Park
Crane Island
Eagle Island
Tuxedo Road Boat Launch
Douglas Park
Kings Point Rd Fishing Pier
Gale Woods Farm
South Cusoke Park
Westonka Recreational Park
Whaletail Lake Boat Access
Little Long Lake Boat Access
Chateau Way Park
Kingswood Park
Friendship Park
Painters Creek Park
Jennings Park
Woods of Sage Hill Park
Mound Westonka High School
Hilltop Primary School
Perennial Park
Stone Creek Park
Gene Lehner Park
Adler Nature View Park
Merz Marsh Park
Linden Park
Lisle Park
Carver Reserve

4.3. Planned Local Non-Motorized Transportation Network

The City's planned local non-motorized transportation network includes sidewalk, paved multi-use trails, and turf trails, along with paved shoulders along most roadways. When the network is complete, it will link residential areas with commercial, institutional, and recreational development within the City. The network will improve options for people to walk and bicycle for transportation within the City, and facilitate regional connections (described in greater detail in the following section). The existing and proposed network is shown in **Figure 9**.

4.4. Planned Regional Non-Motorized Transportation Network

The Met Council 2040 TPP encourages the use of bicycles as a mode of transportation and establishes a Regional Bicycle Transportation Network (RBTN) to establish an integrated network of on-street bikeways and off-road trails that complement each other to improve conditions for bicycle transportation at the regional level. The RBTN establishes regional priorities for bicycle transportation so that regional destinations are accessible by bicycle.

The Metropolitan Council established RBTN alignments in areas where existing facilities created a clear connection between regional destinations. RBTN corridors were identified in areas where there are several options for connections between regional destinations. The RBTN is further divided into two tiers. Tier 1 alignments/corridors are expected to attract the most bicycle use and are the highest priority for regional investments. Tier 2 alignments/corridors are the second priority for regional investments.

The Dakota Rail Regional Trail and a portion of CSAH 92 south of the Dakota Rail Regional Trail have already been identified as Tier 2 RBTN Alignments. There are no RBTN corridors within the City of Minnetrista.

While the Dakota Rail Regional Trail is already established, a facility along this segment of CSAH 92 will have priority over other connections if the City applies for federal non-motorized transportation funding administered by the Metropolitan Council. Note that this connection will require a connection between the existing grade-separated crossing of the Dakota Rail Regional Trail, which currently crosses on a bridge over CSAH 92.

The Baker-Carver Regional Trail corridor has been identified as a north-south connection in the middle portion of the City, which will eventually connect the Carver Park Reserve, Dakota Rail Trail, Gale Woods Farm, Luce Line State Trail, and Baker Park Reserve. Regional trails are designed to provide more of a recreational experience; however, many regional trails also serve valuable transportation purposes for pedestrians and bicyclists.

In addition to these regional designations, Hennepin County's 2040 Bicycle Transportation Plan identifies a planned system of on-street and off-street bikeways. In Minnetrista, planned off-street bikeways have been identified along TH 7 between St. Bonifacius and the County Line and along Highland Road between TH 7 and CSAH 110. Planned on-street bikeways have been identified along CSAH 44 between Maple Forest and CSAH 110 and along CSAH 19 in the northeastern portion of the City.

4.5. Intersection Improvements for Bicycling and Walking

TH 7 is a barrier for people walking and bicycling within the City. Grade-separated crossings are provided at the intersection with CSAH 11/Kings Point Road, where a segment of multiuse trail passes under TH 7 through a tunnel, and at the Dakota Rail Regional Trail, where the trail crosses TH 7 and CSAH 92 over two separate bridges. However, a segment of sidewalk and multiuse trail along Hunters Trail terminates at the intersection of TH 7/Wildwood Avenue. No crosswalks or other intersection improvements are provided at this location; however, Wildwood Avenue is the most direct route for cyclists and pedestrians from the Hunters Trail residential neighborhood into destinations in St. Bonifacius, including commercial businesses and parks. As potential improvements are considered for this intersection, facilities for bicyclists and pedestrians crossing TH 7 should be considered.

4.6. Non-Motorized Transportation Design Considerations

Design dimensions for sidewalks are recommended to be five-feet or wider, with a minimum of a four-foot-wide boulevard between the sidewalk and the curb. Increased separation improves pedestrian comfort and provides space for street signs and snow storage.

Multi-use trails are recommended to be a minimum of eight-feet wide. Regional trails are recommended to be a minimum of ten-feet wide due to higher use and the design requirements to comply with federal funding. Trails must have a two-foot wide clear zone on either side to reduce hazards for bicyclists and provide a recovery zone if a bicyclist leaves the edge of the trail. The clear zone can be paved or turf surface. No signs, furnishings, trees, or other obstructions can be in the clear zone.

Paved shoulders should be a minimum of four-feet wide if intended for bicycle and pedestrian use. Four-foot wide shoulders are adequate on streets with traffic volumes below 1,000 vehicles per day. Six- to eight-foot shoulders are recommended when traffic volumes exceed 1,000 vehicles per day. A wider shoulder improves pedestrian and bicyclist safety and comfort when vehicle traffic speeds and volumes are higher.

As non-motorized facilities are planned and designed, the City should consult additional planning and design resources, including:

- Hennepin County Bicycle Transportation Plan
- Hennepin County Pedestrian Plan
- MnDOT Bikeway Facility Design Manual
- Minnesota Manual on Uniform Traffic Control Devices
- Guide for the Development of Bicycle Facilities – American Association of State Highway and Transportation Officials
- Guide for the Planning, Design, and Operation of Pedestrian Facilities – American Association of State Highway and Transportation Officials
- Public Rights of Way Accessibility Guidelines (PROWAG) – US Access Board
- Urban Bikeway Design Guide – National Association of City Transportation Officials
- Small Town and Rural Multimodal Networks – Federal Highway Administration

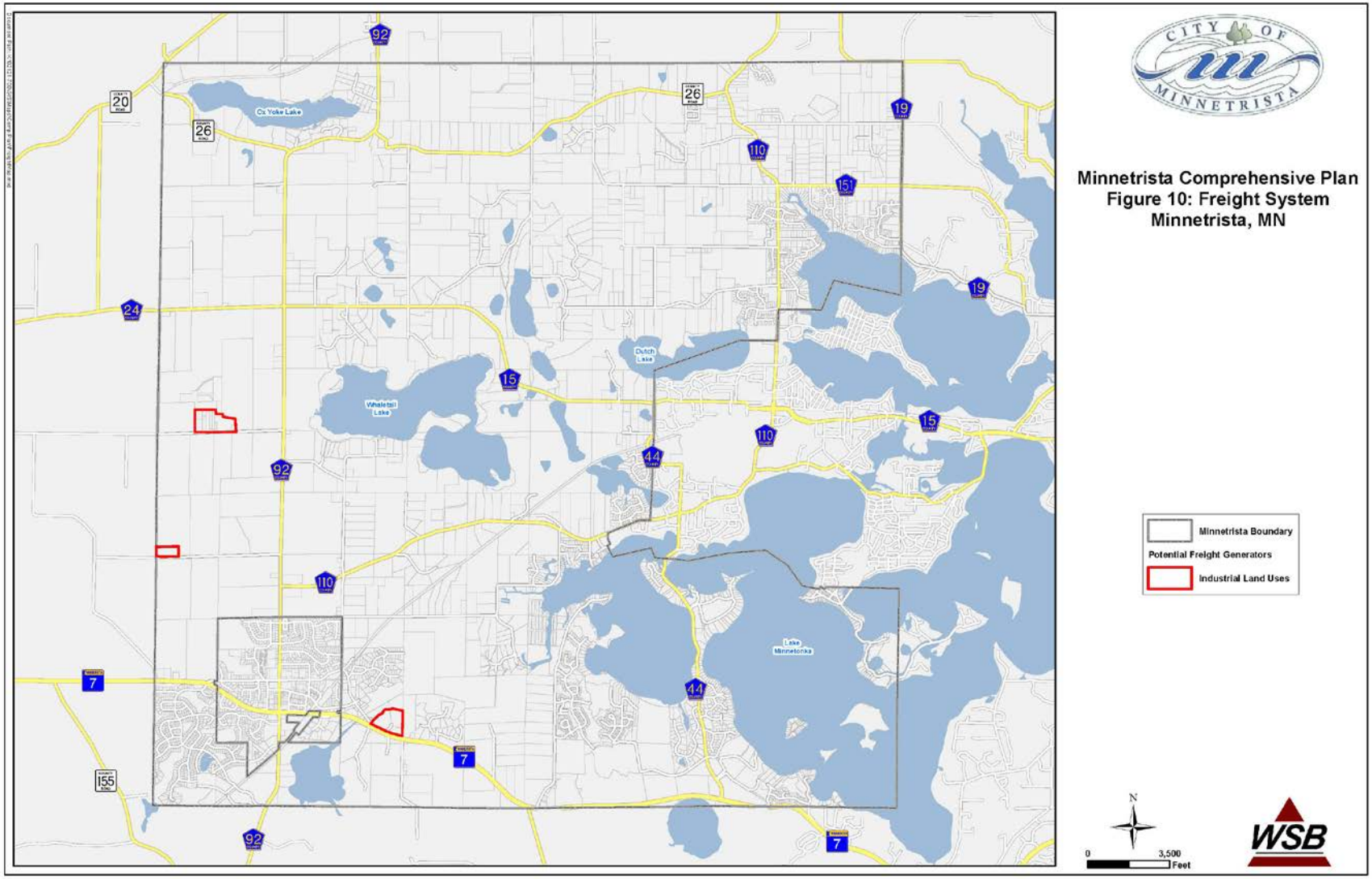
Accessibility is a very important consideration for non-motorized design. All new pedestrian and bicycle facilities must meet the ADA (Americans with Disabilities Act) accessibility guidelines established in PROWAG. The guidelines in PROWAG address the design needs of people with physical and/or visual impairments. Accessibility will become increasingly important over the next 20 years due to demographic changes. Baby boomers are aging and the population over age 65 is increasing. People over 65 are more likely to have physical and/or visual impairments that affect their ability to get around. To address accessibility issues, it is recommended that the City develop and implement an ADA transition plan to bring sidewalks, trails, and intersections into compliance with ADA.

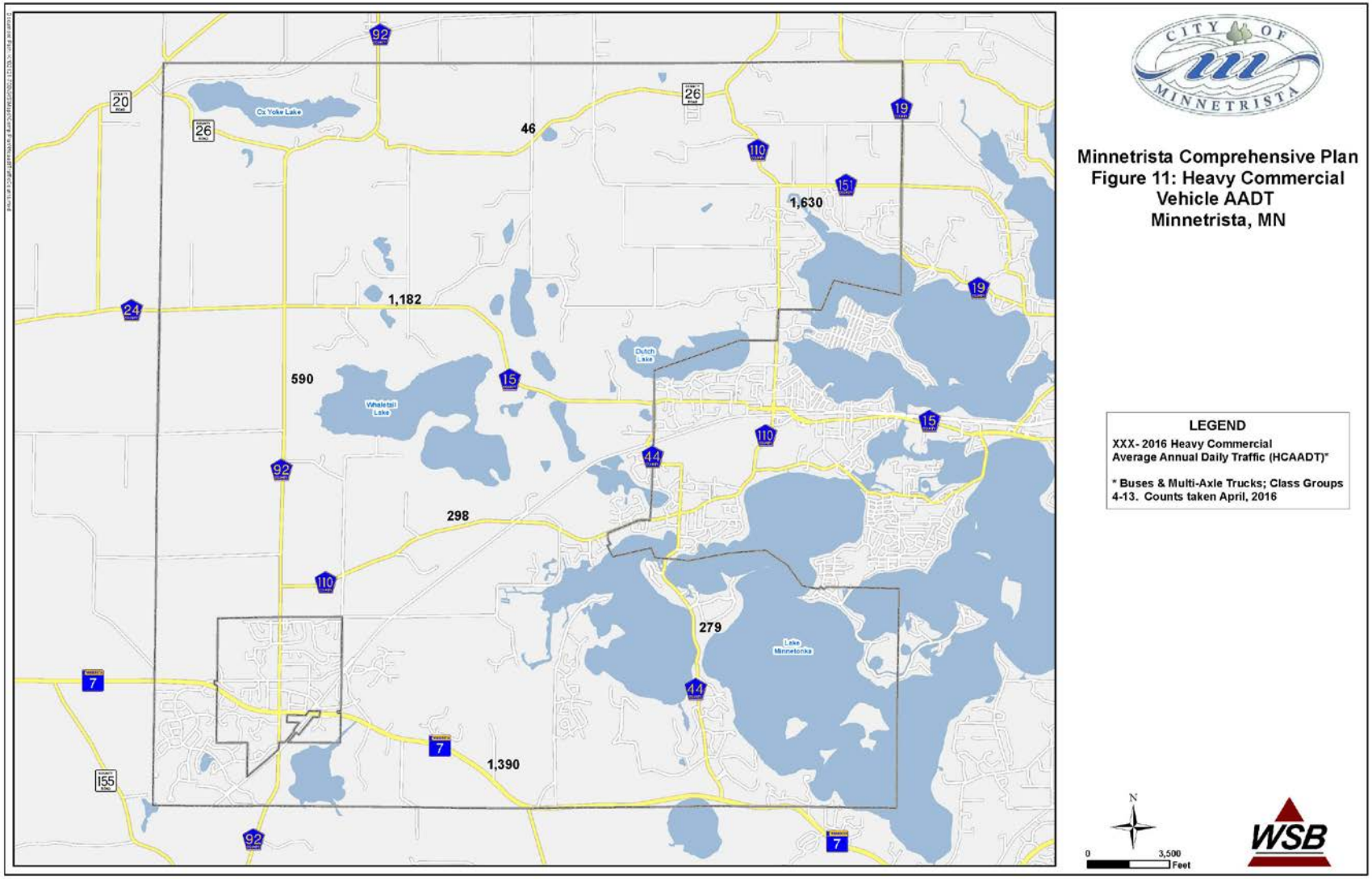
5. Freight

Freight transportation in Minnetrista is primarily served by its one principal arterial highway (TH 7). **Figure 10** shows the City's freight system and potential freight generators.

There are no large freight traffic generators within the City. Most truck and rail traffic is passing through Minnetrista on trips to, from, and through the Twin Cities. Freight traffic generators are located along TH 7 and there are some industrial and commercial land uses in the western portion of the City.

Figure 11 shows Heavy Commercial Average Annual Daily Traffic (HCAADT) within Minnetrista. CSAH 110 carries the greatest number of heavy commercial vehicles (1,630 vehicles per day). TH 7 and CSAH 19 also carry a substantial amount of heavy commercial traffic within the City.


Minnetrista Comprehensive Plan
Figure 10: Freight System
Minnetrista, MN
Minnetrista Boundary
Potential Freight Generators
Industrial Land Uses
Cx Yoke Lake
Whaletail Lake
Dutch Lake
Lake Minnetonka
0
3,500
Feet
N


Minnetrista Comprehensive Plan
Figure 11: Heavy Commercial Vehicle AADT
Minnetrista, MN
LEGEND
XXX- 2016 Heavy Commercial Average Annual Daily Traffic (HCAADT)*
* Buses & Multi-Axle Trucks; Class Groups 4-13. Counts taken April, 2016
46
1,630
1,182
590
298
279
1,390
Ox Yoke Lake
Whaletail Lake
Dutch Lake
Lake Minnetonka
N
0
3,500
Feet
WSB

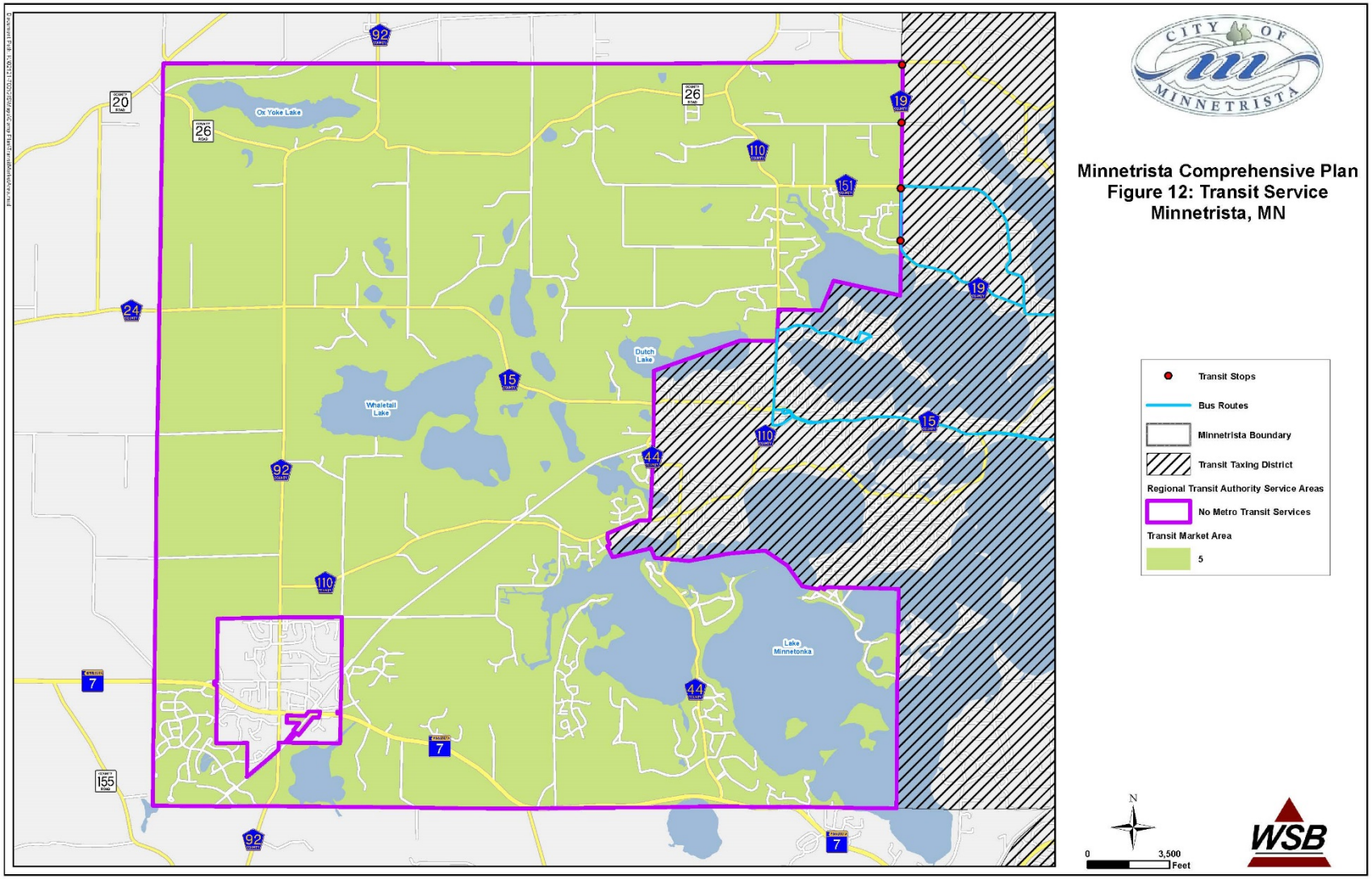
6. Transit

The City of Minnetrista is not in the Transit Capital Levy District as shown in the 2040 TPP. The TPP further classifies the metropolitan area into transit markets based on demographic and urban design factors. Minnetrista is located within Transit Market Area V, which indicates that the City has very low population and employment densities. However, there are several bus stops within the City along CSAH 19, and there is a park and ride located in the City of Mound, as shown on **Figure 12**. The bus routes serving this area are described below.

- Route 674: Limited stop commuter service between Maple Plain, Orono, Wayzata, and downtown Minneapolis
- Route 675: Limited stop express service between Mound, Spring Park, Wayzata, Minnetonka, Golden Valley, St. Louis Park, and downtown Minneapolis
- Route 677: Limited stop commuter service between Mound, Orono, Minnetonka, and downtown Minneapolis

In addition to these fixed-route transit options, the City is served by Hennepin County Transit Link, a dial-a-ride service for the general public. Transit Link provides connections to destinations within Hennepin County. Transit Link also connects to regular route transit for trips within the metro area, including outside of Hennepin County. Minnetrista residents also have opportunities to participate in the Metro Vanpool program. This program provides financial assistance for vanpools to serve areas with limited regular-route transit service.

The TPP's transit investment plan does not show any transitway investments planned for Minnetrista in the current revenue scenario.


Minnetrista Comprehensive Plan
Figure 12: Transit Service
Minnetrista, MN
Transit Stops
Bus Routes
Minnetrista Boundary
Transit Taxing District
Regional Transit Authority Service Areas
No Metro Transit Services
Transit Market Area
5
Ox Yoke Lake
Whaletail Lake
Dutch Lake
Lake Minnetonka
0
3,500
Feet
N
WSB

7. Aviation

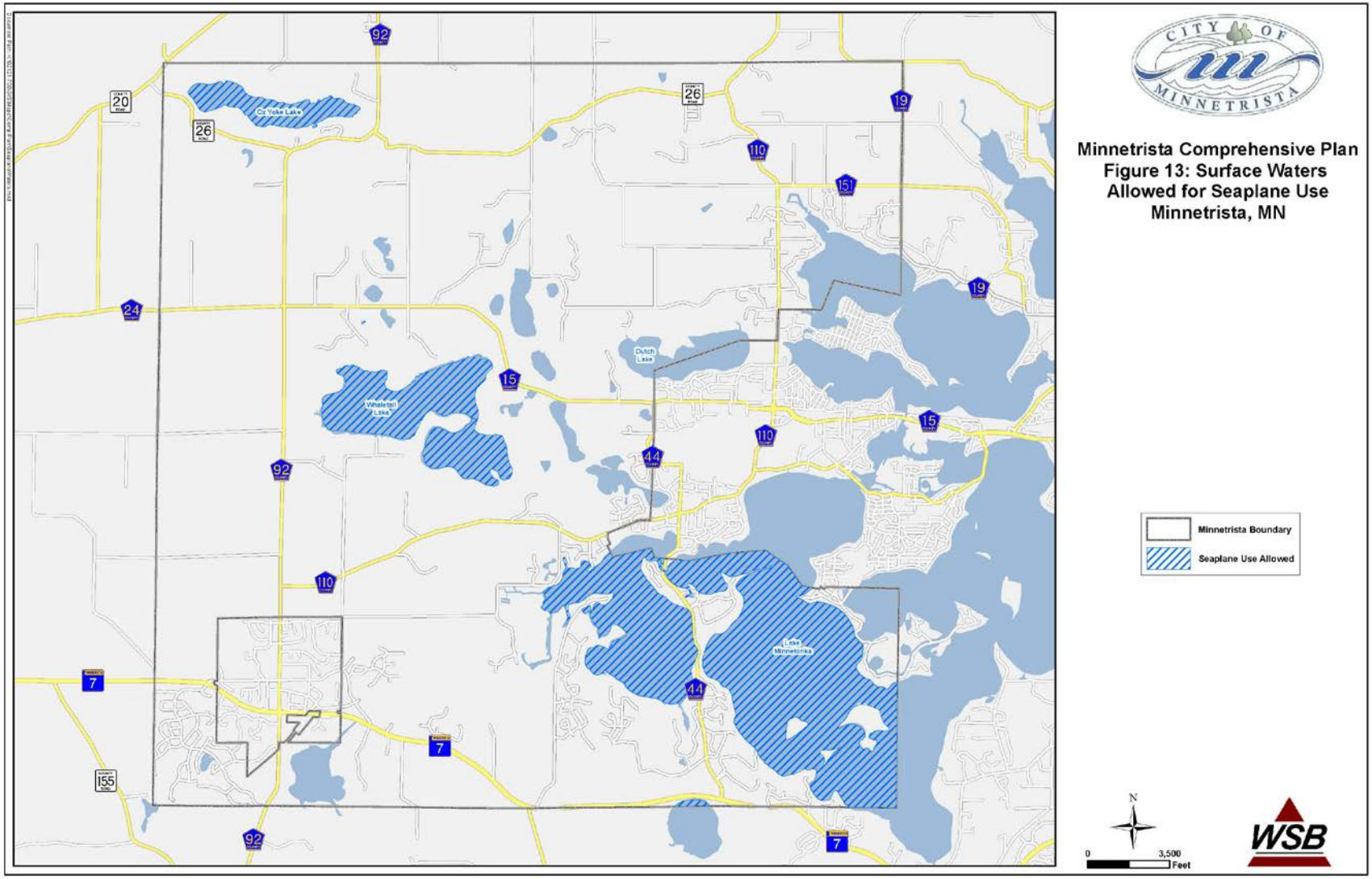
There are currently no existing or planned aviation facilities within the City of Minnetrista. However, the City is responsible for airspace protection in order to reduce hazards to air travel within the region. The closest public use airports to Minnetrista are:

- Flying Cloud Airport, approximately 10 miles southeast of Minnetrista
- Minneapolis Crystal Airport, approximately 15 miles northeast of Minnetrista

Based on the distance to the nearest airports, there are no radio beacons or other air navigation aids located in off-airport locations in Minnetrista. The City is not within the area of influence of any of the airports identified above, and is therefore not subject to associated land use restrictions. Seaplane use is designated and allowed by MnDOT on the following surface waters within Minnetrista, as shown on **Figure 13**—Whaletail Lake, Ox Yoke Lake, and the portions of Lake Minnetonka within the City of Minnetrista.

Any person or organization who intends to sponsor the construction or alteration of a structure affecting navigable airspace as defined in Federal Regulation Title 14; Part 77 needs to inform the Federal Aviation Agency (FAA) of the project. This notification is accomplished through the completion and submittal to FAA of Form 7460-1, Notice of Proposed Construction or Alteration. In Minnetrista, this requirement applies to any construction or alteration exceeding 200 feet above ground level. The City's zoning code allows a maximum structure height of 200 feet; therefore it is unlikely that any structures in the City will require FAA notification.

There are currently no heliports in Minnetrista or any known plans to construct one.


Minnetrista Comprehensive Plan
Figure 13: Surface Waters
Allowed for Seaplane Use
Minnetrista, MN
Minnetrista Boundary
Seaplane Use Allowed
Ox Yoke Lake
Whaleboil Lake
Dutch Lake
Lake Minnetonka
N
0
3,500
Feet
WSB

8. Goals, Objectives, and Multimodal Strategies

This Plan, and the City's actions over the next 20 years, will be guided by the following transportation goals, objectives, and strategies.

8.1. Goals and Objectives

Table 8 displays the goals and objectives of the Minnetrista Transportation Plan. The goals listed below represent the City's overall vision for transportation over the next 20 years. The objectives listed below provide guidance that the City can use to reach the transportation goals.

8.2. Multimodal Strategies

The multimodal strategies listed in this section are specific, actionable steps that the City can take in support of the goals and objectives of this Plan. These strategies are based upon existing and future transportation needs as described in detail in the previous sections of this Plan.

The multimodal strategies are broken into several categories:

1. Roadway Safety/Operations/Capacity
2. Roadway Functional Classification
3. Roadway
4. Transit
5. Bicycle/Pedestrian
6. Freight

Each strategy is tied to one or multiple objectives. **Table 9** on the following pages describes each strategy, notes which objective(s) is/are related to each strategy and the lead agency for the strategy. **Figure 14** following the table illustrates the strategies geographically with reference numbers tied back to the table information.

Table 8: City of Minnetrista Transportation Goals and Objectives

Goals	Objectives
1. Facilitate efficient movement of people within and through the City	1.1. Improve local roadway system connectivity to county roadways and state highways.
	1.2. Provide safe and efficient routes for emergency and public safety vehicles.
	1.3. Provide adequate capacity to relieve congestion.
	1.4. Encourage sound access management.
	1.5. Preserve necessary rights-of-way for the 20-year planning horizon and beyond.
2. Facilitate efficient movements of goods within and through the City	2.1. Maintain a safe and effective network of roadways for freight movement.
	2.2. Coordinate with MnDOT and Hennepin County to proactively address freight safety.
3. Provide a transportation system that is integrated with land use and development	3.1. Coordinate transportation system investments with the Minnetrista Land Use Plan.
	3.2. Connect land use districts and provide safe access to major activity areas.
	3.3. Design, construct, and maintain roadways that fit the character of the adjacent land use (rural vs. urban development areas).
	3.4. Require private residential streets be designed to City standards.
4. Improve transportation safety for all users and modes of transportation	4.1. Implement safety improvements to address high crash locations
	4.2. Proactively address bicycle and pedestrian safety concerns along roadways and at crossings.
	4.3. Bring sidewalks, trails, and intersections into compliance with ADA.
	4.4. Support traffic calming and design to minimize speed on minor City collectors and local roadways.
5. Develop a safe and convenient multimodal transportation system	5.1. Invest in multi-modal transportation solutions including bicycle and pedestrian infrastructure.
	5.2. Preserve adequate right of way for sidewalk and trail construction.
6. Conserve and enhance environmental resources	6.1. Support investments in bicycle, pedestrian, and transit infrastructure to reduce environmental impacts of transportation.
	6.2. Manage storm water effectively and minimize the construction of new impervious surfaces.
	6.3. Support native plant landscapes along roadways.
	6.4. Design new roadways to preserve natural features.
7. Maintain the Existing Transportation System	7.1. Regularly assess transportation maintenance needs and include roadway, trail pavement, and other transportation infrastructure maintenance in the Minnetrista Capital Improvement Plan.

Table 9: Transportation Strategies

Location	Type of Improvement	Strategy	Map Reference	Lead Agency	Objective(s)
CSAH 92/TH 7	Safety/Operations	Evaluate solutions to improve safety, per the Hennepin County Transportation Plan	1	MnDOT/Hennepin County	4.1
CSAH 92/ CSAH 15	Safety/Operations	Evaluate solutions to improve safety and conduct intersection control study, per the Hennepin County Transportation Plan	1/12	Hennepin County	4.1
CSAH 92/ CR 26	Safety/Operations	Evaluate solutions to improve safety	1	Hennepin County	4.1
CR 26 from CSAH 110 to CSAH 92	Safety/Operations	Evaluate solutions to improve safety, per the Hennepin County Transportation Plan	1	Hennepin County	4.1
CR 26/ CSAH 110	Safety/Operations	Evaluate solutions to improve safety	1	Hennepin County	4.1
CSAH 151 just east of CSAH 110	Safety/Operations	Evaluate solutions to improve safety, per the Hennepin County Transportation Plan	1	Hennepin County	4.1
Kingswood Road/CSAH 15	Safety/Operations	Evaluate intersection improvement solutions to improve safety	1	City of Minnetrista	4.1

Table 9: Transportation Strategies (continued)

Location	Type of improvement	Strategy	Map Reference	Lead Agency	Objective(s)
Kingswood Road/Game Farm Road	Safety/Operations	Evaluate solutions to address skewed alignment	1	City of Minnetrista	4.1
CSAH 151/ Maple Crest Drive	Safety/Operations	Evaluate solutions to address vertical alignment issues	1	City of Minnetrista	4.1
CSAH 44/ Lotus Drive	Safety/Operations, Bike/Pedestrian	Evaluate the need for turn lanes and bike trail improvements	8	City of Minnetrista/ Hennepin County	3.1,4.2,5.1,6.1
CSAH 92 near Hennepin-Carver County Line	Safety/ Operations	Evaluate the need for potential turn lanes or operational improvements	9	Carver County	3.1
TH 7/ Merrywood Lane	Safety/ Operations	Evaluate the need for intersection control improvements	10	City of Minnetrista/ MnDOT	3.1
CSAH 110/ Halstad Drive	Safety/ Operations	Evaluate the need for potential turn lanes	11	City of Minnetrista/ Hennepin Co.	3.1

Table 9: Transportation Strategies (continued)

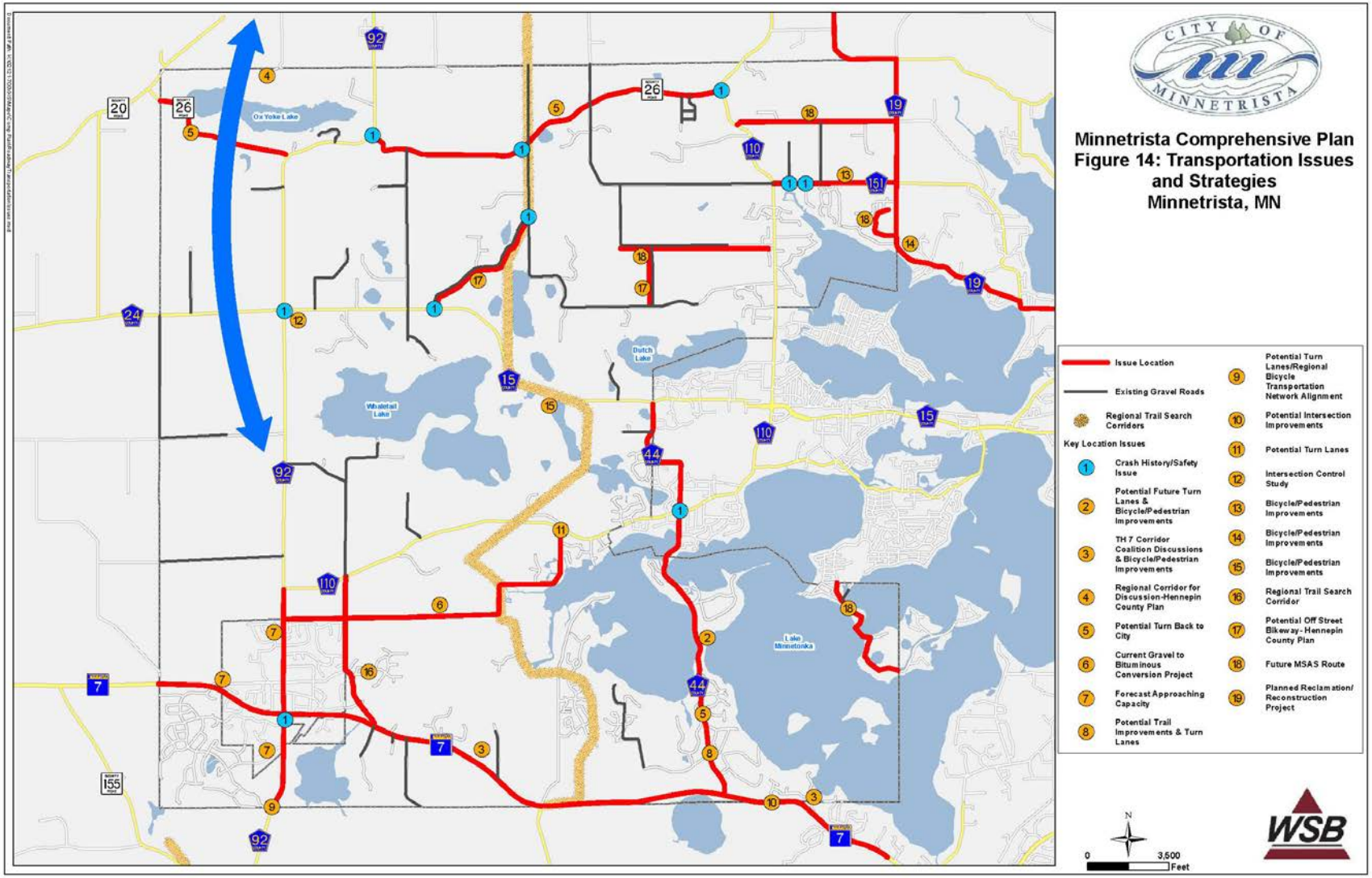
Location	Type of improvement	Strategy	Map Reference	Lead Agency	Objective(s)
CSAH 44	Safety/ Operations, Bike/Pedestrian	Evaluate the need for turn lanes and bike/pedestrian improvements along the corridor from Bartlett Boulevard to TH 7	2	Hennepin County	3.1, 4.2, 5.1,6.1
TH 7	Safety/ Operations/ Capacity	Explore interest of Cities of Minnetonka, Greenwood, Excelsior, Shorewood, Victoria, Chanhassen, St. Bonifacius, Carver County and Hennepin County to establish a TH 7 Corridor Coalition	3	City of Minnetrista and others as noted	1.2, 1.3, 2.1,2.2, 3.1,4.1
Western Minnetrista	New Roadway	Evaluate the need for a new regional corridor, per the Hennepin County Transportation Plan	4	Hennepin County	1.2, 1.3, 2.1, 3.1
CR 26 west of CSAH 110 (excludes CSAH 92 section)	Turnback	Explore potential turnback from Hennepin County to City of Minnetrista, per Hennepin County Transportation Plan	5	Hennepin County	n/a
CSAH 44 north of TH 7	Turnback	Explore potential turnback from Hennepin County to City of Minnetrista	5	Hennepin County	n/a

Table 9: Transportation Strategies (continued)

Location	Type of improvement	Strategy	Map Reference	Lead Agency	Objective(s)
Kingswood Road from CSAH 15 to Game Farm Rd.	MSAS Route Designation	Designate as an MSAS Route	19	City of Minnetrista	3.1
Blair Road from Game Farm Road to Sunnyvale Road	Reconstruction and MSAS designation	Designate as an MSAS Route. Gravel road to be reconstructed to MSAS standard	19, 20	City of Minnetrista	3.1, 3.3
Halstead Dr from CSAH 110 to CSAH 92	Gravel to Bituminous Conversion	This project is currently scheduled for construction	6	City of Minnetrista	3.3
Enchanted Lane	Roadway Reclamation	This project is currently scheduled for 2017 construction	20	City of Minnetrista	3.3
Tuxedo Road	Roadway Reclamation	This project is currently scheduled for 2017 construction	20	City of Minnetrista	3.3
North Arm Drive	Roadway Reconstruction	Roadway to be reclaimed or reconstructed	20	City of Minnetrista	3.3
Sunnyfield Rd. E.	Roadway Recon.	Gravel road reconstructed to MSAS standard	20	City of Minnetrista	3.3

Table 9: Transportation Strategies (continued)

Location	Type of improvement	Strategy	Map Reference	Lead Agency	Objective(s)
Grandview Avenue	Roadway Reclamation	This project is currently scheduled for 2017 construction	20	City of Minnetrista	3.3
CSAH 92 and TH 7 in St. Bonifacius	Capacity	Forecasted traffic counts approaching capacity – monitor; no action required at this time, include consideration of bicycle/pedestrian crossings	7	Hennepin County/ MnDOT/City of Bonifacius/City of Minnetrista	1.3
CSAH 44 from CSAH 15/ Lynwood Blvd. to CSAH 110/ Bartlett Blvd.	Bicycle/Pedestrian Improvements	Consider bicycle/pedestrian improvements	14	Hennepin County/City of Minnetrista	3.1, 4.2, 5.1, 5.2
W Branch Road from CSAH 110/ Commerce Blvd. and CSAH 19/ North Shore Dr.	Bicycle/Pedestrian Improvements	Consider bicycle/pedestrian improvements	15	City of Minnetrista	3.1,4.2,5.1,5.2
CSAH 19/North Shore Dr. (Entire Length)	Bicycle/Pedestrian Improvements	Consider bicycle/pedestrian improvements	16	Hennepin County/City of Minnetrista	3.1,4.2,5.1,5.2
Coordination with City of Orono	Bicycle/Pedestrian Improvements	Work with the City of Orono regarding bicycle/pedestrian improvements along Shadywood Road and connections to Lake Independence Regional Trail	N/A	City of Minnetrista	3.1,4.2,5.1,5.2


Minnetrista Comprehensive Plan
Figure 14: Transportation Issues and Strategies
Minnetrista, MN
Issue Location
Existing Gravel Roads
Regional Trail Search Corridors
Key Location Issues
1 Crash History/Safety Issue
2 Potential Future Turn Lanes & Bicycle/Pedestrian Improvements
3 TH 7 Corridor Coalition Discussions & Bicycle/Pedestrian Improvements
4 Regional Corridor for Discussion-Hennepin County Plan
5 Potential Turn Back to City
6 Current Gravel to Bituminous Conversion Project
7 Forecast Approaching Capacity
8 Potential Trail Improvements & Turn Lanes
9 Potential Turn Lanes/Regional Bicycle Transportation Network Alignment
10 Potential Intersection Improvements
11 Potential Turn Lanes
12 Intersection Control Study
13 Bicycle/Pedestrian Improvements
14 Bicycle/Pedestrian Improvements
15 Bicycle/Pedestrian Improvements
16 Regional Trail Search Corridor
17 Potential Off Street Bikeway - Hennepin County Plan
18 Future MSAS Route
19 Planned Reclamation/ Reconstruction Project
Ox Yoke Lake
Whaletail Lake
Dutch Lake
Lake Minnetonka
N
0
3,500
Feet
WSB

9. Proposed Short and Long Range Roadway Projects

The sections below identify proposed short and long range roadway projects based on the capacity and operations analyses or land use and development. This section does not include information on proposed projects from the 2040 TPP, as the TPP does not include any planned improvements to principal arterials in Minnetrista. No interchanges, MnPASS lanes, dedicated busways, or bus-only shoulders are proposed in the 2040 TPP.

9.1.1. Proposed Project from CIPs

The City's CIP has identified several roadway projects for funding over the next decade. Halstead Drive from CSAH 110 to CSAH 92 will be converted from a gravel surface to a bituminous surface. Blair Road and Sunnyfield Road east have been identified as gravel roads to be reconstructed to MSAS standards. Roadway reclamation is planned along Enchanted Lane, Tuxedo Road, and Grandview Avenue in 2017. North Arm Drive will also be reclaimed or reconstructed. These projects identified in the City's CIP are currently scheduled for construction between 2017 and 2024. Additionally, Hennepin County has identified a future reconstruction project along CR 44 through the City of Minnetrista. This roadway has been identified for potential turn lane and bike trail improvements in conjunction with this reconstruction project.

9.1.2. Proposed Projects based on Design/Safety Issues

A number of intersections within the City have been identified as having design issues that should be evaluated for improvements. Many of these locations have been identified in the Hennepin County Transportation Plan, as they involve County roadways. They include the intersections of CSAH 92 and TH 7 (in St. Bonifacius), CSAH 92 and CSAH 15, CSAH 92 and CR 26, and CR 26 and CSAH 110. Two roadway segments have also been identified as an area for evaluation of safety/operations: CR 26 from CSAH 110 to CSAH 92 and CSAH 151 just east of CSAH 110.

9.1.3. Proposed Projects based on Land Use and Development

Transportation needs in the City will shift as development occurs. Narrow rural roadways, paved or unpaved, may no longer be suitable in certain areas. Additionally, there may be areas where development occurs and requires new connecting roadways to ensure that roadways and intersections can accommodate additional traffic volumes. The City of Minnetrista would also like to explore interest of the Cities of Minnetonka, Greenwood, Excelsior, Shorewood, Victoria, Chanhassen, St. Bonifacius, Carver County and Hennepin County to establish a TH 7 Corridor Coalition to evaluate safety, operation and congestion issues that are expected to become a growing problem over time along this corridor.

10. Public Comments

Draft transportation plan strategies were presented for public comment at an open house meeting. Meeting attendees were asked to identify their top priorities for the transportation plan and provide comments about specific strategies or transportation issues. Specific issues identified include adding bicycle and/or pedestrian improvements on the following sections of roadway:

- CSAH 44 between CSAH 15/Lynwood Boulevard and CSAH 110/Bartlett Boulevard
- CSAH 151 (West Branch Road) between CSAH 110 (Commerce Boulevard) and CSAH 19 (North Shore Drive)
- Entire length of CSAH 19 (North Shore Drive) through the City

There was an additional comment requesting that the City work with the City of Orono for bicycle/pedestrian improvements to Shadywood Road and connections to the Lake Independence Regional Trail.

11. Conclusion and Next Steps

The purpose of this Transportation Plan is to set a multimodal transportation vision for the City of Minnetrista through the year 2040. Goals, objectives and specific strategies have been identified collaboratively by the City, Hennepin County, MnDOT and citizens within the framework of Metropolitan Council requirements. The vision and associated strategies outlined in this Plan were established by considering existing and forecasted conditions, City of Minnetrista priorities, regional travel patterns and a variety of other factors.

As the owners of the transportation network in the City of Minnetrista (i.e. City of Minnetrista, Hennepin County, MnDOT, Three Rivers Park District, and DNR) advance their respective Capital Improvement Programs (CIPs), this Plan is intended to serve as an important resource and reference in establishing priorities and advancing transportation projects for implementation. Advancing these projects from a planning to implementation phase will require collaborative discussions among the City, County, MnDOT, adjacent communities, Met Council, residents and others to conduct traffic studies, finalize designs, preserve rights-of-way, obtain environmental clearances and leverage necessary financial resources. **Figure 15** on the following page outlines the entire planning and project development process required for transportation projects from concept plans to construction implementation.

Figure 15
Transportation Planning Process

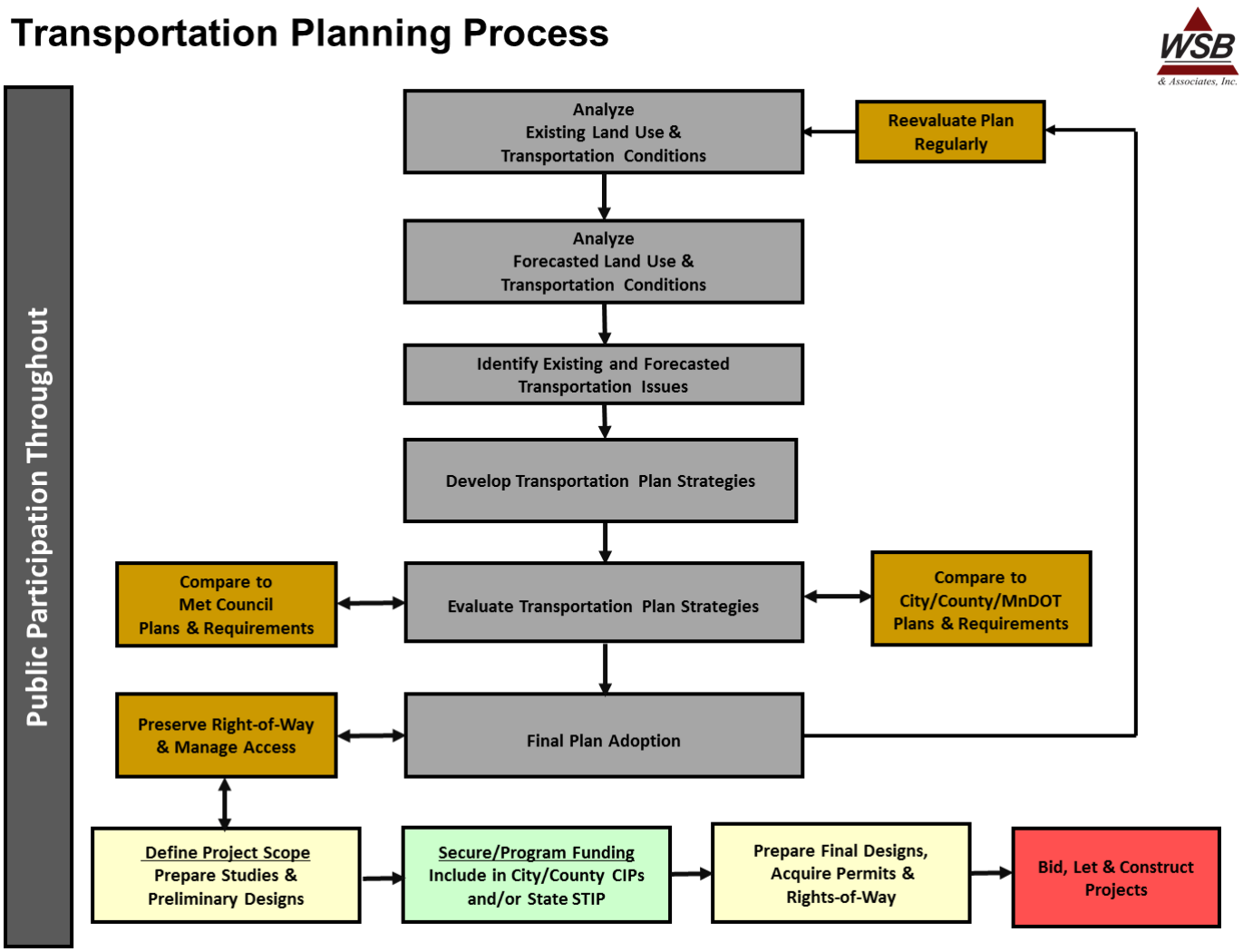


TABLE OF CONTENTS

INTRODUCTION

The City of Minnetrista is required to prepare a Comprehensive Plan that aligns with the Metropolitan Council's Metropolitan System Plan every ten years per Minnesota Rule 473.858. An important part of the Comprehensive Plan is the Sanitary Sewer Plan, which describes the existing sanitary sewer system and outlines the timing and sequence of future improvements. The Sanitary Sewer Plan allows the City and Metropolitan Council to build and improve their sanitary sewer collection and treatment systems so that development can occur in the most efficient and cost-effective manner. This document serves as the sanitary sewer component for the City of Minnetrista's 2040 Comprehensive Plan.

The City of Minnetrista's Sanitary Sewer Plan was developed to align with the Metropolitan Council's Thrive MSP 2040 Water Resources Policy Plan. The Thrive MSP 2040 Plan was approved in May 2015 and outlines regional goals for the wastewater system, including environmental sustainability, water reuse, and water conservation. Additionally, the Thrive MSP 2040 Plan includes population, household, and employment projections, and projected wastewater flows.

As a result of projected population increases and land use changes in Minnetrista, the Metropolitan Council estimates that sanitary sewer flows will increase by approximately 47% by the year 2040. This Sanitary Sewer Plan outlines the locations in which the Metropolitan Council can expect to see increased wastewater flows, allowing the Council to determine if capacity upgrades will be required at regional wastewater treatment plants and interceptors. This plan also serves as a guiding document for City infrastructure improvements and expansion.

BACKGROUND

The City of Minnetrista is located in western Hennepin County and is bordered by Independence to the north, Orono to the northeast, Mound to the east, and Victoria to the southeast. The City of St. Bonifacius is 685 acres and is completely contained within Minnetrista. The City of Minnetrista is primarily residential and agricultural, and approximately 16% of the City is covered by lakes, wetlands, and floodplains.

Minnetrista has been designated primarily as a diversified rural community. This designation indicates that the Metropolitan Council expects that the majority of Minnetrista will maintain a “rural lifestyle” and may become urbanized after 2040. The northeast, southeast, and southwest corners of the City are designated as an emerging suburban edge, signifying that they are in the early stages of transitioning into urbanized development. For the last decade, Minnetrista’s emerging suburban edge has been a region of focus in regards to the expansion and maintenance of municipal services. Thus, this Comprehensive Sewer Plan focuses on the needs and future plans of this region of Minnetrista.

EXISTING SANITARY SEWER SYSTEM

Public Collection Systems

The City of Minnetrista's existing sanitary sewer system collects and conveys wastewater within five Metropolitan Council Environmental Services (MCES) meter service areas: M423, M426, M436, M439, and M455. A summary of the existing lift stations is presented in **Table 1**, and a map of the existing sanitary sewer system is shown in ***Figure 1,*** as follows.

Service Area M423 in central Minnetrista includes two residential developments to the north of Halsted Bay along County Road 110 West. Flow from these developments is directed to MCES Lift Station L38 and is pumped south along County Road 44 to a MCES interceptor sewer near the intersection of County Road 44 and Highway 7. The flow from this area is expected to increase with new medium density residential development.

Service Area M426 in northeast Minnetrista includes the residential developments to the north of Jennings Bay and around Mound Westonka High School along County Road 110 North. Flow from this area is conveyed south through the City of Mound to MCES Lift Station L25, then west to MCES Lift Station L38, and finally south to the interceptor sewer at Highway 7. The flow from this area is expected to increase with new low density residential development.

Service Area M436 in southwest Minnetrista includes two residential developments on either side of the City of St. Bonifacius along Highway 7. Flow from these areas, including that from St. Bonifacius, is conveyed east to MCES Lift Station L24 and is then pumped through the forcemain running along Highway 7 to the interceptor located near the County Road 44 intersection. The flow from these areas is expected to increase significantly due to new commercial and low and high density residential developments.

Service Area M439 in southeast Minnetrista includes the development north of Highway 7 and west of Lake Minnetonka out to Kings Point Road. Nearly all of the flow from this area is collected in lift stations that pump into the MCES forcemain along County Road 44. A small portion on the north end of Kings Point Road is conveyed to Lift Station 4 for discharge into the MCES forcemain along Highway 7. The flow from this area is expected to increase with new retail-commercial development along Highway 7 and low and medium density residential development along Kings Point Road.

Service Area M455 in the southeast corner of Minnetrista includes the small area on Lake Minnetonka along Phelps Bay. Flow from this area is pumped north through Mound through a series of MCES Lift Stations to Lift Station L25, then west to MCES Lift Station L38, and finally south to the interceptor sewer at Highway 7. The flow from this area is not expected to increase since it is fully developed.

All wastewater collected in the City of Minnetrista is conveyed through the MCES system to the MCES Blue Lake Wastewater Treatment Plant (WWTP) in the City of Shakopee. The Blue Lake WWTP has a capacity of 38 MGD, provides primary and secondary treatment, and discharges treated effluent to the Minnesota River.

Table 1. Existing Lift Station Summary

Lift Station	Year Constructed	Pumping Capacity (gpm)	Location
1	1973	489	Cty Rd 110 & Sunnybrook Cir
2	1973	356	Cty Rd 110 & Painters Creek
3	1973	135	Minneapolis Ave
4	1973	449	Kings Point Rd
5	2000	581	Saunders Lake Dr
6	1994	646	Trillium Ln
7	1973	286	Lakeview Dr
8	1973	327	Cty Rd 44 north of Loring Dr
9	1973	122	Cty Rd 44 west of Maple Forest
10	1973	199	Hardscrabble Cir
11	1973	102	Cty Rd 44 & Hardscrabble Cir
12	1973	132	Halstead Dr
13	1973	408	Halstead Ave
14	2002	Flow Monitor	Glacier Rd
15	1973	82	Tuxedo Rd & Enchanted Ln
16	2003, moved in 2007	147	Games Tr
17	1973	94	Cedar Point Rd
18	2002	Flow Monitor	Partridge Rd
19	2007	70	Palmer Pointe Rd

The pumping capacities listed in **Table 1** were determined with pump down tests performed by City staff and WSB & Associates in conjunction with a 2011 update to the City's Sanitary Sewer Plan. When the lift station has two pumps, the pumping capacity listed is the lower of the two tested capacities to be conservative.

Table 2 lists the estimated existing peak flow to each lift station and the remaining capacity at each based on its pumping capacity.

Table 2. Existing Lift Station Capacity

Lift Station	Pumping Capacity (gpm)	Existing Peak Flow (gpm)	Remaining Capacity (gpm)
1	542	1,066	-524*
2	356	307	49
3	135	89	46
4	449	75	374
5	581	58	523
6	646	52	594
7	286	28	258
8	327	59	268
9	122	14	108
10	199	112	87
11	102	17	85
12	132	45	87
13	408	173	235
14	Flow Monitor	59	N/A
15	82	4	78
16	147	5	142
17	94	3	91
18	Flow Monitor	261	N/A
19	70	3	67

**The capacity of Lift Station 1 is recommended to be upsized, as described in the Sanitary Sewer Trunk Recommendations section. Lift Station 1 periodically receives approximately 300 gpm of backwash waste flow from the water treatment plant located on Game Farm Road.*

Table 3 lists the estimated existing peak flow to the system's trunk sewers (those of 10-inch diameter and greater) by meter service area.

Table 3. Existing Trunk Sewer Capacity

Meter Service Area	Location	Pipe Diameter (in)	Capacity (gpm)	Existing Peak Flow (gpm)	Remaining Capacity (gpm)
M423	Walnut Dr	12	600	58	542
	Westedge Blvd	12	800	636	164
M426	Westwood Ave	15	1,390	766	624
	Commerce Blvd	12	750	307	443
M439	Glacier Rd	10	520	59	461
	Highland Rd	24	2,800	419	2,381*
M455	Trillium Ln E	12	750	52	698
	Old County Rd	36	14,000	100	13,900*

**This MCES trunk gravity sewer also receives flow from St. Bonifacius.*

***This MCES trunk gravity sewer also receives flow from several other communities.*

Individual Sewage Treatment Systems

Much of the City of Minnetrista is served by individual sewage treatment systems (ISTS's, septic systems, or on-site sewer treatment systems), especially the northern and western regions of the City. A map of existing ISTS's in Minnetrista is shown in ***Figure 2,*** as follows. The City estimates that there are 656 ISTS currently operational within the City limits. The section of Minnetrista City Code regarding ISTS's, Chapter 5: Planning and Land Use, is consistent with Minnesota Pollution Control Agency (MPCA) regulations (Minnesota Rules Chapters 7080-7083). A portion of this ordinance is excerpted below. The provisions also specify technical standards, site evaluations, sizing requirements, and minimum setbacks from floodplains and wetlands for individual systems.

> *Subd. 9. Administration.*
>
> *(a) Permit required. A permit issued by the city council/building inspector shall be secured prior to the erection, addition, modification, rehabilitation (including normal maintenance and repair), or alteration of any building or structure or portion thereof; prior to the use or change of use of a building, structure, or land; prior to the construction of a dam, fence, or* ***on-site septic system****, prior to the change or extension of a nonconforming use, prior to the repair of a structure that has been damaged by flood, fire, tornado, or any other source, and prior to the placement of fill, excavation of materials or the storage of materials or equipment within the flood plain.*

ISTS inspections in the City of Minnetrista have been performed by Hennepin County since 2001. Every three years the County notifies homeowners to provide maintenance to their septic systems and submit inspection reports to the City. If a complaint is submitted about a septic system, Hennepin County is responsible for performing an inspection of the system. The site will be inspected from the street, and sewage problems need to be visible on the surface. The County actively inspects failing septic systems with sewage seeping out onto the ground (surface discharge), but does not actively inspect systems potentially contaminating groundwater. The County will only inspect a septic system on private property without the homeowner's permission if there is proof that the system outlets in a public street.

Community Treatment Systems

There are no public or private community treatment systems within the City of Minnetrista. All properties in the City are served by either the public collection system or individual sewage treatment systems. Private treatment will be considered where preliminary treatment is necessary to reduce the contaminant load of waters or wastes per City Code, Chapter 7: Public Utilities, Section 710.07.

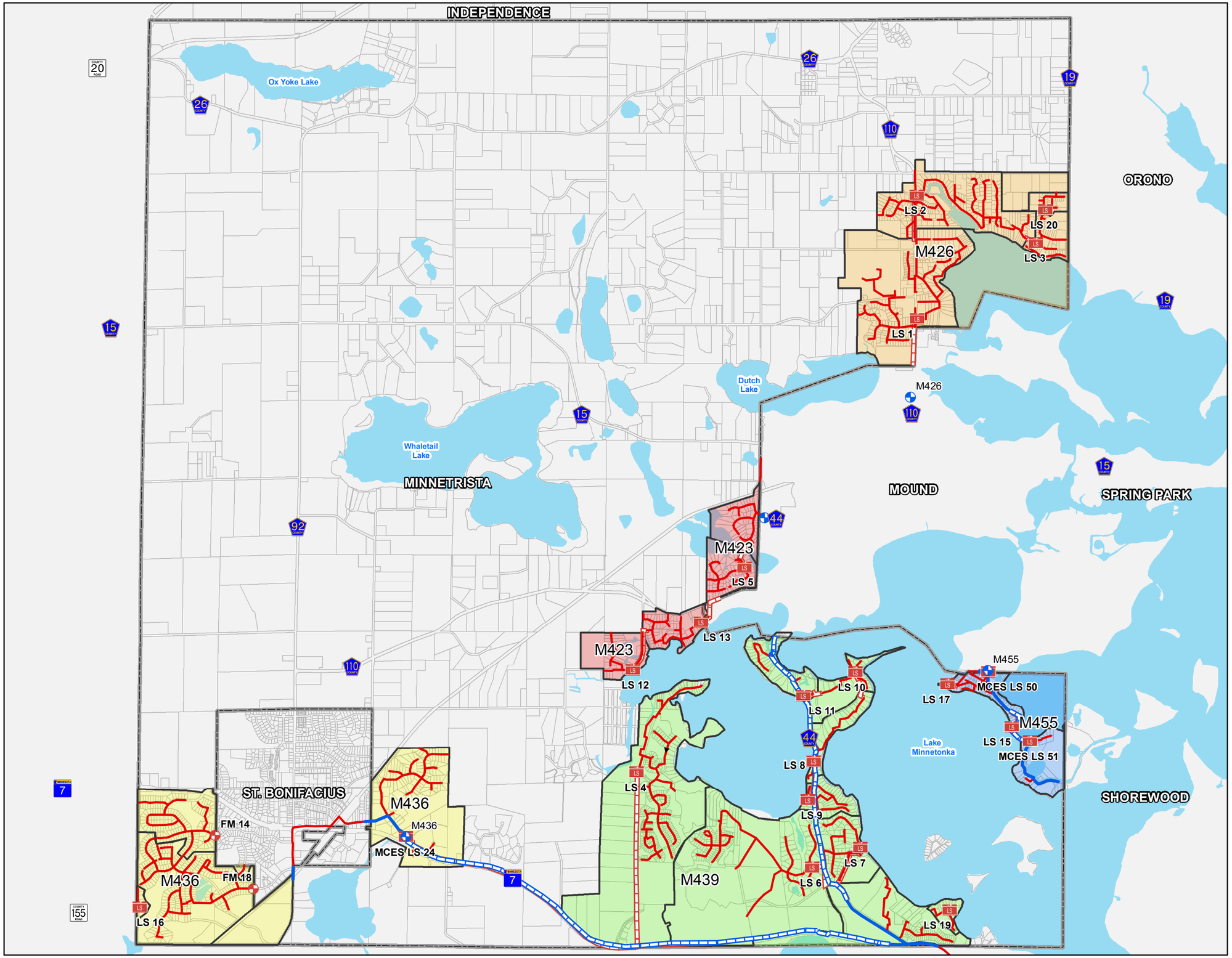


Figure 1
Existing Sanitary Sewer System

Comprehensive Sewer Plan
City of Minnetrista

Legend

- Existing Lift Station
- Existing Flow Meter
- Existing Gravity Main
- Existing Forcemain
- MCES Flow Meter
- MCES Gravity Main
- MCES Forcemain

Service Areas

Metersheds

- M423
- M426
- M436
- M439
- M455

N

0 3,200 Feet

WSB

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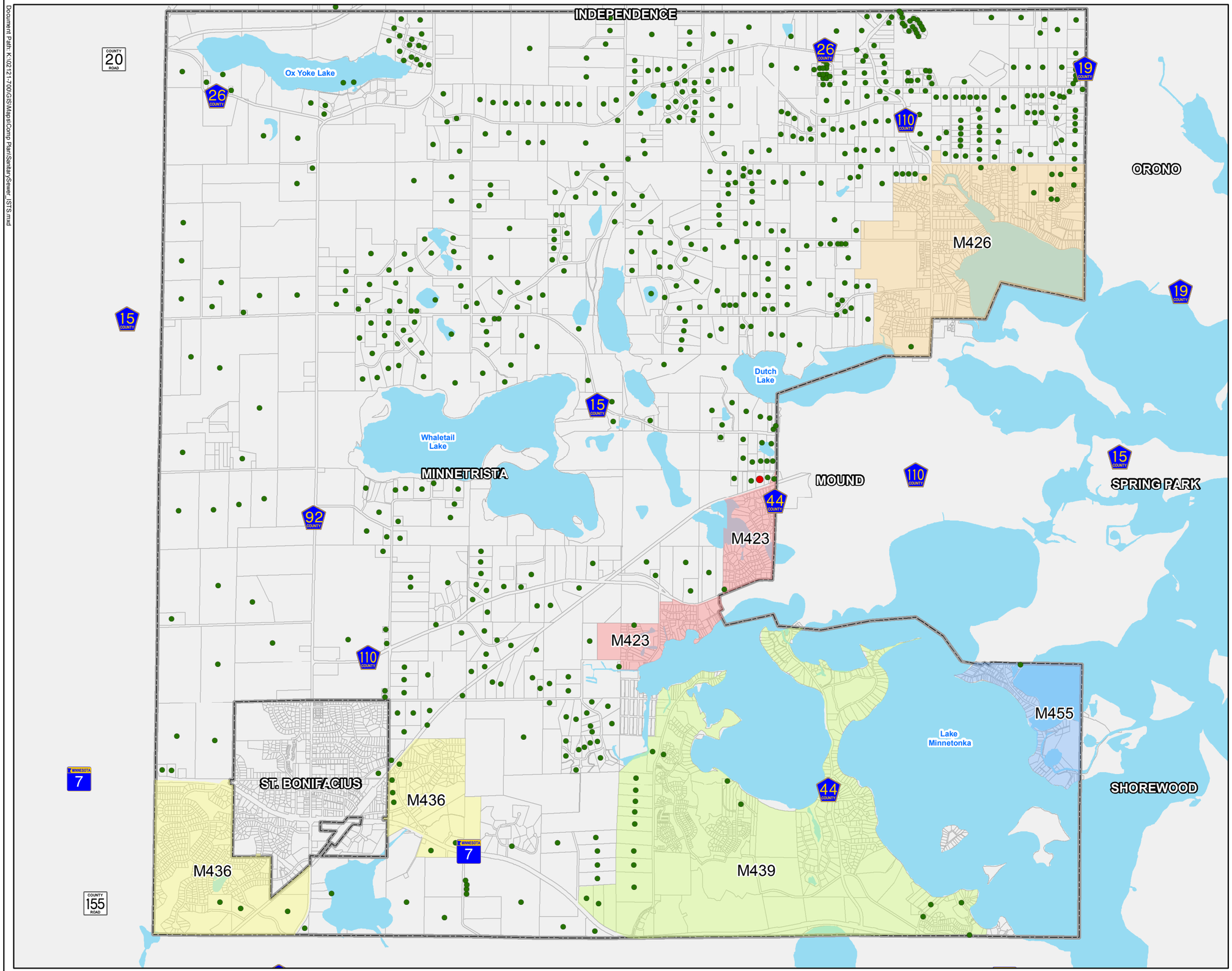


Figure 2
Individual Sewage Treatment Systems (ISTS)

Comprehensive Sewer Plan
City of Minnetrista

Legend

Individual Sewage Treatment System (ISTS)

- Compliant
- Non-Compliant
- Minnetrista Boundary

Service Areas

Metersheds

- M423
- M426
- M436
- M439
- M455

N

0 3,200 Feet

WSB

FORECASTS

Population

The Metropolitan Council publishes population and sewer usage forecasts for each city in the Metropolitan Area. These forecasts serve to help cities prepare infrastructure for growth and to promote continued maintenance of municipal infrastructure. The forecast data in **Table 4** is from the Metropolitan Council's Local Planning Handbook Community Page for Minnetrista and includes both total and sewered population, households, and employment. **Table 5** shows the division of household and employment forecasts by Meter Service Area through the year 2040.

Table 4. Population Projections - City of Minnetrista

	Total			Sewered		
Year	Population	Households	Employment	Population	Households	Employment
2010	6,384	2,176	665	4,770	1,626	360
2015*	7,192	2,538	693	5,360	1,888	375
2020	8,000	2,900	720	5,950	2,150	390
2025*	8,900	3,385	795	6,675	2,535	460
2030	9,800	3,870	870	7,400	2,920	530
2035*	10,900	4,435	945	8,325	3,385	605
2040	12,000	5,000	1,020	9,250	3,850	680

**Interpolated values*

Table 5. Sewered Projections by Meter Service Area

	M423		M426		M436		M439		M455	
Year	Hhds.	Empl.	Hhds.	Empl.	Hhds.	Empl.	Hhds.	Empl.	Hhds.	Empl.
2010	267	7	432	290	366	59	527	4	34	0
2015*	310	7	502	302	425	62	612	4	39	0
2020	321	7	539	302	563	72	687	9	40	0
2025*	337	7	594	302	766	96	797	55	41	0
2030	353	7	649	302	969	120	907	101	42	0
2035*	372	7	716	302	1,214	147	1,040	149	43	0
2040	391	7	783	302	1,459	175	1,173	196	44	0

**Interpolated values*

From the data in Table 2, it can be observed that the population of the City of Minnetrista is projected to increase considerably by the year 2040. This increase is expected primarily in the number of households, with some employment increase in M436 and M439.

Wastewater Flows

All of the existing sewage flow from the City of Minnetrista is treated at the Blue Lake WWTP. All of the anticipated growth in sewered population is expected to occur within or near the five existing meter service areas, and all of the increase in sewage flow will be treated at the Blue Lake WWTP as well. **Table 6** lists projected total average wastewater flow for Minnetrista from this Sanitary Sewer Plan and MCES. Note that the projections used in this report are significantly greater than the MCES projections since they rely on flow estimates for each parcel of developable land, rather than population estimates.

Table 6. Total Wastewater Projections

2020 Projected Flow (MGD)		2030 Projected Flow (MGD)		2040 Projected Flow (MGD)	
Sanitary Sewer Plan	MCES	Sanitary Sewer Plan	MCES	Sanitary Sewer Plan	MCES
0.38	0.34	0.56	0.41	0.74	0.47

Land Use

Analysis of the City of Minnetrista's sanitary sewer considered five general land use designations: agricultural, park/recreational, institutional, retail/commercial/industrial, and residential. Lake Minnetonka Regional Park, operated by the Three Rivers Park District, occupies a large portion of the M439 meter service area. The Westonka Public School facilities occupy a portion of the M426 meter service area. Regions of undeveloped land alongside agricultural land exist through the majority of the northwestern half of the City. Many of these land-type users have private sewage systems, so wastewater generation is not considered for these users. The two land uses of Commercial/Industrial and Residential located in the southeastern half of the city are the most populous users of the public sewage system.

Private Systems

A significant area of Minnetrista falls under the designation of diversified rural communities. Diversified rural communities are characterized by farm use, large-lot residential, clustered housing, and regional parks. These communities are often located adjacent to emerging suburban edges, as is the case in Minnetrista. The Metropolitan Council "discourages urbanized levels of residential development in diversified rural communities to avoid the premature demand for expansion of metropolitan systems and other urban public services" (Thrive MSP 2040). Thus, the majority of Minnetrista's diversified rural community continues to use private treatment systems.

SANITARY SEWER DESIGN CRITERIA

Land Use

The City's existing and 2040 land-use maps were used in the development of this plan. Detailed information and figures regarding Minnetrista's land use is included in the City's 2040 Comprehensive Land Use Plan. Using existing land-use, metering data, and future land use information, current and ultimate flows were calculated and divided by meter service area as described below.

Estimated Average Flows – Existing

To estimate the flows in trunk mains throughout the City, metering data was retrieved from the Metropolitan Council. Flows were assigned proportionally to each meter service area based on the acreage of agricultural, park/recreational, institutional, commercial/industrial, and residential land within each area and typical flows per acre for each particular land use.

Estimated Average Flows – 2040 Build Out

Once average flows were estimated, future flows were projected based on the planned 2040 land use in the Land Use Plan. Parcels that are planned to be developed were assigned wastewater flow rates in accordance to their land use type. **Table 7** lists the assigned flows, which include design considerations for inflow and infiltration (I/I) . (Refer to the Inflow and Infiltration section of this report for more information about I/I as it relates to Minnetrista's sanitary sewer system.)

Table 7. Assumed Wastewater Generation by Land Use Type

Land Use	Daily Flow (gallons/acre)
Agricultural	0
Industrial and Utility	800
Institutional	600
Manufactured Housing Park*	1,350
Multifamily	2,700
Office	800
Park	0
Commercial	800
Seasonal/Vacation**	360
Single Family Attached**	360
Single Family Detached**	360

*Assigned medium density residential

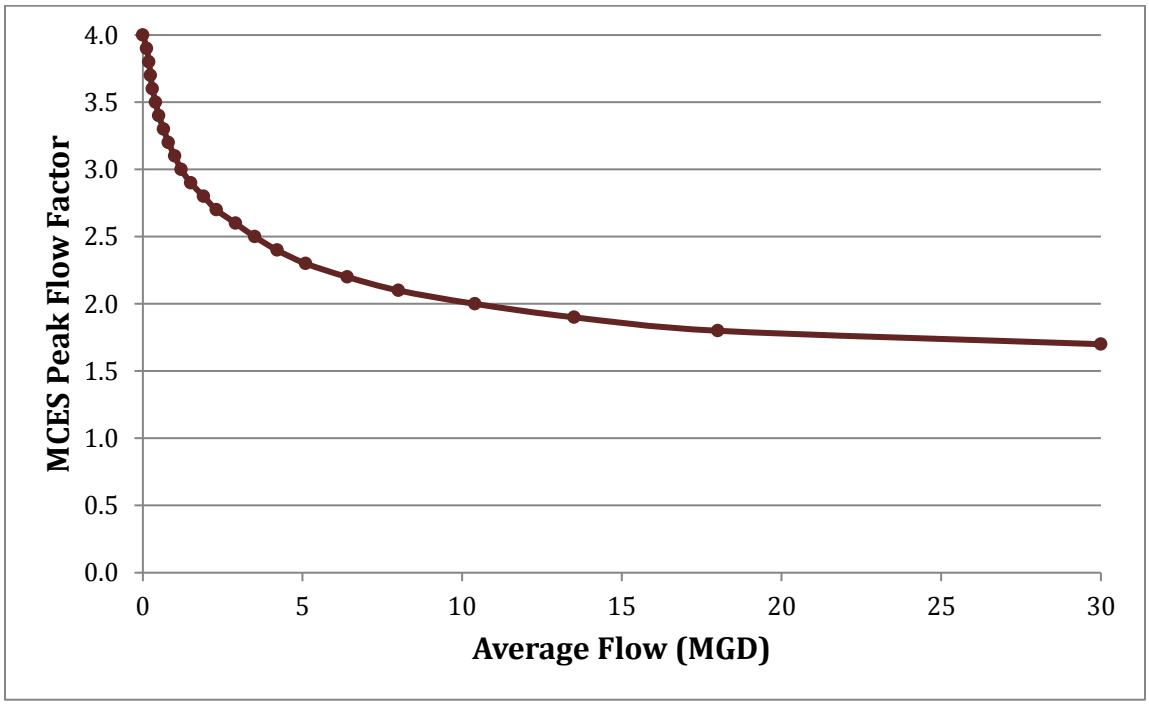
**Assigned low density residential

Future flows were added to existing flows to determine if existing pipe capacities will be sufficient. In locations in which development will lead to pipes that are under capacity, recommendations are made to address the issue. Areas that will need to be served in the future were evaluated to determine the required sewer diameters and improvements to serve these areas.

Peak Flow Factors

To ensure that the sanitary sewer system is capable of handling flow fluctuations throughout the day, peak flow factors are assigned based on average flows. The peak factors are outlined by the Metropolitan Council and are based on average flow volumes. Pipes that serve small generator customers are more likely to experience large fluctuations in flows. Therefore, the peak factor decreases as average flow increases. The Metropolitan Council peak flow factors used in this report are shown in ***Figure 3*** below. These factors include consideration of inflow and infiltration.

Figure 3. MCES Peak Factors for Sanitary Sewer Design



Intercommunity Flows

Minnetrista currently has interconnections with three other municipalities: St. Bonifacius, Mound, and Victoria. Wastewater flow from St. Bonifacius, completely contained in southwest Minnetrista, is collected at MCES Meter M436 and conveyed east to the MCES interceptor sewer near the intersection of Highway 7 and County Road 44. Flow from Mound, on the eastern border of Minnetrista, is collected at MCES Meter M423 and conveyed south to the same MCES interceptor sewer at Highway 7.

Flows collected at the MCES interceptor sewer at Highway 7 leave Minnetrista through its southeastern border and subsequently pass through Victoria, Shorewood, Chanhassen, and Eden Prairie on their way to the Blue Lake WWTP in Shakopee.

SANITARY SEWER TRUNK RECOMMENDATIONS

The proposed future sewer system for the City of Minnetrista, including meter service areas, gravity mains and forcemains, and required lift stations, is shown in ***Figure 4,*** as follows. The required infrastructure additions were determined based on the areas that the City is planning to develop by 2040. By evaluating topography and existing sewer invert elevations, the locations of future lift stations were approximated. The length of forcemain was minimized to the greatest extent possible to reduce construction costs. This report includes only oversized sewer lines (greater than 8-inch) and does not depict lateral lines. The design and siting for lateral lines should be completed in conjunction with development plans and platting. The location of such lines will be dependent on parcel layout and the design of new roads. It is possible that small scale lift stations will be required within developments.

The exact alignment of the proposed mains and lift stations may change during the design phase of each project. The purpose of this report is to provide the City with a document that can be used to plan for large infrastructure additions and replacements.

Table 8 lists the estimated 2040 peak flow to the system's trunk sewers (those of 10-inch diameter and greater) by meter service area.

Table 8. 2040 Trunk Sewer Capacity

Meter Service Area	Location	Pipe Diameter (in)	Capacity (gpm)	2040 Peak Flow (gpm)	Remaining Capacity (gpm)
M423	Walnut Dr	12	600	58	542
	Westedge Blvd	12	800	636	164
M426	Westwood Ave	15	1,390	804	586
	Commerce Blvd	12	750	328	422
M439	Glacier Rd	10	520	59	461
	Highland Rd	24	2,800	618	2,182*
M455	Trillium Ln E	12	750	67	683
	Old County Rd	36	14,000	129	13,871**
	Kings Point Rd	10	520	425	95

**This MCES trunk gravity sewer also receives flow from St. Bonifacius.*

***This MCES trunk gravity sewer also receives flow from several other communities.*

Table 9 lists the projected 2040 peak flow to each lift station and the remaining capacity at each based on its pumping capacity.

Table 9. 2040 Lift Station Capacity

Lift Station	Pumping Capacity (gpm)	2040 Peak Flow (gpm)	Remaining Capacity (gpm)
1	542	1,104	-562*
2	356	328	28
3	135	132	3
4	449	366	83
5	581	58	523
6	646	67	579
7	286	32	254
8	327	47	280
9	122	14	108
10	199	112	87
11	102	17	85
12	132	48	84
13	408	207	201
14	Flow Monitor	59	N/A
15	82	6	76
16	147	5	142
17	94	3	91
18	Flow Monitor	298	N/A
19	70	10	60
20	50	50	0
21	24	23	1

**The capacity of Lift Station 1 is recommended to be upsized, as described later in this section. Lift Station 1 periodically receives approximately 300 gpm of backwash waste flow from the water treatment plant located on Game Farm Road.*

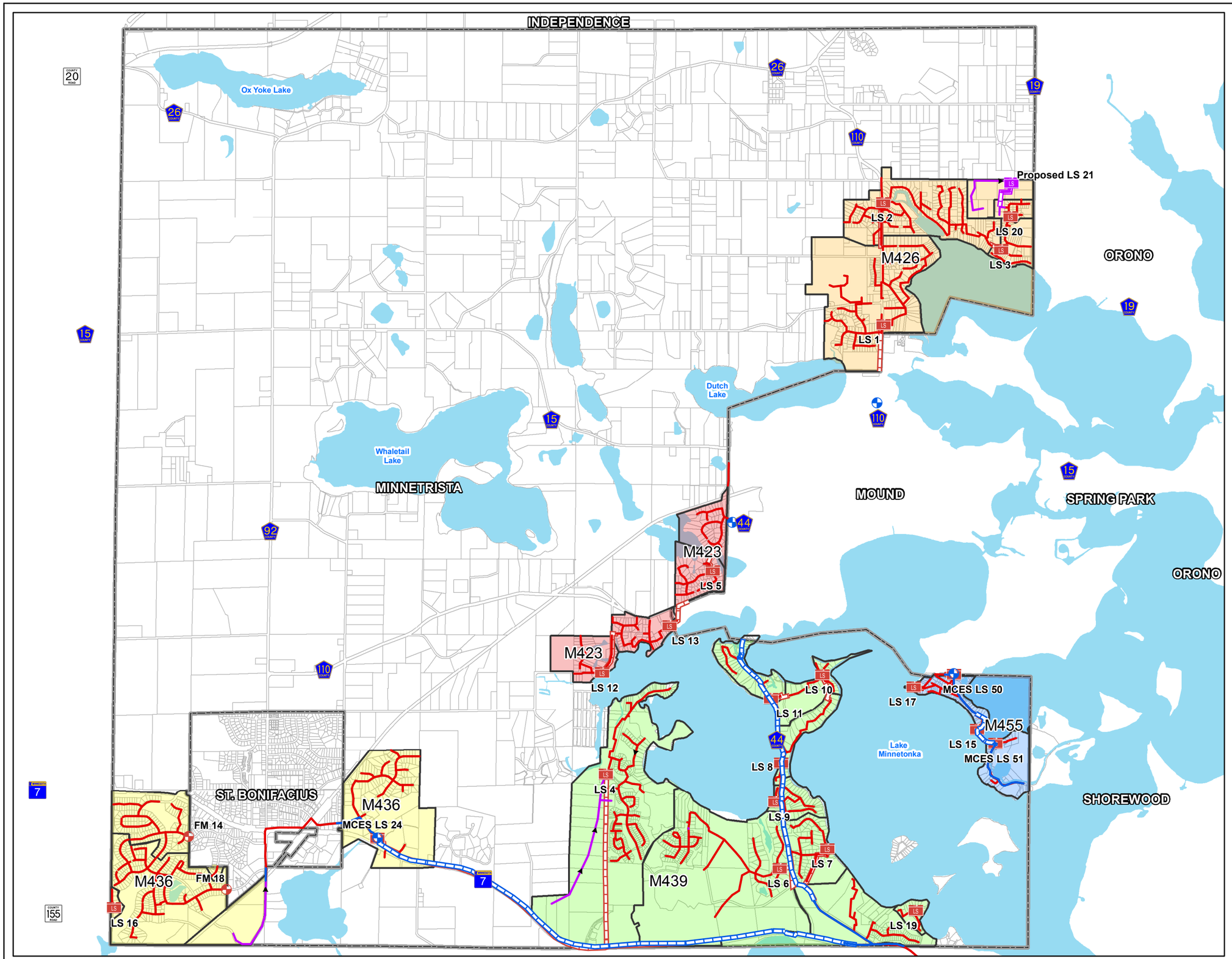


Figure 4
2040 Proposed Sanitary Sewer System

Comprehensive Sewer Plan
City of Minnetrista

Legend

- Existing Lift Station
- Existing Flow Meter
- Existing Gravity Main
- Existing Forcemain
- 2040 Proposed Lift Station
- 2040 Proposed Gravity Main
- 2040 Proposed Forcemain
- MCES Flow Meter
- MCES Gravity Main
- MCES Forcemain

N

0 3,200 Feet

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Meter Service Area M423

The M423 service area includes the residential developments on the north side of Halsted Bay. Sewage from this area is conveyed to MCES Lift Station L38 and then travels south to the MCES interceptor sewer at Highway 7. The estimated 2040 flows are shown in **Table 10**. The land-use types of the properties expected to develop are shown in ***Figure 5,*** as follows.

Table 10. Projected 2040 Flows for Meter Service Area M423 Based on Development

Sub-District	Existing Average Flow (gpd)	Existing Max Flow (gpd)	Additional Average Flow (gpd)	Additional Max Flow (gpd)	Total 2040 Max Flow (gpd)
5	14,249	83,354	-	-	83,354
12	10,977	64,216	1,087	4,349	68,564
13	10,036	58,713	12,460	49,838	108,551
23	13,571	79,391	-	-	79,391
TOTAL	48,833	285,673	13,547	54,187	339,861

Potential new development in this meter service area includes several parcels of low density residential along Halstead Drive, one parcel of low density residential on Williams Lane, and two parcels of medium density residential on County Road 110 West. The potential development to the west of sub-district 12, north of Halstead Drive, can be served by the existing gravity main on Lakeside Circle. No new trunk systems or lift stations will be required to provide service to these properties.

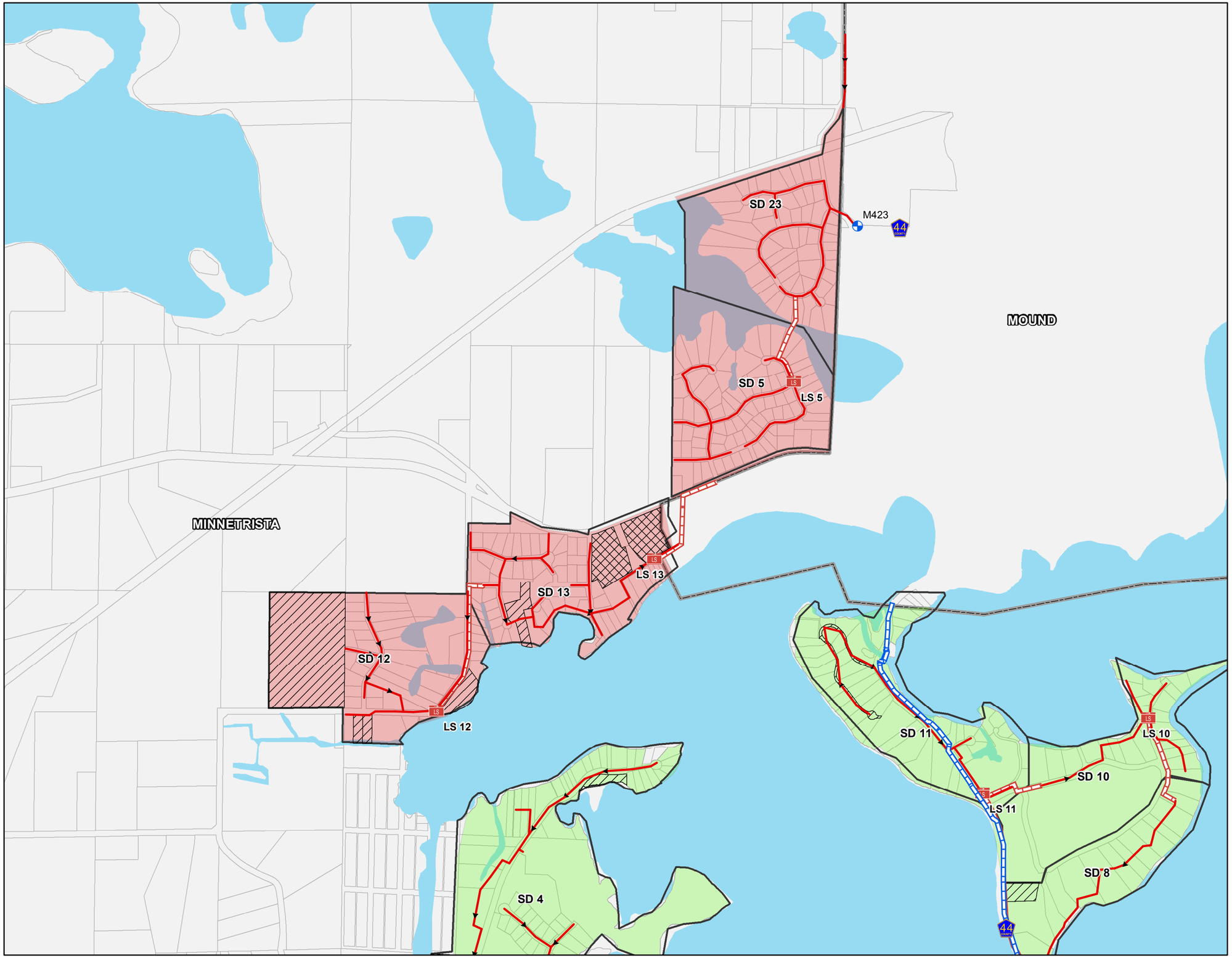

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Figure 5
Metershed M423
Sanitary Sewer System

Comprehensive Sewer Plan
City of Minnetrista

Legend

- Existing Flow Meter
- Existing Lift Station
- Existing Gravity Main
- Existing Forcemain
- MCES Flow Meter
- MCES Gravity Main
- MCES Forcemain

Developable Land

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial

N

0 1,000 Feet

WSB

Meter Service Area M426

The M426 service area includes the residential developments on the north and west sides of Jennings Bay along County Road 110, including the Mound Westonka High School. Sewage from this area is collected and conveyed south to MCES Lift Station L25, travels west to MCES Lift Station L38, and then continues south to the MCES interceptor sewer at Highway 7. The estimated 2040 flows are shown in **Table 11**. The land-use types for the properties expected to develop are shown in ***Figure 6,*** as follows.

Table 11. Projected 2040 Flows for Meter Service Area M426 Based on Development

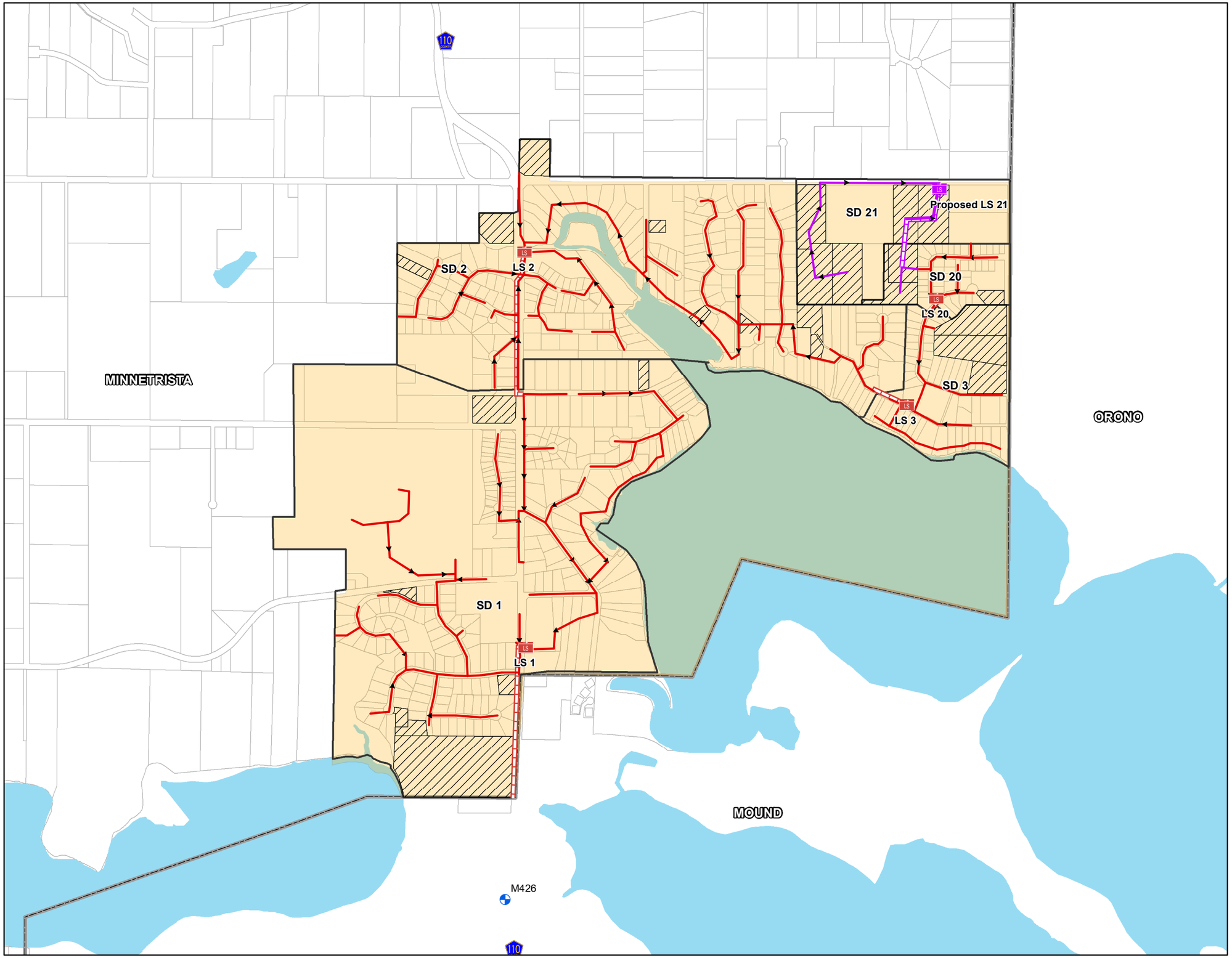
Sub-District	Existing Average Flow (gpd)	Existing Max Flow (gpd)	Additional Average Flow (gpd)	Additional Max Flow (gpd)	Total 2040 Max Flow (gpd)
1	68,362	589,965	13,630	54,518	644,483
2	28,761	248,210	7,564	30,254	278,465
3	6,441	55,588	15,584	62,338	117,926
20	-	-	9,270	37,080	37,080
21	-	-	8,453	33,811	33,811
TOTAL	103,565	893,763	54,500	218,002	1,111,765

Active developments in this meter service area include Dutch Lake Knoll, Orchard Cove, and Red Oak. Potential new development in this area includes a large parcel of low density residential in the southwest corner of the service area on the west side of County Road 110, several medium-sized parcels of low density residential in the northeast corner of the service area on the west side of County Road 19, and a dozen other small parcels of low density residential scattered through the service area.

The Red Oak development, a portion of which is contained in sub-district 20 in ***Figure 6***, includes a newly constructed lift station (Minnetrista Lift Station 20). This lift station discharges to an 8-inch gravity main on Grandview Avenue.

The northeast corner of the service area, labeled sub-district 21 in ***Figure 6***, will require a new lift station (Minnetrista Lift Station 21) to provide service to new low density residential development in that area. This lift station will discharge to an 8-inch gravity main on Red Oak Lane. The trunk system that will be required to serve future development is planned to consist of approximately 0.9 miles of gravity main and 1,200 feet of 3-inch forcemain.

To accommodate the maximum flows from this new development downstream, the capacity of Lift Station 1 will need to be increased to at least 1,104 gpm. The estimated costs of future improvements, including oversized or overdepth trunk main or lift stations that will serve more than one development, are tabulated in the “Cost Estimates and Financing” section of this report.



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CITY OF MINNETRISTA

Figure 6
Metershed M426
Sanitary Sewer System

Comprehensive Sewer Plan
City of Minnetrista

Legend

- 2040 Proposed Lift Station
- 2040 Proposed Gravity Main
- 2040 Proposed Forcemain
- Existing Lift Station
- Existing Flow Meter
- Existing Gravity Main
- Existing Forcemain
- MCES Flow Meter
- MCES Gravity Main
- MCES Forcemain

Developable Land

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial

N

0 1,000 Feet

WSB

Meter Service Area M436

The M436 service area includes the residential developments on the southwest and east sides of St. Bonifacius along Highway 7, as well as projected commercial development on the east side of St. Bonifacius along Highway 7. Sewage from this area is collected at MCES Lift Station L24 and pumped east to the MCES interceptor sewer at Highway 7. The estimated 2040 flows are shown in **Table 12.** The land-use types for the properties expected to develop are shown in ***Figure 7,*** as follows.

Table 12. Projected 2040 Flows for Meter Service Area M436 Based on Development

Sub-District	Existing Average Flow (gpd)	Existing Max Flow (gpd)	Additional Average Flow (gpd)	Additional Max Flow (gpd)	Total 2040 Max Flow (gpd)
14	15,129	84,271	-	-	84,271
16	1,373	7,646	-	-	7,646
18	29,410	163,812	13,288	53,150	216,962
22	25,671	142,989	58,577	234,309	377,297
25	-	-	158,733	587,312	587,312
TOTAL	71,583	398,718	230,598	874,771	1,273,489

Potential new development in this meter service area includes several parcels of low density residential on the south end of Hunters Trail along Townsedge Road, a large area of high density residential on the west side of Laketown Parkway south of St. Bonifacius, a few parcels of low density residential on the east border of St. Bonifacius, and several medium parcels of retail/commercial to the east of St. Bonifacius along Highway 7.

The new low density residential development along Townsedge Road can connect to the existing trunk system in sub-district 18. The new high density residential development on the west side of Laketown Parkway, labeled sub-district 25 in ***Figure 7***, will require a trunk system with approximately 0.5 mile of 10-inch gravity main that will discharge to the north into the existing 15-inch gravity main on Main Street (which turns into Laketown Parkway). The new low density residential and retail/commercial development to the east of St. Bonifacius can be served by the existing trunk system in that area which collects at MCES Lift Station L24. The estimated costs of future improvements, including oversized or overdepth trunk main or lift stations that will serve more than one development, are tabulated in the "Cost Estimates and Financing" section of this report.

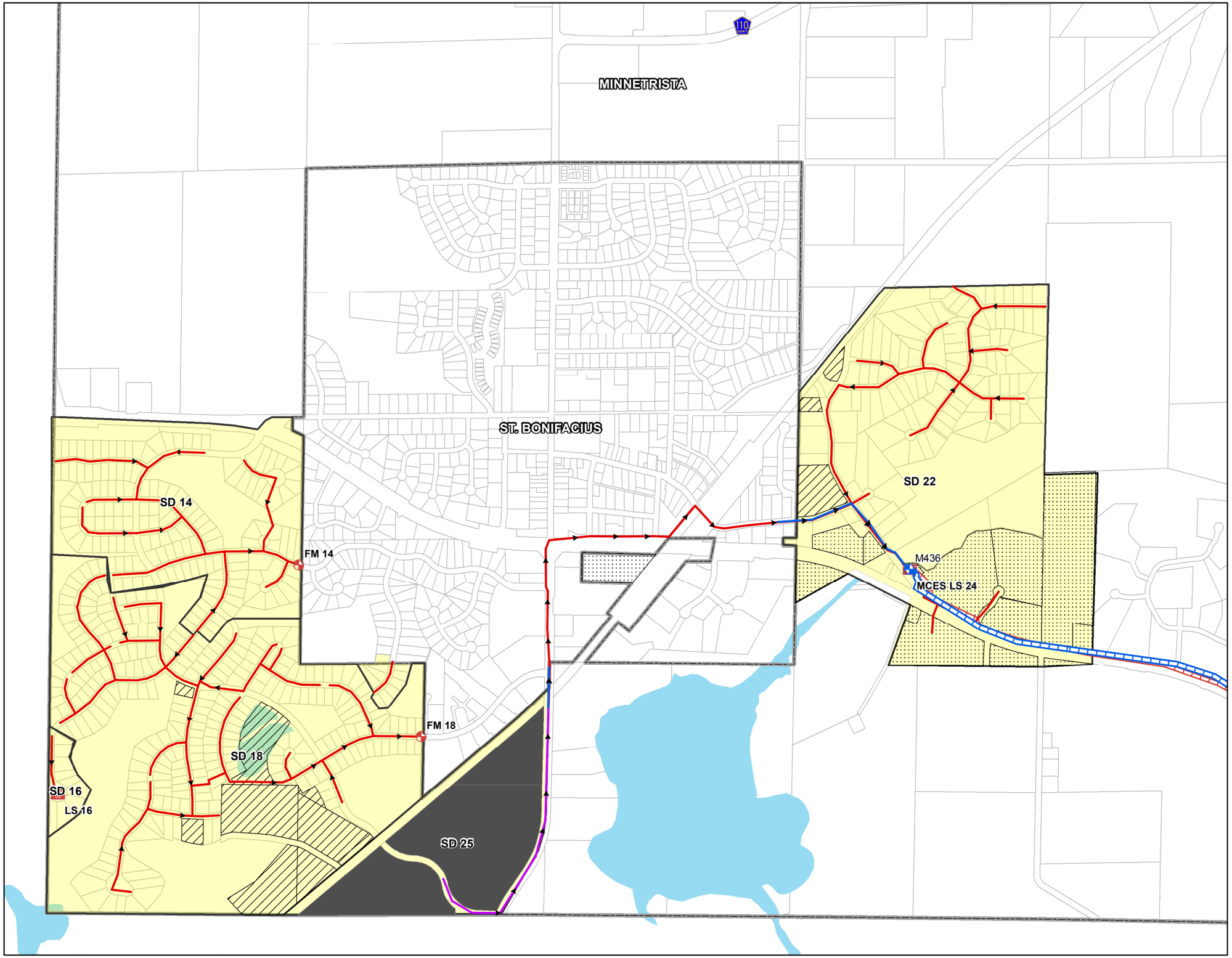

Figure 7
Metershed M436
Sanitary Sewer System

Comprehensive Sewer Plan
City of Minnetrista

Legend

- Existing Flow Meter
- Existing Gravity Main
- Existing Forcemain
- Existing Lift Station
- 2040 Proposed Gravity Main
- 2040 Proposed Forcemain
- 2040 Proposed Lift Station
- MCES Flow Meter
- MCES Gravity Main
- MCES Forcemain

Developable Land

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial

N

0 1,000 Feet

WSB

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Meter Service Area M439

The M439 service area includes the residential developments along County Road 44 southeast of Halsted Bay and on the north end of Kings Point Road southwest of Halsted Bay. Sewage from the development along County Road 44 is collected and pumped south to the MCES interceptor sewer at Highway 7. Sewage from the development on the north end of Kings Point Road is collected at Lift Station 4 and pumped south and discharged into the MCES forcemain that runs along Highway 7. The estimated 2040 flows for this area are shown in **Table 13**. The land-use types for the properties expected to develop are shown in ***Figure 8,*** as follows.

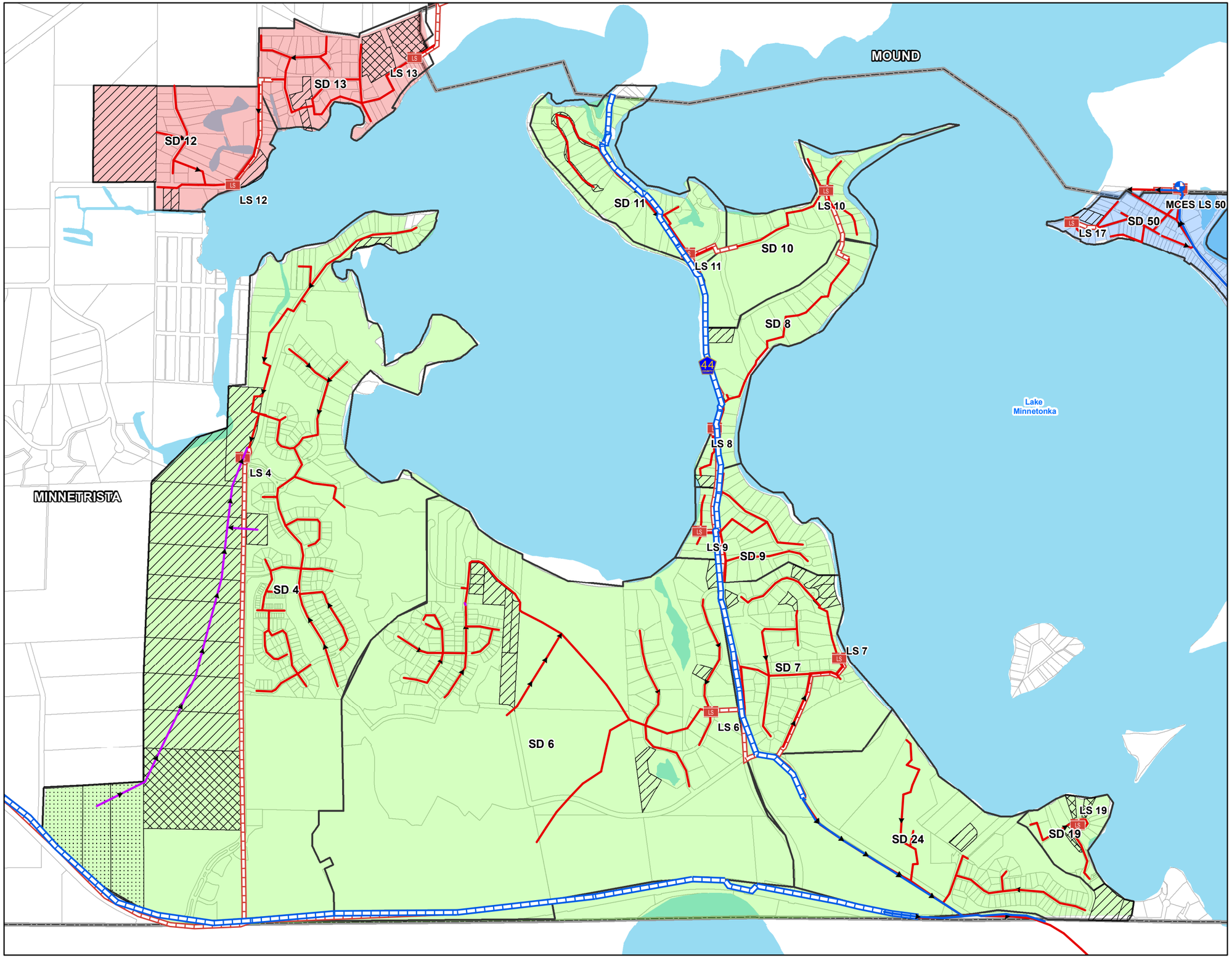
Table 13. Projected 2040 Flows for Meter Service Area M439 Based on Development

Sub-District	Existing Average Flow (gpd)	Existing Max Flow (gpd)	Additional Average Flow (gpd)	Additional Max Flow (gpd)	Total 2040 Max Flow (gpd)
4	24,357	108,631	110,086	418,326	526,957
6	16,651	74,266	5,454	21,816	96,082
19	965	4,303	2,471	9,882	14,185
24	24,705	110,184	2,059	8,237	118,421
7	8,942	39,880	1,573	6,293	46,173
9	4,656	20,764	-	-	20,764
8	5,654	25,218	864	3,456	28,674
10	3,254	14,511	-	-	14,511
11	5,340	23,816	-	-	23,816
TOTAL	94,523	421,574	122,507	468,009	889,583

The bulk of the potential new development in this area includes several parcels of low density residential, one parcel of medium density residential, and three parcels of commercial on the west side of Kings Point Road. There are also over a dozen other small parcels of potential low and medium density residential development scattered throughout the sub-districts along County Road 44.

The trunk system for the new commercial and low and medium density residential development along Kings Point Road could discharge to Lift Station 4 to the north to be pumped back to the MCES forcemain along Highway 7, which will require approximately 0.5 miles of 10-inch gravity main and 0.6 miles of 8-inch gravity main. The total 2040 maximum projected flow at Lift Station 4 would then be 366 gpm. The existing capacity of Lift Station 4 is 449 gpm, which would satisfy these projected flows.

The remaining, scattered low and medium density residential developments in this meter service area can be served by the existing trunk systems in their respective sub-districts. The estimated costs of future improvements, including oversized or overdepth trunk main or lift stations that will serve more than one development, are tabulated in the “Cost Estimates and Financing” section of this report.



CITY OF MINNETRISTA

Figure 8
Metershed M439
Sanitary Sewer System

Comprehensive Sewer Plan
City of Minnetrista

Legend

- Existing Gravity Main
- Existing Forcemain
- Existing Lift Station
- Existing Flow Meter
- 2040 Proposed Gravity Main
- 2040 Proposed Forcemain
- 2040 Proposed Lift Station
- MCES Flow Meter
- MCES Gravity Main
- MCES Forcemain

Developable Land

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial

N

0 1,200 Feet

WSB

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Meter Service Area M455

The M455 service area includes the small residential developments located directly south of Mound on Phelps Bay. Sewage from this area is conveyed north to MCES Lift Station L50, north and west through Mound, and then back south along County Road 44 to the MCES interceptor sewer at Highway 7. The estimated 2040 flows for this area are shown in **Table 14.** The land-use types for the properties expected to be developed are shown in ***Figure 9,*** as follows.

Table 14. Projected 2040 Flows for Meter Service Area M455 Based on Development

Sub-District	Existing Average Flow (gpd)	Existing Max Flow (gpd)	Additional Average Flow (gpd)	Additional Max Flow (gpd)	Total 2040 Max Flow (gpd)
50	1,425	5,701	385	1,541	7,242
51	1,612	6,448	623	2,491	8,939
TOTAL	3,037	12,149	1,008	4,032	16,181

There is only one parcel of low density residential development in each of the sub-districts in this meter service area, and they can be served by the existing trunk system. No new sanitary sewer improvements are anticipated in this area.

Individual Sewage Treatment Systems

As development continues to occur throughout Minnetrista, it is recommended that the City encourages homeowners to connect to the municipal sanitary sewer system as it becomes available. Having residents abandon ISTS's will promote improved groundwater quality and will reduce the risks associated with noncompliant systems.

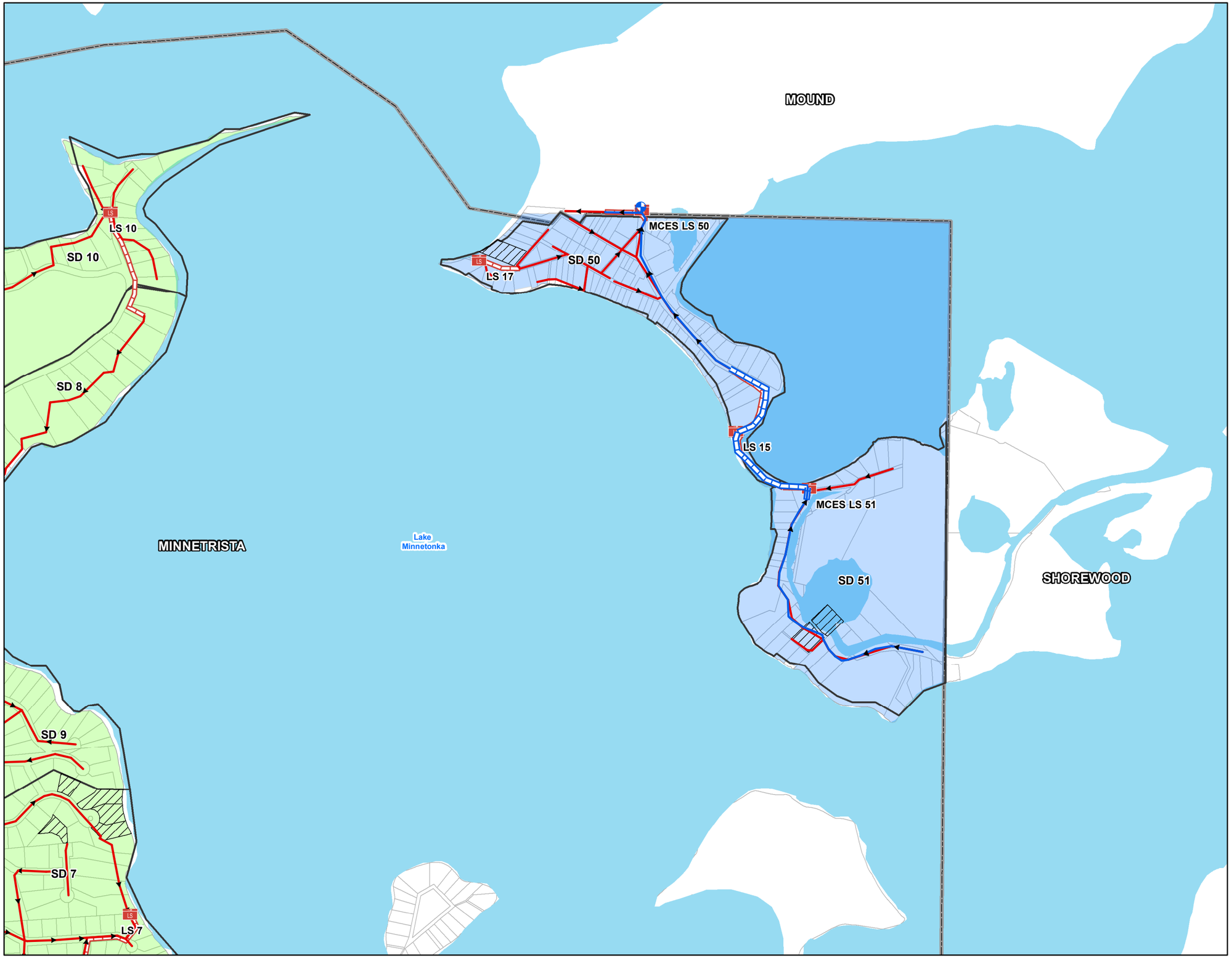

Figure 9
Metershed M455
Sanitary Sewer System

Comprehensive Sewer Plan
City of Minnetrista

Legend

- Existing Gravity Main
- Existing Forcemain
- Existing Lift Station
- Existing Flow Meter
- MCES Flow Meter
- MCES Gravity Main
- MCES Forcemain

Developable Land

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial

N

0 800 Feet

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MCES Interceptor Facility Forecasts

The MCES interceptors used by each meter service area, as well as the 2040 forecasted flow to those interceptors, are listed in **Table 15**. Where multiple interceptors are used in series, all are listed sequentially from the beginning of the metershed to the border of Minnetrista. Note that the total flow listed may not correspond to all interceptors in the series, as the flow may accumulate along the interceptor path through the metershed. Also, note that the total flow listed is only the flow generated in Minnetrista and does not include any flows from neighboring communities that may also discharge into the metershed.

Table 15. Projected 2040 MCES Interceptor Use

Metershed	MCES Interceptor(s)		2040 Average Flow (MGD)	2040 Max Flow (MGD)
M423	7021 7019-A		0.06	0.34
M426	6-MO-650 7021 7019-A		0.16	1.11
M436	7020 7019-A		0.30	1.27
M439	7020 7019-A	7021 7019-A	0.22	0.89
M455	6-MT-647 6-MO-651 6-MO-650 7021 7019-A		0.004	0.02
TOTAL	7019-A		0.74	3.63

INFLOW AND INFILTRATION

General

Inflow is water, typically stormwater, which enters the sewer system through broken manhole covers, sewer cleanouts, sump pumps, foundation drains, and rain leaders. ***Infiltration*** is water, typically groundwater, which leaks into the sewer system through cracks in the sewer mains, laterals, joints, and manholes.

Water from inflow and infiltration (I/I) can consume available capacity in the wastewater collection system and increase the flow into treatment facilities. In extreme cases, the added flow can cause bypasses or overflows of raw wastewater. This extra flow also requires a larger capacity in the city's collection and treatment components, which results in increased capital, operation and maintenance, and replacement costs. As a sewer system ages and deteriorates, I/I can become an increasing burden on a City's system. Therefore, it is imperative that I/I be reduced whenever it is cost effective to do so.

The MCES has established I/I goals for each community discharging wastewater into the Metropolitan Disposal System (MDS) based on average daily flows, adjustments for community growth, and I/I mitigation peaking factors. In 2006, the MCES began an Ongoing I/I Program which requires communities within their service area to eliminate excessive I/I.

MCES began monitoring flows from Minnetrista fairly recently - in November of 2013 - so Minnetrista is not currently monitored through the Ongoing I/I Program and does not have an I/I goal. Nonetheless, flow metering data is available for the metersheds within Minnetrista, and an analysis of this data as it relates to I/I is presented on the following page. The City's strategies, programs, investments, and goals for reducing I/I are listed in this section as well.

I/I Analysis

Minnetrista's sanitary sewer system currently consists of approximately 35 miles of sanitary main, seventeen lift stations, and two flow monitors**,** of which a majority was built within the last 45 years. Many of the lift stations and their associated forcemains were constructed in 1973 (see Table 1), and the trunk sewers, lateral lines, and service connections in these areas are more susceptible to I/I due to their age, although some sections of trunk sewer have since been lined. Approximately 18% of the residential housing served by the public collection system was built before the year 1970, and fewer than 5% of the pre-1970 era private services have been evaluated for I/I susceptibility.

A comparison of the dry weather flow versus wet weather flow generated in the City's system, as provided by MCES, is given in **Table 16**. The flows listed were determined by a combination of meter data, number of connections, lift station run times, and water use records. The dry weather flow corresponds to MCES Quarters 1 & 4 (October through March), and the wet weather flow corresponds to MCES Quarters 2 & 3 (April through September). The purpose of this comparison is to give a general indication of the extent of I/I in the City's system. The difference between dry and wet weather flow indicates susceptibility to I/I.

Table 16. Dry Weather Flow vs. Wet Weather Flow

Year	Dry Weather Flow (MGD)	Wet Weather Flow (MGD)
2011	0.262	0.383
2012	0.230	0.309
2013	0.248	0.411
2014	0.236	0.492
2015	0.277	0.329
2016	0.320	0.372

The volume of clearwater entering the City's sanitary sewer system was also estimated using City and MCES data from 2011-2015. The average annual and peak quarter I/I rates were estimated as the difference between the average sanitary flow rate and the base sanitary flow rate. The average annual and peak quarter flow rates were calculated from MCES billing records. I/I rates at smaller time scales are difficult to calculate for Minnetrista because its metersheds overlap with neighboring communities and therefore metered flows must be adjusted based on number of connections, lift station runtimes, and water use records. The base sanitary flow rate was approximated as winter water usage, calculated from City pumping records in December through February and a historic average of percent water used of water pumped. Because Minnetrista's water and sanitary sewer service areas do not exactly overlap, assumptions were made based on land use type and unit counts to adjust and align the flows by service area.

Table 17. Estimated I/I Rates

Metershed	M423	M426	M436 + M439
Wells	Well No. 5	Wells No. 1 & 2A	Wells No. 3 & 4
Average Annual Flow (MGD)	0.037	0.085	0.150
Peak Quarter Flow (MGD)	0.049	0.113	0.198
Base Sanitary Flow (MGD)	0.029	0.053	0.109
Average Annual I/I Rate (MGD (%))	**0.008 (22%)**	**0.033 (38%)**	**0.041 (27%)**
Peak Quarter I/I Rate (MGD (%))	**0.020 (41%)**	**0.060 (53%)**	**0.089 (45%)**

Given the system's susceptibility to I/I, the City will continue to work to identify I/I sources. Based on the estimated I/I rates above and peaking trends from MCES meter data, Metershed M426 is a good candidate for further I/I investigation and mitigation. The tools the City has implemented and is considering implementing to evaluate I/I include:

- Review of MCES flow data and lift station run times to identify critical areas
- Collection of additional flow data in critical areas
- Smoke testing, manhole inspection, sewer televising
- Sump pump and foundation drain inspection

I/I Reduction

The City's strategy for preventing excess I/I is based on requiring all development to conform to City standards. City code prohibiting the discharge of storm water to the sanitary sewer system and requiring the disconnection of existing I/I sources is excerpted below.

> ***710.01. Prohibited discharges.***
> *Except as otherwise provided, no person will discharge or cause to be discharged any of the following described waters or wastes to any public sewer:*
> *…*
> *(k) Any storm water, surface water, ground water, roof runoff, subsurface drainage, cooling water or unpolluted industrial process waters to any sanitary sewer. Storm water and all other unpolluted drainage will be discharged to such sewers as are specifically designed as storm sewers, or to a natural outlet approved by the council. Industrial cooling water or unpolluted process waters may be discharged, upon approval of the council, to a storm sewer, or natural outlet.*
> *(l) Any substances prohibited by the metropolitan sewer board.*
> *…*
> ***710.13. Storm water discharge enforcement.***
> *<u>Subdivision 1. Disconnection required.</u>*
> *Any person, firm or corporation having a roof, sump pump, swimming pool discharge, cistern overflow pipe or surface drain now connected and/or discharging into the sanitary sewer system must disconnect and/or remove same prior to April 30, 1993. Any disconnects or openings in the sanitary sewer must be closed or repaired in an effective manner as described in subdivision 2 below.*

In addition, the City has routine activities directed at recognizing and correcting I/I. During the City's annual sewer system maintenance activities, selected segments are cleaned and televised to locate leaks or service connections with continuous flows. Appropriate corrective measures are then initiated with the affected property owner. The City also has an ongoing annual review of flows and discussions with consulting engineers to develop the next stage of improvement plans.

Some of the specific activities completed by the City of Minnetrista to identify and reduce I/I sources are described in **Table 18**.

Table 18. I/I Activities Completed

Project	Description
2005 Sanitary Sewer Rehabilitation Project	Lining of 3,200 feet of 12-inch gravity sewer north of Jennings Bay.
2006 Sanitary Sewer Rehabilitation Project	Lining and rehabilitation of 3,000 feet of 9-inch and 12-inch gravity sewer along Minneapolis Ave and 365 feet of 15-inch gravity sewer along Morningview Dr.
2008 Sanitary Sewer Rehabilitation Project	Rehabilitation of 9-inch, 12-inch, and 15-inch pipe, primarily along Westwood Dr and Westwood Ave.
2012 Forcemain Rehabilitation Project	Rehabilitation of 2,800 feet of 12-inch forcemain and installation of 260 feet of 12-inch forcemain south of Lift Station 1 where it discharges to the gravity main in Mound.
2016 Mill & Overlay Improvements	Addition of I/I shields to all sanitary sewer manholes.
2017 Mill & Overlay Improvements	Addition of I/I shields to all sanitary sewer manholes.
2017 Enchanted Ln, Tuxedo Rd, and Grandview Ave Improvements	Addition of I/I shields to all sanitary sewer manholes.
2018 Mill & Overlay Improvements	Addition of I/I shields to all sanitary sewer manholes.

I/I Implementation Plan

From 2009-2018, the City paid the Metropolitan Council $236,000 per year on average for service through their regional collection and treatment system. Per **Table 7**, the City-wide average annual I/I percentage is 30%. Therefore, the City spent approximately $71,000 per year to convey and treat I/I from 2009-2018. This may be used as a rough guide for the City's annual I/I mitigation investment.

The City has budgeted $100,000 annually for I/I reduction work. As part of its I/I program, the City cleans and televises 30,000-40,000 feet of sewer per year. The televising is used to identify areas of concern and to compile a list of lining and rehabilitation projects. The lining and rehabilitation projects are completed once every three years to make the work more cost effective. Other I/I reduction activities include inspections, smoke testing, and miscellaneous maintenance. The City will continue to proactively identify I/I sources and take corrective actions. The rehabilitation that has been completed to date has resulted in a reduction of I/I. However, the City will continue its I/I program to monitor the sewer system for potential I/I issues on an annual basis.

COST ESTIMATES AND FINANCING

Table 19 lists the capital improvements proposed for each metershed and their estimated costs. Only oversized gravity sewer lines (greater than 8-inch) are included, and lift station cost estimates do not include a stationary emergency generator.

Table 19. Capital Improvements by Metershed

Metershed	Item	Length	Estimated Cost	Estimated Timeframe
All	I/I Reduction	-	$100,000	Annual
M423	None	-	-	-
M426	Upsize pump at Lift Station 1 (1,104 gpm)	-	$100,000	TBD
	Lift Station 21 (24 gpm), 3-inch forcemain	1,200 feet	$600,000	TBD
M436	10-inch gravity main to MCES LS24	0.5 miles	$150,000	TBD
M439	10-inch gravity main to LS4	0.5 miles	$150,000	TBD
M455	None	-	-	-

SUMMARY AND OUTCOMES

The analysis provided in this Sanitary Sewer Plan is aimed to provide the City of Minnetrista and the Metropolitan Council assistance in planning for wastewater collection and treatment. It is anticipated that the design flows and criteria outlined will be used for utility planning as development continues within the City. Tables and figures can be utilized to create budget-level estimates and schematic representations of infrastructure improvements, with specific sizing and routing to be determined during the design phase.

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EXECUTIVE SUMMARY

Introduction

The City of Minnetrista's Comprehensive Water Supply Plan describes the City's existing water distribution system and water demand, projects future water demand through the year 2040, and proposes infrastructure improvements to accommodate that demand. This Plan has been prepared according to the guidelines established by the Metropolitan Council and the Minnesota Department of Natural Resources (DNR). The Water Supply Plan immediately following this report follows the template provided by the DNR, while this Comprehensive Water Supply Plan expands upon the template and provides further information for City and Metropolitan Council planning.

Existing System

The City of Minnetrista's water distribution system provides approximately 160 million gallons of water each year to about 1,900 service connections. The system was formerly separated into three distinct regions (north, central, and south), but the central and south regions have been connected leaving only two distinct areas, referred to in this report as the North System and the South System. The 16-inch watermain connecting the former central and south regions is currently inactive pending an analysis of water pressure reduction in the area to the north of County Road 110 West. The North System is served by two groundwater wells, one water treatment plant (WTP), and one water tower. The South System is served by five groundwater wells, one WTP, one water tower, and one hydropneumatic tank.

Population and Water Demand

The population of the City of Minnetrista has been growing steadily since 2008. Despite this growth, average daily water demand has not shown a corresponding trend, and total per capita demand has been decreasing since 2012. Improved appliances, reduced irrigation, general attitudes toward conservation, rainfall, and climate likely all play a role in these trends.

Growth and Demand Projections

The Metropolitan Council projects that the City of Minnetrista will continue to develop and grow over the lifetime of this Plan, and that its total per capita water use will plateau by the year 2020. The population served by the City of Minnetrista's water distribution system is expected to increase to 8,524 people by the year 2040, at which time the projected total per capita water use of 116 gallons per capita per day will result in an average day demand of 0.99 million gallons per day and a maximum day demand of 2.97 million gallons per day.

Proposed Improvements

The recommended infrastructure improvements to satisfy future water demand include the installation of a new 500,000 gallon elevated storage tank in the south system before the year 2020, the installation of a new groundwater source in the north system capable of producing at least 500 gallons per minute (gpm), and the installation of a new groundwater source in the south system capable of producing at least 500 gpm. Trunk watermain will need to be expanded to accommodate the direction and rate of future development.

INTRODUCTION

Purpose

This Comprehensive Water Supply Plan is a section of the City's 2040 Comprehensive Plan. The purpose of the Comprehensive Water Supply Plan is to provide an overview of the City's current drinking water resources, infrastructure, policies, and challenges, and to present future plans. Water distribution maps are included in ***Appendices 12 and 13***, which depict the existing system and proposed improvements.

It is the policy of the City of Minnetrista to provide the following to all customers receiving service from the City's water distribution system:

- Water Quality: Provide water to the community that meets the standards required by the State of Minnesota.
- Water Affordability: Provide water at sufficient utility rates so that current and future residents contribute to the long term maintenance of the water supply system.

This Comprehensive Water Supply Plan has been prepared according to the guidelines established by the Metropolitan Council and the Minnesota Department of Natural Resources (DNR) per Minnesota Statute 473.859, which requires water supply plans be completed by all local units of government in the seven-county Metropolitan Area. The attached Water Supply Plan conforms to the template provided by the DNR, while this Comprehensive Plan expands upon the template and provides further information for City and Metropolitan Council planning.

Background

The City of Minnetrista, 32 square miles in area, is located in Hennepin County on the western bays of Lake Minnetonka. Only a portion of the properties within the City limits are currently serviced by the City's water utility. To accommodate the existing and projected population, the City authorized an update to the 2030 Comprehensive Plan in accordance with Minnesota Statue 473.513. The City has continued to experience growth since the last Comprehensive Plan update, which was last completed in 2011.

The scope of this study includes the population projections from the City's overall comprehensive plan, consistent with the Metropolitan Council Environmental Services (MCES) City System Statement, to project water system demands for the City of Minnetrista through the year 2040. The 2040 service area was defined based on the Land Use Plan prepared for the City's 2040 Comprehensive Plan. Existing and future water demands were calculated for the City based on the historical data and population projections.

Data Available

The following sources of information were used to prepare this report:

- Water Supply Plan for the City of Minnetrista, prepared by WSB & Associates, Inc.
- MCES System Statement for the City of Minnetrista
- MCES Community Profile for the City of Minnetrista
- Water usage data as reported by the City to the DNR's Minnesota Permitting and Reporting System (MPARS)
- Wellhead Protection Plan for the City of Minnetrista

General Contact Information

City of Minnetrista Water System
DNR Water Appropriation Permit Numbers: 1970-1386
Ownership: Public
Metropolitan Council Area, Hennepin County
MDH Supplier Classification: Municipal

Public Works Superintendent: Gary Peters
7701 County Road 110 West
Minnetrista, MN 55364
Phone: (952) 241-2532

Water Use Categories and Definitions

General water use categories and definitions used in this report, as defined by the Department of Natural Resources, are as follows:

- ***Residential*** uses consist of water being used for normal household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens.
- ***Institutional*** uses consist of those for hospitals, nursing homes, day care centers, and other facilities that use water for essential domestic requirements. This includes public facilities and public metered uses. Institutional water-use records are typically maintained for emergency planning and allocation purposes.
- ***Commercial*** uses consist of water used by motels, hotels, restaurants, office buildings, and commercial facilities.
- ***Industrial*** uses consist of water used for thermoelectric power (electric utility generation) and other industrial uses such as steel, chemical and allied products, food processing, paper and allied products, mining, and petroleum refining.
- ***Wholesale deliveries*** consist of bulk water sales to other public water suppliers.
- ***Unaccounted water*** is the volume of water withdrawn from all sources minus the volume sold.
- ***Non-essential water uses*** as defined by Minnesota Statutes 103G.291, include lawn sprinkling, vehicle washing, golf course and park irrigation, and other non-essential uses. Some of the above categories also include non-essential uses of water.

EXISTING SYSTEM

The existing water distribution system for the City of Minnetrista is shown in ***Appendix 12***. It currently serves an area of approximately 1,830 acres with 1,650 service connections. The system consists of approximately 29 miles of watermain, including both ductile iron and PVC pipe ranging from 6 inches to 24 inches in diameter. The existing water system is divided into two separate service areas: North and South.

The North system is served by two wells: Well 1 and Well 2A, both located on Game Farm Road. Well 1 was drilled in 1971 to a depth of 678 feet and is still in use. Well 2A was drilled in 2010 to a depth of 498 feet and is still in use. Both of these wells discharge into the North Water Treatment Plant (WTP) which has a capacity of 500 gallons per minute (gpm). Water storage is provided by a single 300,000 gallon elevated storage tank located on Sunnyfield Road East. An interconnect with the City of Mound's water distribution system serves as a backup water supply should an emergency or maintenance situation require additional water.

The South System is served by Well 3 on County Road 44, Well 4 on Lotus Drive, Well 5 on South Saunders Lake Drive, and Wells 6 and 7 on Kings Point Road. Water from Wells 6 and 7 is pumped to the South WTP which has a capacity of 1,000 gpm. The south system has one 400,000 gallon elevated storage tank located on Kings Point Road and one 5,000 gallon hydropneumatic tank located on South Saunders Lake Drive. The purpose of the hydropneumatic tank is to maintain system pressure, rather than provide storage for fire protection.

Water Sources and Treatment

Well information by system is provided in **Table 1**. The total well pumping capacity in the North and South water systems is 1,000 gallons per minute (gpm) and 2,400 gpm, respectively. The North System has a firm capacity (capacity with the largest well out of service in each system) of 500 gpm, and the South System has a firm capacity of 1,900 gpm. Well logs and maintenance reports are included in ***Appendix 1.*** The City's water level monitoring plan is included in ***Appendix 2***, and water level graphs for each well are included in ***Appendix 3.***

Table 1. Well Summary

System	Well Name and ID	Year Installed	Capacity (gpm)	Depth (feet)	Aquifer	Status	Treatment
North	Well 1 #208864	1971	500	678	Tunnel City – Wonewoc	Active	North WTP
	Well 2A #773393	2010	500	498	Tunnel City – Wonewoc	Active	North WTP
South	Well 3 #161408	1980	500	785	Tunnel City – Wonewoc	Active	Chlorine, fluoride, phosphate
	Well 4 #554097	1995	500	787	Mt. Simon	Active	Chlorine, fluoride, phosphate
	Well 5 #638450	1999	400	253	Glacial Drift	Active	Chlorine, fluoride, phosphate
	Well 6 #818310	2016	500	593	Wonewoc	Active	South WTP
	Well 7 #818311	2016	500	517	Wonewoc	Active	South WTP

Each system in Minnetrista has a Water Treatment Plant (WTP) that will be brought on line in the spring of 2017. Both wells in the North System discharge into the North WTP, which was constructed in 2016 and has a capacity of 0.72 million gallons per day (MGD) or 500 gpm. The treatment processes in this plant include oxidation, filtration, chlorination, and fluoridation. In the South System, only Wells 6 and 7 discharge into the South WTP. The South WTP was also constructed in 2016 and has a capacity of 1.44 MGD or 1,000 gpm. This plant also includes oxidation, filtration, chlorination, and fluoridation for the treatment processes.

Water Storage

The North System has one 300,000 gallon elevated storage tank located on Sunnyfield Road East. This tank is a spheroid type of tower located approximately 600 feet south of the west end of Kramer Road.

The South System has one 400,000 gallon elevated storage tank, the Kings Point Tower, which is a hydropillar type of tower located approximately a quarter mile north of the intersection of Highway 7 and Kings Point Road. The south system also has one 5,000 gallon hydropneumatic tank located on South Saunders Lake Drive. The purpose of the hydropneumatic tank is to maintain system pressure between 55 and 90 psi rather than provide storage for fire protection, as is the normal purpose of a hydropneumatic tank. This tank only provides approximately 2,000 gallons of storage under pressure.

Water Distribution

Both the North and South water distribution systems include ductile iron and PVC watermain of 6-inch to 24-inch nominal diameter. The majority of each system is comprised of 6-inch, 8-inch, 10-inch, and 12-inch pipe. A short stretch of 24-inch pipe exists in the North System along West Branch Road.

The North System provides service primarily to the developments to the west of Jennings Bay, including Mound Westonka High School. Its larger 12-inch mains run along County Road 110 North, Game Farm Road East, and through the school grounds.

The South System provides service to the developments located north of Halsted Bay (formerly an independent central system), the developments to the southeast of Halsted Bay, and the developments near St. Bonifacius. The larger 12-inch mains in this system run along County Road 44, through Lake Minnetonka Regional Park, and along Highway 7, Highland Road, and Hunters Trail.

POPULATION AND WATER DEMAND

The population served by the City of Minnetrista's water system decreased in 2008, but has been growing steadily since then. The total population served by the City's water system grew from 2,665 in 2010 to 3,472 in 2015. Population and water use and demand data from the past ten years are listed in **Table 2.**

There has been an increasing trend in population served and average daily water demands over the past three years, potentially due to the expansion of the City's water distribution system and new development occurring in the southwest part of the City. Total per capita and maximum daily water demands are decreasing overall. It is likely that improved appliances, reduced irrigation, general attitudes toward conservation, rainfall, and climate all play a role in this trend.

Table 2 – Historic Water Demand

Year	Pop. Served	Total Connections	Total Water Use (MG)	Total Water Pumped (MG)	Percent Unmetered/ Unaccounted	Average Daily Demand (MGD)	Max. Daily Demand (MGD)	Date of Max. Demand	Residential Per Capita Demand (GPCD)	Total Per Capita Demand (GPCD)
2005	2,403	890	104.2	110.3	5.5%	0.29	2.76	N/A	99	126
2006	2,863	948	121.8	134.0	9.1%	0.33	1.11	7/8/2006	106	128
2007	3,319	1,038	139.4	153.3	9.1%	0.38	1.39	7/31/2007	106	127
2008	2,484	949	139.7	142.6	2.0%	0.38	1.29	8/4/2008	131	157
2009	2,484	999	150.3	151.5	0.8%	0.41	1.29	8/4/2009	142	167
2010	2,665	1,007	124.6	133.2	6.5%	0.34	0.69	7/11/2010	118	137
2011	2,770	1,057	131.0	142.8	8.3%	0.36	N/A	N/A	120	141
2012	2,876	1,079	171.1	171.1	< 0.1%	0.47	0.81	8/23/2012	136	163
2013	2,981	1,305	149.5	149.5	< 0.1%	0.41	1.22	7/3/2013	120	137
2014	3,110	1,474	128.6	128.6	< 0.1%	0.35	0.7	8/5/2014	93	113
2015	3,472	1,648	142.5	142.5	<0.1%	0.39	0.69	6/23/2015	92	112
2016	3,708	1,740	151.4	151.4	<0.1%	0.41	1.31	7/4/2016	95	112
2017	3,850	1,788	160.0	172.1	7.0%	0.44	1.71	7/16/2017	102	122
2018	4,135	1,917	159.2	180.2	11.6%	0.44	1.89	9/16/2018	95	119
Avg. 2014-2018	3,655	1,713	148.3	155.0	3.7%	0.41	1.26		95	116

MG – Million Gallons **MGD –** Million Gallons per Day **GPCD** – Gallons per Capita per Day

Table 3 lists the top 10 water users by volume, from largest to smallest, for the City of Minnetrista. All of the users with irrigation systems must comply with the City-wide watering ban that is enforced from 10am - 6pm each day.

Table 3 – Large Volume Users

Customer	Category	Use (gallons per year)	Percent of Total Water Use
Westonka Public School (High School)	Institutional	1,147,630	0.76%
Woodland Cove – Big Woods Irrigation	Residential	1,057,700	0.70%
Woodland Cove – Maple Leaf Irrigation	Residential	888,140	0.59%
David Thaler Sports Center	Commercial	818,090	0.54%
Woodland Cove – Crosby Ct. Irrigation	Residential	807,250	0.53%
Westonka Public School (District Office)	Institutional	699,140	0.46%
Hunters Crest Irrigation	Residential	693,120	0.46%
Woodland Cove – Woodland Cove Pkwy Irrigation	Residential	530,840	0.35%
Palmer Point Irrigation	Residential	525,050	0.35%
4345 Trillium Lane West	Residential	446,000	0.29%

Existing Water Conservation Policies

Although Minnesotans benefit from the state's abundant water supplies, those supplies are finite and potential threats exist that could impact the quality of our drinking water. Factors that can potentially limit water supply include population increases, economic trends, uneven statewide availability of groundwater, climate change, and degraded water quality. There are many benefits to enacting water conservation policies and many practical, feasible objectives the City has already and will continue to pursue.

The average total water used per year in the City of Minnetrista from 2010 to 2015 was 141.2 million gallons, with an average of 2.5% of that usage being unmetered or unaccounted. The average residential per capita demand has been decreasing steadily since 2012. From 2010 to 2015 the average residential per capita use was 113 gallons per day, which is greater than the DNR's recommended residential demand of less than 75 gallons per capita per day. As previously discussed, the decrease in residential per capita demand may be attributed to improved appliances, reduced irrigation, general attitudes toward conservation, rainfall, and climate.

Wellhead Protection

Long-term preventative programs and measures for the City's existing water system will help reduce the risk of emergency situations. The City of Minnetrista has a number of programs to help reduce these risks. This includes a Wellhead Protection Plan (WHPP) that was adopted in September of 2016 and is due to be updated in 2026. It lists the following goals:

1. Maintain or improve the current level of water quality so that the municipal water supply will continue to meet or exceed all applicable state and federal water quality standards.
2. Continue to supply sufficient water quantity for system users and emergency needs.
3. Provide and promote activities that protect the source water aquifers, which provide water to the municipal system. This will include increased public education of the Wellhead and Source Water Protection Program and groundwater-related issues, as well as management of the identified potential contaminant sources and conveyance mechanisms within the DWSMA.
4. Continue to collect data to support future wellhead and source water protection efforts.

In order to achieve these objectives, the WHPP lists the following measures to be implemented:

- Well Management
    - Promote proper sealing of abandoned, unused, unmaintained, or damaged wells
    - Obtain documentation for the North and South Test Wells
    - Educate the public about proper well management
    - Identify new high-capacity wells within the Drinking Water Supply Management Area (DWSMA)
    - Continue to monitor water quality and quantity
    - Review and monitor the Inner Wellhead Management Zone (IWMZ) for potential contaminant sources
    - Conduct rehabilitation of City water supply wells
    - Improve security in and around the well houses
- Public Education
    - Foster public support for and understanding of WHPP
    - Educate City staff on transportation corridor concerns
- Data Collection
    - Cooperate with and support future data collection efforts by other agencies
    - Incorporate WHPP initiatives into City plans
    - Request all wells be sampled for tritium
- Water Conservation
    - Implement a community-wide conservation program
- Implementation
    - Track and report completed WHPP activities
- Evaluation
    - Evaluate the WHPP Plan

GROWTH AND DEMAND PROJECTIONS

The City of Minnetrista is currently experiencing new development and growth. The City's projected population and demands are listed in **Table 4**. The population projections were linearly extrapolated using Metropolitan Council (MCES) estimates for the years 2020, 2030, and 2040. As of 2016, any new population growth will be serviced by the municipal water system. The demands (daily average and max day peaking factors) were obtained from the City's annual water use data from 2014-2018. The maximum day demand is expected to increase to 2.97 MGD by year 2040.

Table 4 – Projected Annual Water Demand

Year	Projected Total Population	Projected Population Served	Projected Total Per Capita Water Demand (GPCD)	Projected Average Day Demand (MGD)	Projected Maximum Day Demand (MGD)
2019	7,810	4,310	116	0.50	1.50
2020	8,000	4,524	116	0.52	1.57
2021	8,180	4,700	116	0.55	1.64
2022	8,360	4,880	116	0.57	1.70
2023	8,540	5,060	116	0.59	1.76
2024	8,720	5,240	116	0.61	1.82
2025	8,900	5,420	116	0.63	1.89
2030	9,800	6,324	116	0.73	2.20
2040	12,000	8,524	116	0.99	2.97

GPCD – Gallons per Capita per Day **MGD** – Million Gallons per Day

Future Water Conservation Policies

The Minnesota DNR has established eight water conservation objectives and strategies. These are listed below with comments on the City of Minnetrista's progress towards the completion of each.

1. Reduce unaccounted (non-revenue) water loss to less than 10%.
    - The City's average unaccounted water use from 2010 to 2015 was 2.5%, which is well below the recommended target of 10%. The City has an automated meter system to notify the City of leaky fixtures, and leak detection surveys are performed as needed. The City does lose water due to above average water system flushing because of the high iron and manganese content in the source water. This loss will decrease when the two new WTP's are brought on line in the spring of 2017.
    - There are a total of 1,303 metered connections in Minnetrista which are tested quarterly. The average age of these meters is 3.2 years, and they are replaced as necessary. The City is completing the final phase of replacing meters in the North System with updated water meters. For the remaining unmetered parts of the City, the City does not require property owners to hook up to City water.
2. Achieve residential demand of less than 75 gallons per capita per day.
    - The average residential per capita water demand for the City of Minnetrista from 2010 to 2015 was 113 gallons per capita per day (gpcd), which is greater than the 75 gpcd target. Data from the DNR and the City indicates that residential water demand has been decreasing since 2009, with the exception of 2012.
    - In order to continue reducing residential demand, the City will review its ordinances on water efficient landscaping and water reuse annually, revise its ordinance to limit irrigation 3-6 years following the implementation of this plan, continue to make water system improvements, provide incentives for installing water efficient appliances and fixtures 1-3 years following adoption of this plan, provide incentives to reduce outdoor water use 1-3 years following adoption of this plan, and continue water conservation education and outreach.
3. Achieve at least a 15% reduction in per capita daily demand across all customer categories over the next 10 years.
    - The City of Minnetrista will conduct facility water use audits annually, install enhanced water meters, install conservation fixtures and appliances, repair leaking system components, investigate water reuse, and reduce outdoor water use.
4. Achieve a decreasing trend in total per capita demand.
    - Residential water usage shows an increasing trend which may be attributed to high water use during dry summer months, although it has decreased since 2012. There is no trend seen for agricultural/irrigation water usage. Commercial, institutional, and industrial (C/I/I) water use shows a decreasing trend which may be attributed to water efficient fixtures and public education on the importance of water conservation. A graph showing total per capita water demand by customer category is included in ***Appendix 8.***
5. Reduce peak day demand so that the ratio of maximum to average day demand is less than 2.6.

- The City's ten-year average (2005-2014) ratio of maximum to average day demand is 3.4. The position of the DNR has been that a peak day/average day ratio that is above 2.6 indicates that the volume of water being used for irrigation in a community is too high and that efforts should be made to reduce the peak day use by the community.

6. Implement a conservation water rate structure
    - The water rates in Minnetrista are based on an increasing block rate structure. This rate structure promotes water conservation because the price is volume-tiered. Water billing in Minnetrista is on a quarterly schedule, and the billing structure is evaluated every year with the last change made in January 2017, included in ***Appendix 9***.
    - The City has also implemented an odd/even watering restriction to reduce peak day demands during months of high water usage.
7. Additional strategies to reduce water use and support wellhead protection planning
    - The City of Minnetrista will review the best practices in sustainability and may consider adopting some quality-of-life goals and implement a water conservation outreach program that will include education about and encouragement of the installation of water efficient appliances and fixtures.
8. Tracking success
    - The City will continue to monitor water usage by customer category, including the City's regular maintenance activities (hydrant flushing, street sweeping, etc.).

Regulation

The City of Minnetrista has implemented several regulations to reduce demand and improve efficiency in its water system. Rainfall sensors are required on landscape irrigation systems, water efficient plumbing fixtures are required in new development per code, water use is restricted by odd/even days during months of high water usage, water waste is prohibited during emergencies, and a critical water deficiency ordinance has been established. A summary of these regulations is included in ***Appendix 10.***

Retrofitting Programs

The Minnehaha Creek Watershed District (MCWD) provides education about rain gardens and native and drought tolerant landscaping and has a cost share program to encourage clean-water landscaping.

Education and Outreach

The City has implemented, or plans to implement, the following education and outreach programs:

- Billing inserts include educational information
- Consumer Confidence Reports prepared annually
- Staff training includes awareness of conservation goals
- Facility tours are available on request
- Minnetrista Messenger newsletters prepared every three months
- K-12 education programs
- Information available at utility and public buildings, a booth during Trista Days, and on the City website (http://www.cityofminnetrista.com)

PROPOSED IMPROVEMENTS

The City of Minnetrista's existing water system will need improvements to satisfy projected demand through 2040. **Table 5** lists the improvements proposed, along with estimated dates of implementation and costs, in order to satisfy the City's anticipated demand. In addition, the City's Capital Improvement Plan for 2016-2020 is included in ***Appendix 4***.

Table 5 – Proposed Capital Improvements

Year(s)	Improvement	Location	Estimated Cost*
2018-2019	Install new 500,000 gallon elevated storage tank	South System (Hunter's Crest)	$2,600,000
Before 2037	Install new 500 gpm groundwater source	North System	$574,000
Before 2040	Install new 500 gpm groundwater source and new 1,000 gpm WTP	South System (Hunter's Crest)	$5,200,000
After 2040	Install new 500 gpm groundwater source	South System (Hunter's Crest)	$725,000

*Values listed include both direct and indirect costs.

Proposed Sources and Treatment

It is generally recommended that a City's treatment or production capacity be equal to at least the maximum day demand with the largest well out of service (firm capacity). Since the City has two separate systems, each should be able to satisfy this constraint individually.

The North System's firm capacity is 500 gpm. The maximum day demand for this system (based on a twenty-hour supply period) is projected to exceed that capacity in 2037 and reach 551 gpm by the year 2040, so the City should plan to install additional production capacity before that time. It is recommended that the City install an additional source capable of providing at least 500 gpm for the North System. If the City would like to be able to supply entirely treated water during maximum day demand through the year 2040, without supplementing untreated water, the North WTP's capacity will need to be upgraded to 700-750 gpm.

The South System's firm capacity is 1,900 gpm. The maximum day demand for this system is projected to reach 1,921 gpm by the year 2040, so the City should plan to install additional production and treatment capacity before that time. It is recommended that the City install a new source capable of providing at least 500 gpm and a new WTP capable of treating 1,000 gpm in the southwest near the developments surrounding St. Bonifacius. An additional 500 gpm well can be installed in that area when there is adequate demand.

Proposed Storage

It is generally recommended that a City's storage capacity be equal to at least the average day demand plus a fire fighting reserve.

The North System's storage capacity is 0.30 MG. The average day demand for this system is projected to increase to 0.22 MG by the year 2040. Therefore, it is not anticipated that the North System will require additional storage capacity over the lifetime of this plan.

The South System's storage capacity is 0.40 MG. The average day demand for this system is estimated to reach 0.77 MG by the year 2040, so it is recommended that the City add additional storage capacity before that time. The City plans to add a 0.50 MG elevated storage tank to the South System before 2020. This additional elevated storage will also provide increased flow for fire suppression in the southwest corner of the City.

Proposed Distribution

The City recently connected its south and central distribution systems. In order to provide service to future developments, the City will need to expand trunk watermain in several areas. These include:

- Potential low density residential development southwest of the intersection of West Branch Road and North Shore Drive
- Potential high density residential development at Hunter's Trail and Laketown Parkway
- Potential low and medium density residential and commercial development to the west of Kings Point Road

EMERGENCY PREPAREDNESS PROCEDURES

Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failures, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan.

Federal Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act, as amended by the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Public Law 107-188, Title IV – Drinking Water Security and Safety), requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan.

The City of Minnetrista has a Federal Emergency Response Plan that was revised in 2015. The contacts for this plan are:

Emergency Response Lead: Gary Peters
Phone: (952) 241-2532
Email: gpeters@ci.minnetrista.mn.us

Alternate Emergency Response Lead: Mike Pawelk
Phone: (952) 466-2538

Operational Contingency Plan

The State recommends that all utilities develop an operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures, as well as for routine maintenance. A contact list for contractors and suppliers and a water emergency telephone list that act as an Operational Contingency Plan are included in ***Appendix 5***.

Emergency Response Procedures

Quick access to concise and detailed information on water sources, water treatment, and the distribution system may be needed in an emergency. System operation and maintenance records should be maintained in secured central and back-up locations so that the records are accessible for emergency purposes. A detailed map of the system showing the water sources, treatment plant, storage facilities, supply lines, interconnections, and other information that would be useful in an emergency should also be readily available. It is critical that public water supplier representatives and emergency response personnel communicate about the response procedures and be able to easily obtain this kind of information both in electronic and hard copy formats (in case of a power outage).

The City of Minnetrista maintains records and maps of the water system. City staff can access these resources from a central secured location in the event of an emergency, and appropriate staff know where these resources are located.

Procedures for Augmenting Water Supplies

The City of Minnetrista has two interconnections with neighboring water supply systems, to be used only in the event of an emergency. One interconnection is with the City of Mound, which has a supply capacity of 4.3 MGD or 3,000 gpm. The second interconnection is with the City of St. Bonifacius, which has a capacity of 2.3 MGD or 1,600 gpm. Copies of these cooperative agreements are included in ***Appendix 6***.

In the case of a short-term emergency, the City would need to obtain and distribute bottled water. For a long-term emergency, the City will evaluate the cause of service disruption and will determine if a new water source or improved water treatment is necessary. The scale of the response will depend on the cause of the disruption. In this case, a feasibility study should be conducted to determine how to address the issue in the most cost-effective manner.

Allocation and Demand Reduction Procedures and Triggers

The City must prepare procedures to address gradual decreases in water supply, as well as emergencies and the sudden loss of water due to line breaks, power failures, sabotage, etc. These allocation and demand reduction procedures must be consistent with Minnesota State Statute 103G.261, that identifies and defines the priorities in which water usage will be allocated in the event of an emergency. They are defined as follows:

1. Domestic water supply only, excluding industrial and commercial uses of municipal water supply. The first priority also includes uses for power production that meet contingency requirements. Domestic use is defined by MN Rules 6115.0630, Subp. 9, as use for general household purposes for human needs such as cooking, cleaning, drinking, washing, and waste disposal, and uses for on-farm livestock watering excluding commercial livestock operations which use more than 10,000 gallons per day or one million gallons per year.
2. Consumption of less than 10,000 gallons per day.
3. Agricultural irrigation and processing of agricultural products of more than 10,000 gallons per day.
4. Power production in excess of the use provided for in the contingency plan.
5. All other water use of more than 10,000 gallons per day.
6. Non-essential uses. These uses are defined by Minnesota Statutes 103G.291 as lawn sprinkling, vehicle washing, golf course and park irrigation, and other non-essential uses.

Table 6 lists the priority ranking, average day demand, and demand reduction potential for each customer category in the City.

Table 6 – Water Use Priorities

Customer Category	Allocation Priority	Average Day Demand (GPD)	Short-Term Emergency Demand Reduction Potential (GPD)
Residential	1	304,400	*
Institutional/Commercial	2	17,600	*
Irrigation	3	11,900	*
Non-Essential	4	-	294,200
Total	-	333,900	294,200

GPD – Gallons per Day

* Non-essential use calculated as increased summer demand across all customer categories

The City of Minnetrista will use the following conditions to trigger an emergency response:

- Contamination
- Loss of Production
- Infrastructure Failure
- Governor's Executive Order

The City of Minnetrista has identified the following short-term and long-term actions to be implemented as part of an emergency response:

Short-term Actions

- Supply augmentation through interconnection(s)
- Enforce its critical water deficiency ordinance
- Allocate water through emergency action of the City Council
- Encourage voluntary reduction through public service announcements

Long-term Actions

- Supply augmentation through interconnections
- Enforce its critical water deficiency ordinance
- Allocate water through emergency action of the City Council
- Meet with large water users to discuss their contingency plan

Notification Procedures

The City of Minnetrista has developed the following plan to inform customers regarding conservation requests, water use restrictions, and suspensions; with the support of City staff, neighboring communities, and local news outlets:

Short-term demand reduction declared (within one year)	Long-term demand reduction declared (over one year)	Governor's Critical water deficiency declared
Frequency: Monthly	Frequency: Annually	Frequency: As Needed
▪ Website ▪ Social media (e.g. Twitter, Facebook) ▪ Direct customer mailing ▪ Press release (TV, radio, newspaper)	▪ Website ▪ Social media (e.g. Twitter, Facebook) ▪ Direct customer mailing ▪ Press release (TV, radio, newspaper)	▪ Website ▪ Social media (e.g. Twitter, Facebook) ▪ Direct customer mailing ▪ Press release (TV, radio, newspaper)

Enforcement

Minnesota Statutes require public water supply authorities to adopt and enforce water conservation restrictions during periods of critical water shortages. As stated in Minnesota Statutes 103G.291, Subdivision 1, regarding public water supply appropriation during deficiency, if the governor determines and declares by executive order that there is a critical water deficiency, public water supply authorities appropriating water must adopt and enforce water conservation restrictions within their jurisdiction that are consistent with rules adopted by the commissioner. The restrictions must limit lawn sprinkling, vehicle washing, golf course and park irrigation, and other nonessential uses, and have appropriate penalties for failure to comply with the restrictions.

The City has a critical water deficiency ordinance defined in Minnetrista City Code, Chapter 7: Section 700.33. A copy of this ordinance is included in ***Appendix 7***. The City has authorized the City Administrator, or their designee, to have standing authority to implement water restrictions, which improves response times for dealing with water emergencies.

APPENDIX

Water Supply Plan

Local Water Supply Plan Template
Third Generation for 2016-2018

Formerly called Water Emergency & Water Conservation Plan

Cover photo by Molly Shodeen

MNDNR

For more information on this Water Supply Plan Template, please contact the DNR Division of Ecological and Water Resources at (651) 259-5034 or (651) 259-5100.

This information is available in an alternative format upon request.

Equal opportunity to participate in and benefit from programs of the Minnesota Department of Natural Resources is available to all individuals regardless of race, color, creed, religion, national origin, sex, marital status, public assistance status, age, sexual orientation, disability or activity on behalf of a local human rights commission. Discrimination inquiries should be sent to Minnesota DNR, 500 Lafayette Road, St. Paul, MN 55155-4049; or the Equal Opportunity Office, Department of the Interior, Washington, DC 20240.

Table of contents

DEPARTMENT OF NATURAL RESOURCES – DIVISION OF ECOLOGICAL AND WATER RESOURCES AND METROPOLITAN COUNCIL

INTRODUCTION TO WATER SUPPLY PLANS (WSP)

Who needs to complete a Water Supply Plan

Public water suppliers serving more than 1,000 people, and large private water suppliers in designated Groundwater Management Areas, and all water suppliers in the Twin Cities metropolitan area, are required to prepare and submit a water supply plan.

The goal of the WSP is to help water suppliers: 1) implement long term water sustainability and conservation measures; and 2) develop critical emergency preparedness measures. Your community needs to know what measures will be implemented in case of a water crisis. A lot of emergencies can be avoided or mitigated if long term sustainability measures are implemented.

Groundwater Management Areas (GWMA)

The DNR has designated three areas of the state as Groundwater Management Areas (GWMAs) to focus groundwater management efforts in specific geographies where there is an added risk of overuse or water quality degradation. A plan directing the DNRs actions within each GWMA has been prepared. Although there are no specific additional requirements with respect to the water supply planning for communities within designated GWMAs, communities should be aware of the issues and actions planned if they are within the boundary of one of the GWMAs. The three GWMAs are the North and East Metro GWMA (Twin Cities Metro), the Bonanza Valley GWMA and the Straight River GWMA (near Park Rapids). Additional information and maps are included in the DNR webpage at http://www.dnr.state.mn.us/gwmp/areas.html

Benefits of completing a WSP

Completing a WSP using this template, fulfills a water supplier's statutory obligations under M.S. M.S.103G.291 to complete a water supply plan. For water suppliers in the metropolitan area, the WSP will help local governmental units to fulfill their requirements under M.S. 473.859 to complete a local comprehensive plan. Additional benefits of completing WSP template:

- The standardized format allows for quicker and easier review and approval
- Help water suppliers prepare for droughts and water emergencies.
- Create eligibility for funding requests to the Minnesota Department of Health (MDH) for the Drinking Water Revolving Fund.
- Allow water suppliers to submit requests for new wells or expanded capacity of existing wells.
- Simplify the development of county comprehensive water plans and watershed plans.
- Fulfill the contingency plan provisions required in the MDH wellhead protection and surface water protection plans.
- Fulfill the demand reduction requirements of Minnesota Statutes, section 103G.291 subd 3 and 4.

- Upon implementation, contribute to maintaining aquifer levels, reducing potential well interference and water use conflicts, and reducing the need to drill new wells or expand system capacity.
- Enable DNR to compile and analyze water use and conservation data to help guide decisions.
- Conserve Minnesota's water resources

If your community needs assistance completing the Water Supply Plan, assistance is available from your area hydrologist or groundwater specialist, the MN Rural Waters Association circuit rider program, or in the metropolitan area from Metropolitan Council staff. Many private consultants are also available.

WSP Approval Process

10 Basic Steps for completing a 10-Year Water Supply Plan

1. Download the DNR/Metropolitan Council Water Supply Plan Template www.mndnr.gov/watersupplyplans
2. Save the document with a file name with this naming convention: WSP_cityname_permitnumber_date.doc.
3. The template is a form that should be completed electronically.
4. Compile the required water use data (Part 1) and emergency procedures information (Part 2)
5. The Water Conservation section (Part 3) may need discussion with the water department, council, or planning commission, if your community does not already have an active water conservation program.
6. Communities in the seven-county Twin Cities metropolitan area should complete all the information discussed in Part 4. The Metropolitan Council has additional guidance information on their webpage http://www.metrocouncil.org/Handbook/Plan-Elements/Water-Resources/Water-Supply.aspx. All out-state water suppliers do *not* need to complete the content addressed in Part 4.
7. Use the Plan instructions and Checklist document to insure all data is complete and attachments are included. This will allow for a quicker approval process. www.mndnr.gov/watersupplyplans
8. Plans should be submitted electronically – no paper documents are required. https://webapps11.dnr.state.mn.us/mpars/public/authentication/login
9. DNR hydrologist will review plans (in cooperation with Metropolitan Council in Metro area) and approve the plan or make recommendations.
10. Once approved, communities should complete a Certification of Adoption form, and send a copy to the DNR.

Complete Table 1 with information about the public water supply system covered by this WSP.

Table 1. General information regarding this WSP

Requested Information	Description
DNR Water Appropriation Permit Number(s)	**1970-1386**
Ownership	**Public**
Metropolitan Council Area	**Yes, Hennepin County**
Street Address	**7701 County Road 110 West**
City, State, Zip	**Minnetrista, MN 55364**
Contact Person Name	**Gary Peters**
Title	**Public Works Superintendent**
Phone Number	**952-241-2532**
MDH Supplier Classification	**Municipal**

PART 1. WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION

The first step in any water supply analysis is to assess the current status of demand and availability. Information summarized in Part 1 can be used to develop Emergency Preparedness Procedures (Part 2) and the Water Conservation Plan (Part 3). This data is also needed to track progress for water efficiency measures.

A. Analysis of Water Demand

Complete Table 2 showing the past 10 years of water demand data.

- Some of this information may be in your Wellhead Protection Plan.
- If you do not have this information, do your best, call your engineer for assistance or if necessary leave blank.

If your customer categories are different than the ones listed in Table 2, please describe the differences below:

The City has not had any wholesale deliveries so this column was removed from the table.

Table 2. Historic water demand (see definitions in the glossary after Part 4 of this template)

Year	Pop. Served	Total Connections	Residential water Delivered (MG)	C/I/I Water Delivered (MG)	Agricultural/ Irrigation Water Delivered (MG)	Water Supplier Services (WSS) *	Total Water Delivered (MG)	Total Water Pumped (MG)	Percent Unmetered/ Unaccounted	Average Daily Demand (MGD)	Max. Daily Demand (MGD)	Date of Max. Demand	Residential Per Capita Demand (GPCD)	Total per Capita Demand (GPCD)
2005	2,403	890	87.00	17.20	-	-	104.20	110.30	5.5%	0.29	2.76	n/a	99.2	125.8
2006	2,863	948	110.50	11.30	-	-	121.80	133.97	9.1%	0.33	1.11	7/8/2006	105.7	128.2
2007	3,319	1,038	128.10	11.30	-	-	139.40	153.31	9.1%	0.38	1.39	7/31/2007	105.7	126.6
2008	2,484	949	118.28	8.14	4.55	8.72	139.69	142.58	2.0%	0.38	1.29	8/4/2008	130.5	157.3
2009	2,484	999	128.39	7.71	5.45	8.72	150.26	151.45	0.8%	0.41	1.29	8/4/2009	141.6	167.0
2010	2,665	1,007	114.70	6.14	3.71	-	124.56	133.16	6.5%	0.34	0.69	7/11/2010	117.9	136.9
2011	2,770	1,057	121.37	6.69	-	2.94	131.00	142.81	8.3%	0.36	n/a	n/a	120.0	141.2
2012	2,876	1,079	143.20	14.75	-	13.17	171.12	171.12	< 0.1%	0.47	0.81	8/23/2012	136.4	163.0
2013	2,981	1,305	130.22	8.54	-	10.69	149.45	149.45	< 0.1%	0.41	1.22	7/3/2013	119.7	137.4
2014	3,110	1,474	105.12	6.93	1.88	14.69	128.63	128.63	< 0.1%	0.35	0.70	8/5/2014	92.6	113.3
2015	3,472	1,648	117.10	5.90	6.84	12.63	142.46	142.46	<0.1%	0.39	0.69	6/23/2015	92.4	112.4
2016	3,708	1,740	128.05	3.96	5.14	14.30	151.45	151.45	0.0%	0.41	1.31	7/4/2016	94.6	111.9
2017	3,850	1,788	143.54	16.43			159.96	172.09	7.0%	0.44	1.71	7/16/2017	102.1	122.5
2018	4,135	1,917	143.51	15.66			159.17	180.15	11.6%	0.44	1.89	9/16/2018	95.1	119.4
Avg. 2014-2018	3,655	1,713	127.46	9.77	4.62	13.87	148.33	154.95	3.7%	0.41	1.26		95.4	115.9

MG – Million Gallons **MGD –** Million Gallons per Day **GPCD** – Gallons per Capita per Day;

*Increase in the number of hydrants flushed due to increased number in residential complaints regarding water quality

Complete Table 3 by listing the top 10 water users by volume, from largest to smallest. For each user, include information about the category of use (residential, commercial, industrial, institutional, or wholesale), the amount of water used in gallons per year, the percent of total water delivered, and the status of water conservation measures.

Table 3. Large volume users

Customer	Use Category (Residential, Industrial, Commercial, Institutional, Wholesale)	Amount Used (Gallons per Year)	Percent of Total Annual Water Delivered	Implementing Water Conservation Measures? (Yes/No/Unknown)
Westonka Public School (High School)	Institutional	1,147,630	0.76	Unknown
Woodland Cove – Big Woods Irrigation	Residential	1,057,700	0.70	Unknown
Woodland Cove – Maple Leaf Irrigation	Residential	888,140	0.59	Unknown
David Thaler Sports Center	Commercial	818,090	0.54	Unknown
Woodland Cove – Crosby Ct. Irrigation	Residential	807,250	0.53	Unknown
Westonka Public School (District Office)	Institutional	699,140	0.46	Unknown
Hunters Crest Irrigation	Residential	693,120	0.46	Unknown
Woodland Cove – Woodland Cove Pkwy Irrigation	Residential	530,840	0.35	Unknown
Palmer Point Irrigation	Residential	525,050	0.35	Unknown
4345 Trillium Lane West	Residential	446,000	0.29	Unknown

B. Treatment and Storage Capacity

Complete Table 4 with a description of where water is treated, the year treatment facilities were constructed, water treatment capacity, the treatment methods (i.e. chemical addition, reverse osmosis, coagulation, sedimentation, etc.) and treatment types used (i.e. fluoridation, softening, chlorination, Fe/MN removal, coagulation, etc.). Also describe the annual amount and method of disposal of treatment residuals. Add rows to the table as needed.

Table 4. Water treatment capacity and treatment processes

Treatment Site ID (Plant Name or Well ID)	Year Constructed	Treatment Capacity (MGD)	Treatment Method	Treatment Type	Annual Amount of Residuals	Disposal Process for Residuals	Do You Reclaim Filter Backwash Water?
Well 3	1980	0.72	Chemical addition	Chlorination, fluoridation & polyphosphates	n/a	n/a	n/a
Well 4	1995	0.72	Chemical addition	Chlorination, fluoridation & polyphosphates	n/a	n/a	n/a
Well 5	1999	0.58	Chemical addition	Chlorination, fluoridation & polyphosphates	n/a	n/a	n/a
South WTP (Wells 6 & 7)	2016	1.44	Chemical addition, filtration, Fe/Mn removal	Oxidation and filtration, chlorination, fluoridation	n/a	sanitary	yes
North WTP (Wells 1 & 2A)	2016	0.72	Chemical addition, filtration, Fe/Mn removal	Oxidation and filtration, chlorination, fluoridation	n/a	sanitary	yes
Total	n/a	4.18	n/a	n/a	n/a	n/a	n/a

Complete Table 5 with information about storage structures. Describe the type (i.e. elevated, ground, etc.), the storage capacity of each type of structure, the year each structure was constructed, and the primary material for each structure. Add rows to the table as needed.

Table 5. Storage capacity, as of the end of the last calendar year

Structure Name	Type of Storage Structure	Year Constructed	Primary Material	Storage Capacity (Gallons)
King's Point Tower	Elevated storage	1995	Steel	400,000
Sunnyfield Tower	Elevated storage	2002	Steel	300,000
Central	Hydropneumatic tank	1999		1,900
Total	NA	NA	NA	701,900

Treatment and storage capacity versus demand

It is recommended that total storage equal or exceed the average daily demand.

Discuss the difference between current storage and treatment capacity versus the water supplier's projected average water demand over the next 10 years (see Table 7 for projected water demand):

It is generally recommended that a City's storage capacity be equal to at least the average day demand plus a fire fighting reserve. Since the City has two separate systems, each should be able to satisfy this constraint individually. The North System's storage capacity is 0.30 MG. The average day demand for this system is projected to increase to 0.22 MG by the year 2040. Therefore, it is not anticipated that the North System will require additional storage capacity over the lifetime of this plan. The South System's storage capacity is 0.40 MG. The average day demand for this system is estimated to reach 0.77 MG by the year 2040, so it is recommended that the City add additional storage capacity before that time. The City plans to add a 0.50 MG elevated storage tank to the South System before 2020. This additional elevated storage will also provide increased flow for fire suppression in the southwest corner of the City.

It is generally recommended that a City's treatment or production capacity be equal to at least the maximum day demand with the largest well out of service (firm capacity). The North System's firm capacity is 500 gpm. The maximum day demand for this system (based on a twenty-hour supply period) is projected to exceed that capacity in 2037 and reach 551 gpm by the year 2040, so the City should plan to install additional production capacity before that time. It is recommended that the City install an additional source capable of providing at least 500 gpm for the North System. If the City would like to be able to supply entirely treated water during maximum day demand through the year 2040, without supplementing untreated water, the North WTP's capacity will need to be upgraded to 700-750 gpm. The South System's firm capacity is 1,900 gpm. The maximum day demand for this system is projected to reach 1,921 gpm by the year 2040, so the City should consider installing additional production and treatment capacity before that time. It is recommended that the City install a new source capable of providing at least 500 gpm and a new WTP capable of treating 1,000 gpm in the southwest near the developments surrounding St. Bonifacius. An additional 500 gpm well can be installed in that area when there is adequate demand.

C. Water Sources

Complete Table 6 by listing all types of water sources that supply water to the system, including groundwater, surface water, interconnections with other water suppliers, or others. Provide the name of each source (aquifer name, river or lake name, name of interconnecting water supplier) and the Minnesota unique well number or intake ID, as appropriate. Report the year the source was installed or established and the current capacity. Provide information about the depth of all wells. Describe the status of the source (active, inactive, emergency only, retail/wholesale interconnection) and if the source facilities have a dedicated emergency power source. Add rows to the table as needed for each installation.

Include copies of well records and maintenance summary for each well that has occurred since your last approved plan in **Appendix 1.**

Table 6. Water sources and status

Resource Type (Groundwater, Surface water, Interconnection)	Resource Name	MN Unique Well # or Intake ID	Year Installed	Capacity (Gallons per Minute)	Well Depth (Feet)	Status of Normal and Emergency Operations (active, inactive, emergency only, retail/wholesale interconnection))	Does this Source have a Dedicated Emergency Power Source? (Yes or No)
Groundwater	Tunnel City – Wonewoc	Well 1: 208864	1971	500	678	Active	No
Groundwater	Tunnel City – Wonewoc	Well 2A:773393	2010	500	498	Active	No
Groundwater	Tunnel City – Wonewoc	Well 3: 161408	1980	500	785	Active	No
Groundwater	Mt. Simon	Well 4: 554097	1995	500	787	Active	No
Groundwater	Glacial Drift	Well 5: 638450	1999	400	253	Active	Yes
Groundwater	Wonewoc	Well 6: 818310	2016	500	593	Active	Yes
Groundwater	Wonewoc	Well 7: 818311	2016	500	517	Active	Yes
Interconnect	City of Mound			3000		Emergency Only	
Interconnect	City of Bonifacius			1600		Emergency Only	

Limits on Emergency Interconnections

Discuss any limitations on the use of the water sources (e.g. not to be operated simultaneously, limitations due to blending, aquifer recovery issues etc.) and the use of interconnections, including capacity limits or timing constraints (i.e. only 200 gallons per minute are available from the City of Prior Lake, and it is estimated to take 6 hours to establish the emergency connection). If there are no limitations, list none.

The interconnections with the City of Mound and St. Bonifacius are to be used only in the event of an emergency.

D. Future Demand Projections – *Key Metropolitan Council Benchmark*

Water Use Trends

Use the data in Table 2 to describe trends in 1) population served; 2) total per capita water demand; 3) average daily demand; 4) maximum daily demand. Then explain the causes for upward or downward trends. For example, over the ten years has the average daily demand trended up or down? Why is this occurring?

The historic trend in population served and average daily demands shows an increasing trend, likely due to the expansion of the City's water distribution system and new development occurring in the southwest part of the City. Total per capita demand and maximum daily demands show a decreasing trend. It is likely that improved appliances, decrease in irrigation, general attitude towards conservation, rainfall, and climate play a much larger role in water usage than other factors.

Use the water use trend information discussed above to complete Table 7 with projected annual demand for the next ten years. Communities in the seven-county Twin Cities metropolitan area must also include projections for 2030 and 2040 as part of their local comprehensive planning.

Projected demand should be consistent with trends evident in the historical data in Table 2, as discussed above. Projected demand should also reflect state demographer population projections and/or other planning projections.

Table 7. Projected annual water demand

Year	Projected Total Population	Projected Population Served	Projected Total Per Capita Water Demand (GPCD)	Projected Average Daily Demand (MGD)	Projected Maximum Daily Demand (MGD)
2019	7,810	4,310	116	0.50	1.50
2020	8,000	4,524	116	0.52	1.57
2021	8,180	4,700	116	0.55	1.64
2022	8,360	4,880	116	0.57	1.70
2023	8,540	5,060	116	0.59	1.76
2024	8,720	5,240	116	0.61	1.82
2025	8,900	5,420	116	0.63	1.89
2030	9,800	6,324	116	0.73	2.20
2040	12,000	8,524	116	0.99	2.97

GPCD – Gallons per Capita per Day **MGD** – Million Gallons per Day

Projection Method

Describe the method used to project water demand, including assumptions for population and business growth and how water conservation and efficiency programs affect projected water demand:

The projected population was assumed to increase linearly between the Metropolitan Council (MCES) estimates for 2020, 2030, and 2040. As of 2016, any new population growth will be serviced by the City's municipal water system. The per capita demands (daily average and max day peaking factors) were determined from the City's annual water use data from 2014-2018, during which time the maximum day peaking factor was 3.0 (on average over the five years).

E. Resource Sustainability

Monitoring – *Key DNR Benchmark*

Complete Table 8 by inserting information about source water quality monitoring efforts. The list should include all production wells, observation wells, and source water intakes or reservoirs. Additional information on groundwater level monitoring program at: http://www.dnr.state.mn.us/waters/groundwater_section/obwell/index.html Add rows to the table as needed.

Table 8. Information about source water quality and quantity monitoring

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
Well No. 1: Unique # 208864	☑ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☑Routine MDH sampling ☑Routine water utility sampling ☐ other	☑continuous ☐hourly ☑ daily ☐ monthly ☐quarterly ☐annually	☑SCADA ☑ grab sampling ☐ steel tape ☐ stream gauge
Well No. 2A: Unique # 773393	☑ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☑Routine MDH sampling ☑Routine water utility sampling ☐ other	☑continuous ☐hourly ☑ daily ☐ monthly ☐quarterly ☐annually	☑SCADA ☑ grab sampling ☐ steel tape ☐ stream gauge
Well No. 3: Unique # 161408	☑ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☑Routine MDH sampling ☑Routine water utility sampling ☐ other	☑continuous ☐hourly ☑ daily ☐ monthly ☐quarterly ☐annually	☑SCADA ☑ grab sampling ☐ steel tape ☐ stream gauge
Well No. 4: Unique # 554097	☑ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☑Routine MDH sampling ☑Routine water utility sampling ☐ other	☑continuous ☐hourly ☑ daily ☐ monthly ☐quarterly ☐annually	☑SCADA ☑ grab sampling ☐ steel tape ☐ stream gauge
Well No. 5: Unique # 638450	☑ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☑Routine MDH sampling ☑Routine water utility sampling ☐ other	☑continuous ☐hourly ☑ daily ☐ monthly ☐quarterly ☐annually	☑SCADA ☑ grab sampling ☐ steel tape ☐ stream gauge
Well No. 6: Unique # 818310	☑ production well ☐ observation well ☐ source water intake ☐ source water reservoir	☑Routine MDH sampling ☑Routine water utility sampling ☐ other	☑continuous ☐hourly ☑ daily ☐ monthly ☐quarterly ☐annually	☑SCADA ☑ grab sampling ☐ steel tape ☐ stream gauge
Well No. 7: Unique # 818311	☑ production well ☐ observation well	☑Routine MDH sampling	☑continuous ☐hourly	☑SCADA ☑ grab sampling

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
	☐ source water intake ☐ source water reservoir	☑Routine water utility sampling ☐ other	☑ daily ☐ monthly ☐quarterly ☐annually	☐ steel tape ☐ stream gauge
DNR Obwell 207044: Unique # 206937	☐ production well ☑ observation well ☐ source water intake ☐ source water reservoir	☐Routine MDH sampling ☑Routine water utility sampling ☐ other	☐continuous ☐hourly ☑ daily ☐ monthly ☐quarterly ☐annually	☐SCADA ☐ grab sampling ☑ steel tape ☐ stream gauge
DNR Obwell 207043: Unique # 208866	☐ production well ☑ observation well ☐ source water intake ☐ source water reservoir	☐Routine MDH sampling ☑Routine water utility sampling ☐ other	☐continuous ☐hourly ☑ daily ☐ monthly ☐quarterly ☐annually	☐SCADA ☐ grab sampling ☑ steel tape ☐ stream gauge

Water Level Data

A water level monitoring plan that includes monitoring locations and a schedule for water level readings must be submitted as **Appendix 2**. If one does not already exist, it needs to be prepared and submitted with the WSP. Ideally, all production and observation wells are monitored at least monthly.

Complete Table 9 to summarize water level data for each well being monitored. Provide the name of the aquifer and a brief description of how much water levels vary over the season (the difference between the highest and lowest water levels measured during the year) and the long-term trends for each well. If water levels are not measured and recorded on a routine basis, then provide the static water level when each well was constructed and the most recent water level measured during the same season the well was constructed. Also include all water level data taken during any well and pump maintenance. Add rows to the table as needed.

Provide water level data graphs for each well in **Appendix 3** for the life of the well, or for as many years as water levels have been measured. See DNR website for Date Time Water Level http://www.dnr.state.mn.us/waters/groundwater_section/obwell/waterleveldata.html

Table 9. Water level data

Unique Well Number or Well ID	Aquifer Name	Seasonal Variation (Feet)*	Long-term Trend in water level data*	Water level measured during well/pumping maintenance
Well 1: Unique # 208864	CTCW		☐ Falling ☐ Stable ☐ Rising	Daily from Sept 2016 – Feb. 2017
Well 2A: Unique # 773393	CTCW		☐ Falling ☐ Stable ☐ Rising	Daily from Sept 2016 – Feb. 2017
Well 3:	CTCW		☐ Falling	Daily from Sept

Unique Well Number or Well ID	Aquifer Name	Seasonal Variation (Feet)*	Long-term Trend in water level data*	Water level measured during well/pumping maintenance
Unique # 161408			☐ Stable ☐ Rising	2016 – Feb. 2017
Well 4: Unique # 554097	CMTS		☐ Falling ☐ Stable ☐ Rising	Daily from Sept 2016 – Feb. 2017
Well 5: Unique # 638450	CSLF		☐ Falling ☐ Stable ☐ Rising	Daily from Sept 2016 – Feb. 2017
DNR Observation Well # 27044: Unique # 206937	CMTS	Approximately 6.8 feet	☐ Falling ☑ Stable ☐ Rising	Daily from 2011 - 2016
DNR Observation Well # 27043: Unique # 208866	CMRC	Approximately 9.1 feet	☐ Falling ☑ Stable ☐ Rising	Daily from 2011 - 2016

*The City did not measure this data until SCADA upgrade, water level data is now measured daily

Potential Water Supply Issues & Natural Resource Impacts – *Key DNR & Metropolitan Council Benchmark*

Complete Table 10 by listing the types of natural resources that are or could be impacted by permitted water withdrawals. If known, provide the name of specific resources that may be impacted. Identify what the greatest risks to the resource are and how the risks are being assessed. Identify any resource protection thresholds – formal or informal – that have been established to identify when actions should be taken to mitigate impacts. Provide information about the potential mitigation actions that may be taken, if a resource protection threshold is crossed. Add additional rows to the table as needed. See the glossary at the end of the template for definitions.

Some of this baseline data should have been in your earlier water supply plans or county comprehensive water plans. When filling out this table, think of what are the water supply risks, identify the resources, determine the threshold and then determine what your community will do to mitigate the impacts.

Your DNR area hydrologist is available to assist with this table.

For communities in the seven-county Twin Cities metropolitan area, the *Master Water Supply Plan Appendix 1 (Water Supply Profiles*, provides information about potential water supply issues and natural resource impacts for your community.

Table 10. Natural resource impacts

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
☐ River or		☐ Flow/water	☐ GIS analysis		☐ Revise	

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
stream		level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts ☐Other: _____	☐ Modeling ☐ Mapping ☐ Monitoring ☐ Aquifer testing ☐ Other: ___		permit ☐ Change groundwater pumping ☐ Increase conservation ☐ Other	
☐ Calcareous fen		☐ Flow/water level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts ☐Other: _____	☐ GIS analysis ☐ Modeling ☐ Mapping ☐ Monitoring ☐ Aquifer testing ☐ Other: ___		☐ Revise permit ☐ Change groundwater pumping ☐ Increase conservation ☐ Other	
☑ Lake	Whaletail Lake/Ox Yoke Lake	☑ Flow/water level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts ☑Other: Unknown	☐ GIS analysis ☐ GIS analysis ☐ Modeling ☐ Mapping ☑ Monitoring ☐ Aquifer testing ☐ Other: ___	Lower limit on acceptable lake level	☐ Revise permit ☐ Change groundwater pumping ☑ Increase conservation ☐ Other	Monitor lake levels and compare to historic records (if available) to determine lake level trends.
☐ Wetland		☐ Flow/water level decline ☐ Degrading water quality	☐ GIS analysis ☐ Modeling ☐ Mapping ☐ Monitoring		☐ Revise permit ☐ Change groundwater	

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
		trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts ☐Other:	☐ Aquifer testing ☐ Other: ___		pumping ☐ Increase conservation ☐ Other	
☐ Trout Stream		☐ Flow/water level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts ☐Other: _____	☐ GIS analysis ☐ Modeling ☐ Mapping ☐ Monitoring ☐ Aquifer testing ☐ Other: ___		☐ Revise permit ☐ Change groundwater pumping ☐ Increase conservation ☐ Other	
☑ Aquifer	Tunnel City/ Wonewoc/ Mt. Simon	☑ Flow/water level decline ☐ Degrading water quality trends and/or MCLs exceeded ☐ Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts ☑Other: Unknown	☐ GIS analysis ☐ Modeling ☐ Mapping ☑ Monitoring ☑ Aquifer testing ☐ Other: ___	Decline at one or more monitoring wells. Withdrawals that exceed some percent of the total amount available from a source during well pumping.	☐ Revise permit ☐ Change groundwater pumping ☑ Increase conservation ☐ Other	Compare new monitoring data to determine trends in aquifer levels.
☐ Endangered, threatened, or special concern						

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
species habitat, other Natural resource impacts						

* Examples of thresholds: a lower limit on acceptable flow in a river or stream; water quality outside of an accepted range; a lower limit on acceptable aquifer level decline at one or more monitoring wells; withdrawals that exceed some percent of the total amount available from a source; or a lower limit on acceptable changes to a protected habitat.

Wellhead Protection (WHP) and Source Water Protection (SWP) Plans

Complete Table 11 to provide status information about WHP and SWP plans.

The emergency procedures in this plan are intended to comply with the contingency plan provisions required in the Minnesota Department of Health's (MDH) Wellhead Protection (WHP) Plan and Surface Water Protection (SWP) Plan.

Table 11. Status of Wellhead Protection and Source Water Protection Plans

Plan Type	Status	Date Adopted	Date for Update
WHP	☑ In Process ☐Completed ☐ Not Applicable	September 2016	September 2026
SWP	☐ In Process ☐ Completed ☑ Not Applicable		

WHP – Wellhead Protection Plan **SWP** – Source Water Protection Plan

F. Capital Improvement Plan (CIP)

Please note that any wells that received approval under a ten-year permit, but that were not built, are now expired and must submit a water appropriations permit.

Adequacy of Water Supply System

Complete Table 12 with information about the adequacy of wells and/or intakes, storage facilities, treatment facilities, and distribution systems to sustain current and projected demands. List planned capital improvements for any system components, in chronological order. Communities in the seven-county Twin Cities metropolitan area should also include information about plans through 2040.

The assessment can be the general status by category; it is not necessary to identify every single well, storage facility, treatment facility, lift station, and mile of pipe.

Please attach your latest Capital Improvement Plan as **Appendix 4**.

Table 12. Adequacy of Water Supply System

System Component	Planned action	Anticipated Construction Year	Notes
Wells/Intakes	☐ No action planned - adequate ☐ Repair/replacement ☑ Expansion/addition	TBD	-Additional water supply wells
Water Storage Facilities	☐ No action planned - adequate ☐ Repair/replacement ☑ Expansion/addition	2018 - 2019	-Additional elevated storage tank
Water Treatment Facilities	☐ No action planned - adequate ☐ Repair/replacement ☑ Expansion/addition	2030-2040	-Additional Southwest WTP
Distribution Systems (pipes, valves, etc.)	☐ No action planned - adequate ☐ Repair/replacement ☑ Expansion/addition	2017-2040	-Watermain expansion*
Pressure Zones	☐ No action planned - adequate ☐ Repair/replacement ☐ Expansion/addition		
Other:	☐ No action planned - adequate ☐ Repair/replacement ☐ Expansion/addition		

*Expansion of water distribution system is dependent of future developments

Proposed Future Water Sources

Complete Table 13 to identify new water source installation planned over the next ten years. Add rows to the table as needed.

Table 13. Proposed future installations/sources

Source	Installation Location (approximate)	Resource Name	Proposed Pumping Capacity (gpm)	Planned Installation Year	Planned Partnerships
Groundwater	Southwest	n/a	500	Approx. 2036	n/a
Groundwater	North system	n/a	500	Approx. 2033	n/a
Surface Water					
Interconnection to another supplier					

Water Source Alternatives - *Key Metropolitan Council Benchmark*

Do you anticipate the need for alternative water sources in the next 10 years? __ Yes ✓ No

For metro communities, will you need alternative water sources by the year 2040? __ Yes ✓ No

If you answered yes for either question, then complete table 14. If no, insert NA.

Complete Table 14 by checking the box next to alternative approaches that your community is considering, including approximate locations (if known), the estimated amount of future demand that could be met through the approach, the estimated timeframe to implement the approach, potential partnerships, and the major benefits and challenges of the approach. Add rows to the table as needed.

For communities in the seven-county Twin Cities metropolitan area, these alternatives should include approaches the community is considering to meet projected 2040 water demand.

Table 14. Alternative water sources

Alternative Source Considered	Source and/or Installation Location (approximate)	Estimated Amount of Future Demand (%)	Timeframe to Implement (YYYY)	Potential Partners	Benefits	Challenges
☐ Groundwater						
☐ Surface Water						
☐ Reclaimed Stormwater						
☐ Reclaimed Wastewater						
☐ Interconnection to another supplier						

Part 2. Emergency Preparedness Procedures

The emergency preparedness procedures outlined in this plan are intended to comply with the contingency plan provisions required by MDH in the WHP and SWP. Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failings, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan. Municipalities that already have written procedures dealing with water emergencies should review the following information and update existing procedures to address these water supply protection measures.

A. Federal Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act, (Public Law 107-188, Title IV- Drinking Water Security and Safety) requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan.

Do you have a federal emergency response plan? ☑ Yes ☐ No

If yes, what was the date it was certified? __Revised in 2015_____

Complete Table 15 by inserting the noted information regarding your completed Federal Emergency Response Plan.

Table 15. Emergency Preparedness Plan contact information

Emergency Response Plan Role	Contact Person	Contact Phone Number	Contact Email
Emergency Response Lead	Gary Peters	952-241-2532	gpeters@ci.minnetrista.mn.us
Alternate Emergency Response Lead	Mike Pawelk	952-466-2538	

B. Operational Contingency Plan

All utilities should have a written operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance.

Do you have a written operational contingency plan? ☐ Yes ☑ No

At a minimum, a water supplier should prepare and maintain an emergency contact list of contractors and suppliers.

C. Emergency Response Procedures

Water suppliers must meet the requirements of MN Rules 4720.5280 . Accordingly, the Minnesota Department of Natural Resources (DNR) requires public water suppliers serving more than 1,000 people to submit Emergency and Conservation Plans. Water emergency and conservation plans that have been approved by the DNR, under provisions of Minnesota Statute 186 and Minnesota Rules, part 6115.0770, will be considered equivalent to an approved WHP contingency plan.

Emergency Telephone List

Prepare and attach a list of emergency contacts, including the MN Duty Officer (1-800-422-0798), as **Appendix 5**. A template is available at www.mndnr.gov/watersupplyplans

The list should include key utility and community personnel, contacts in adjacent water suppliers, and appropriate local, state and federal emergency contacts. Please be sure to verify and update the contacts on the emergency telephone list and date it. Thereafter, update on a regular basis (once a year is recommended). In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the Emergency Manager for that community. Responsibilities and services for each contact should be defined.

Current Water Sources and Service Area

Quick access to concise and detailed information on water sources, water treatment, and the distribution system may be needed in an emergency. System operation and maintenance records should be maintained in secured central and back-up locations so that the records are accessible for emergency purposes. A detailed map of the system showing the treatment plants, water sources, storage facilities, supply lines, interconnections, and other information that would be useful in an emergency should also be readily available. It is critical that public water supplier representatives and emergency response personnel communicate about the response procedures and be able to easily obtain this kind of information both in electronic and hard copy formats (in case of a power outage).

Do records and maps exist? ☑ Yes ☐ No

Can staff access records and maps from a central secured location in the event of an emergency?

☑ Yes ☐ No

Does the appropriate staff know where the materials are located?

☑ Yes ☐ No

Procedure for Augmenting Water Supplies

Complete Tables 16 – 17 by listing all available sources of water that can be used to augment or replace existing sources in an emergency. Add rows to the tables as needed.

In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the warning point for that community. Municipalities are encouraged to execute cooperative agreements for potential emergency water services and copies should be included in **Appendix 6**. Outstate Communities may consider using nearby high capacity wells (industry, golf course) as emergency water sources.

WSP should include information on any physical or chemical problems that may limit interconnections to other sources of water. Approvals from the MDH are required for interconnections or the reuse of water.

Table 16. Interconnections with other water supply systems to supply water in an emergency

Other Water Supply System Owner	Capacity (GPM & MGD)	Note Any Limitations On Use	List of services, equipment, supplies available to respond
City of Mound	3000 GPM/ 4.32MGD	Emergency Only	Interconnect
City of St. Bonifacius	1600 GPM/ 2.30 MGD	Emergency Only	Interconnect

GPM – Gallons per minute MGD – million gallons per day

Table 17. Utilizing surface water as an alternative source

Surface Water Source Name	Capacity (GPM)	Capacity (MGD)	Treatment Needs	Note Any Limitations On Use
N/A				

If not covered above, describe additional emergency measures for providing water (obtaining bottled water, or steps to obtain National Guard services, etc.)

For a short-term emergency, the City would obtain and distribute bottled water. For long-term water emergency, bulk water distribution would be set up at public facilities.

Allocation and Demand Reduction Procedures

Complete Table 18 by adding information about how decisions will be made to allocate water and reduce demand during an emergency. Provide information for each customer category, including its priority ranking, average day demand, and demand reduction potential for each customer category. Modify the customer categories as needed, and add additional lines if necessary.

Water use categories should be prioritized in a way that is consistent with Minnesota Statutes 103G.261 (#1 is highest priority) as follows:

1. Water use for human needs such as cooking, cleaning, drinking, washing and waste disposal; use for on-farm livestock watering; and use for power production that meets contingency requirements.
2. Water use involving consumption of less than 10,000 gallons per day (usually from private wells or surface water intakes)
3. Water use for agricultural irrigation and processing of agricultural products involving consumption of more than 10,000 gallons per day (usually from private high-capacity wells or surface water intakes)
4. Water use for power production above the use provided for in the contingency plan.
5. All other water use involving consumption of more than 10,000 gallons per day.
6. Nonessential uses – car washes, golf courses, etc.

Water used for human needs at hospitals, nursing homes and similar types of facilities should be designated as a high priority to be maintained in an emergency. Lower priority uses will need to address water used for human needs at other types of facilities such as hotels, office buildings, and

manufacturing plants. The volume of water and other types of water uses at these facilities must be carefully considered. After reviewing the data, common sense should dictate local allocation priorities to protect domestic requirements over certain types of economic needs. Water use for lawn sprinkling, vehicle washing, golf courses, and recreation are legislatively considered non-essential.

Table 18. Water use priorities

Customer Category	Allocation Priority	Average Daily Demand (GDP)	Short-Term Emergency Demand Reduction Potential (GPD)
Residential	1	304,400	*
Institutional/Commercial	2	17,600	*
Irrigation	3	11,900	*
Non-Essential	4		294.200
TOTAL	N/A	333,900	294,200

GPD – Gallons per Day; 2014-2015 Water Use Data; *Non-essential calculated as increased summer demand between all customer categories

Tip: Calculating Emergency Demand Reduction Potential

The emergency demand reduction potential for all uses will typically equal the difference between maximum use (summer demand) and base use (winter demand). In extreme emergency situations, lower priority water uses must be restricted or eliminated to protect priority domestic water requirements. Emergency demand reduction potential should be based on average day demands for customer categories within each priority class. Use the tables in Part 3 on water conservation to help you determine strategies.

Complete Table 19 by selecting the triggers and actions during water supply disruption conditions.

Table 19. Emergency demand reduction conditions, triggers and actions (Select all that may apply and describe)

Emergency Triggers	Short-term Actions	Long-term Actions
☑ Contamination ☑ Loss of production ☑ Infrastructure failure ☑ Executive order by Governor	☑ Supply augmentation through interconnection ☑ Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. ☑ Water allocation through emergency action of City Council ☐ Meet with large water users to discuss their contingency plan. ☑ Voluntary reduction measures encouraged by public service announcements, i.e. bill stuffers, fliers, and notices in local newspaper	☑ Supply augmentation through interconnection ☑ Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. ☑ Water allocation through emergency action of City Council ☑ Meet with large water users to discuss their contingency plan.

Notification Procedures

Complete Table 20 by selecting trigger for informing customers regarding conservation requests, water use restrictions, and suspensions; notification frequencies; and partners that may assist in the notification process. Add rows to the table as needed.

Table 20. Plan to inform customers regarding conservation requests, water use restrictions, and suspensions

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
☑ Short-term demand reduction declared (< 1 year)	☑ Website ☐ Email list serve ☑ Social media (e.g. Twitter, Facebook) ☑ Direct customer mailing, ☑ Press release (TV, radio, newspaper), ☐ Meeting with large water users (> 10% of total city use) ☐ Other: _____	☐ Daily ☐ Weekly ☑ Monthly ☐ Annually	• City Staff • Neighboring communities • Local news outlets
☑ Long-term Ongoing demand reduction declared	☑ Website ☐ Email list serve ☑ Social media (e.g. Twitter, Facebook) ☑ Direct customer mailing, ☑ Press release (TV, radio, newspaper), ☐ Meeting with large water users (> 10% of total city use) ☐ Other: _____	☐ Daily ☐ Weekly ☐ Monthly ☑ Annually	• City Staff • Neighboring communities • Local news outlets
☑ Governor's Critical water deficiency declared	☑ Website ☐ Email list serve ☑ Social media (e.g. Twitter, Facebook) ☑ Direct customer mailing, ☑ Press release (TV, radio, newspaper), ☐ Meeting with large water users (> 10% of total city use) ☐ Other: _____	☐ Daily ☐ Weekly ☐ Monthly ☐ Annually ☑ As needed	• City Staff • Neighboring communities • Local news outlets

Enforcement

Prior to a water emergency, municipal water suppliers must adopt regulations that restrict water use and outline the enforcement response plan. The enforcement response plan must outline how conditions will be monitored to know when enforcement actions are triggered, what enforcement tools will be used, who will be responsible for enforcement, and what timelines for corrective actions will be expected.

Affected operations, communications, and enforcement staff must then be trained to rapidly implement those provisions during emergency conditions.

Important Note:

Disregard of critical water deficiency orders, even though total appropriation remains less than permitted, is adequate grounds for immediate modification of a public water supply authority's water use permit (2013 MN Statutes 103G.291)

Does the city have a critical water deficiency restriction/official control in place that includes provisions to restrict water use and enforce the restrictions? (This restriction may be an ordinance, rule, regulation, policy under a council directive, or other official control) ☑ Yes ☐ No

If yes, attach the official control document to this WSP as **Appendix 7**.

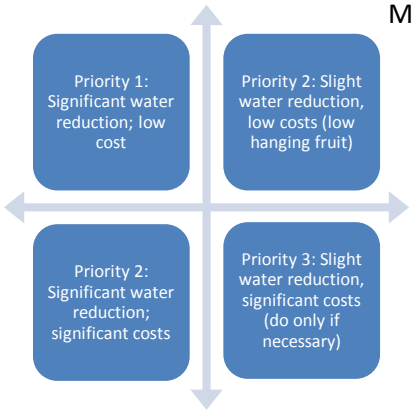
If no, the municipality must adopt such an official control within 6 months of submitting this WSP and submit it to the DNR as an amendment to this WSP.

Irrespective of whether a critical water deficiency control is in place, does the public water supply utility, city manager, mayor, or emergency manager have standing authority to implement water restrictions? ☑ Yes ☐ No

If yes, cite the regulatory authority reference: ____ Ordinance Code 700.33**_____**

If no, who has authority to implement water use restrictions in an emergency?

PART 3. WATER CONSERVATION PLAN



Minnesotans have historically benefited from the state's abundant water supplies, reducing the need for conservation. There are however, limits to the available supplies of water and increasing threats to the quality of our drinking water. Causes of water supply limitation may include: population increases, economic trends, uneven statewide availability of groundwater, climatic changes, and degraded water quality. Examples of threats to drinking water quality include: the presence of contaminant plumes from past land use activities, exceedances of water quality standards from natural and human sources, contaminants of emerging concern, and increasing pollutant trends from nonpoint sources.

There are many incentives for conserving water; conservation:

- reduces the potential for pumping-induced transfer of contaminants into the deeper aquifers, which can add treatment costs
- reduces the need for capital projects to expand system capacity
- reduces the likelihood of water use conflicts, like well interference, aquatic habitat loss, and declining lake levels
- conserves energy, because less energy is needed to extract, treat and distribute water (and less energy production also conserves water since water is use to produce energy)
- maintains water supplies that can then be available during times of drought

It is therefore imperative that water suppliers implement water conservation plans. The first step in water conservation is identifying opportunities for behavioral or engineering changes that could be made to reduce water use by conducting a thorough analysis of:

- Water use by customer
- Extraction, treatment, distribution and irrigation system efficiencies
- Industrial processing system efficiencies
- Regulatory and barriers to conservation
- Cultural barriers to conservation
- Water reuse opportunities

Once accurate data is compiled, water suppliers can set achievable goals for reducing water use. A successful water conservation plan follows a logical sequence of events. The plan should address both conservation on the supply side (leak detection and repairs, metering), as well as on the demand side (reductions in usage). Implementation should be conducted in phases, starting with the most obvious and lowest-cost options. In some cases one of the early steps will be reviewing regulatory constraints to water conservation, such as lawn irrigation requirements. Outside funding and grants may be available for implementation of projects. Engage water system operators and maintenance staff and customers in brainstorming opportunities to reduce water use. Ask the question: "How can I help save water?"

Progress since 2006

Is this your community's first Water Supply Plan? ☐ Yes ☑ No

If yes, describe conservation practices that you are already implementing, such as: pricing, system improvements, education, regulation, appliance retrofitting, enforcement, etc.

If no, complete Table 21 to summarize conservation actions taken since the adoption of the 2006 water supply plan.

Table 21. Implementation of previous ten-year Conservation Plan

2006 Plan Commitments	Action Taken?
Change Water Rates Structure to provide conservation pricing	☑ Yes ☐ No
Water Supply System Improvements (e.g. leak repairs, valve replacements, etc.)	☑ Yes ☐ No
Educational Efforts	☑ Yes ☐ No
New water conservation ordinances	☐ Yes ☐ No
Rebate or retrofitting Program (e.g. for toilet, faucets, appliances, showerheads, dish washers, washing machines, irrigation systems, rain barrels, water softeners, etc.	☐ Yes ☐ No
Enforcement	☑ Yes ☐ No
Describe Other	☐ Yes ☐ No

What are the results you have seen from the actions in Table 21 and how were results measured?

The City has automated meter system to notify the City of leaky fixtures. The City has also seen a decreasing trend in residential and total per capita demand with the exception of 2012.

A. Triggers for Allocation and Demand Reduction Actions

Complete table 22 by checking each trigger below, as appropriate, and the actions to be taken at various levels or stages of severity. Add in additional rows to the table as needed.

Table 22. Short and long-term demand reduction conditions, triggers and actions

Objective	Triggers	Actions
Protect Surface Water Flows	☐ Low stream flow conditions ☑ Reports of declining wetland and lake levels	☑ Increase promotion of conservation measures ☑ Other: consider water reuse/stormwater irrigation projects
Short-term demand reduction (less than 1 year	☑ Extremely high seasonal water demand (daily demands exceed 80% of firm capacity	☑ Enforce the critical water deficiency ordinance to restrict or prohibit lawn watering, vehicle washing, golf course and

Objective	Triggers	Actions
	and precipitation forecast is for dry conditions) ☑ Loss of treatment capacity ☑ Lack of water in storage ☑ State drought plan ☑ Well interference ☐ Other:	park irrigation & other nonessential uses. ☑ Supply augmentation through emergency interconnection ☑ Water allocation through emergency interconnection ☐ Meet with large water users to discuss user's contingency plan.
Long-term demand reduction (>1 year)	☑ Per capita demand increasing ☐ Total demand increase (higher population or more industry)Water level in well(s) below elevation of _____ ☑ Declared emergency	☑ Develop a critical water deficiency ordinance that is or can be quickly adopted to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. ☑ Enact a water waste ordinance that targets overwatering (causing water to flow off the landscape into streets, parking lots, or similar), watering impervious surfaces (streets, driveways or other hardscape areas), and negligence of known leaks, breaks, or malfunctions. ☐ Meet with large water users to discuss user's contingency plan. ☑ Enhanced monitoring and reporting: audits, meters, billing, etc.
Governor's "Critical Water Deficiency Order" declared	☑ Describe Governor Declaration as needed	☑ Describe Take action as directed by the governor

B. Conservation Objectives and Strategies – *Key benchmark for DNR*

This section establishes water conservation objectives and strategies for eight major areas of water use.

Objective 1: Reduce Unaccounted (Non-Revenue) Water loss to Less than 10%

The Minnesota Rural Waters Association, the Metropolitan Council and the Department of Natural Resources recommend that all water uses be metered. Metering can help identify high use locations and times, along with leaks within buildings that have multiple meters.

It is difficult to quantify specific unmetered water use such as that associated with firefighting and system flushing or system leaks. Typically, water suppliers subtract metered water use from total water pumped to calculate unaccounted or non-revenue water loss.

Is your ten-year average (2005-2014) unaccounted Water Use in Table 2 higher than 10%?

☐ Yes ☑ No

What is your leak detection monitoring schedule? (e.g. monitor 1/3rd of the city lines per year)

Leak detection surveys are performed as needed.

Water Audits - are intended to identify, quantify and verify water and revenue losses. The volume of unaccounted-for water should be evaluated each billing cycle. The American Water Works Association

(AWWA) recommends that ten percent or less of pumped water is unaccounted-for water. Water audit procedures are available from the AWWA and MN Rural Water Association www.mrwa.com . Drinking Water Revolving Loan Funds are available for purchase of new meters when new plants are built.

What is the date of your most recent water audit? __n/a___

Frequency of water audits: ☐ **yearly** ☑ **other (specify frequency):** as needed
Leak detection and survey: ☐ **every year** ☐ **every other year** ☑ **periodic as needed**
Year last leak detection survey completed: ___n/a_____

If Table 2 shows annual water losses over 10% or an increasing trend over time, describe what actions will be taken to reach the <10% loss objective and within what timeframe

Metering -AWWA recommends that every water supplier install meters to account for all water taken into its system, along with all water distributed from its system at each customer's point of service. An effective metering program relies upon periodic performance testing, repair, maintenance or replacement of all meters. AWWA also recommends that water suppliers conduct regular water audits to ensure accountability. Some cities install separate meters for interior and exterior water use, but some research suggests that this may not result in water conservation.

Complete Table 23 by adding the requested information regarding the number, types, testing and maintenance of customer meters.

Table 23. Information about customer meters

Customer Category	Number of Customers	Number of Metered Connections	Number of Automated Meter Readers	Meter testing intervals (years)	Average age/meter replacement schedule (years
Residential	1,245	1,245	1,245	Quarterly	3.2 years / failure
Irrigation	20	20	20	Quarterly	3.2 years / failure
Commercial/institutional	31	31	31	Quarterly	3.2 years / failure
Public Facilities	7	7	7	Quarterly	3.2 years / failure
TOTALS	1,303	1,303	1,303	N/A	N/A

For unmetered systems, describe any plans to install meters or replace current meters with advanced technology meters. Provide an estimate of the cost to implement the plan and the projected water savings from implementing the plan.

The City is completing the final phase of replacing meters in the North system with updated water meters. For the remaining unmetered parts of the City, the City does require property owners to hook up to City water.

Table 24. Water source meters

	Number of Meters	Meter testing schedule (years)	Number of Automated Meter Readers	Average age/meter replacement schedule (years
Water Source (wells/intakes)	6	6	6	13 years / as needed
Treatment Plant	2	2	2	New/ as needed

Objective 2: Achieve Less than 75 Residential Gallons per Capita Demand (GPCD)

The 2002 average residential per capita demand in the Twin Cities Metropolitan area was 75 gallons per capita per day.

Is your average 2010-2015 residential per capita water demand in Table 2 more than 75? ☑ Yes ☐ No

What was your 2005 – 2014 ten-year average residential per capita water demand? 113 gal/person/day

Describe the water use trend over that timeframe:

From the MnDNR and City water use reports from 2009 to 2015, there has been an overall decrease in residential per capita demand with the exception of 2012, where water usage increased from the previous year.

Complete Table 25 by checking which strategies you will use to continue reducing residential per capita demand and project a likely timeframe for completing each checked strategy (Select all that apply and add rows for additional strategies):

Table 25. Strategies and timeframe to reduce residential per capita demand

Strategy to reduce residential per capita demand	Timeframe for completing work
☑ Revise city ordinances/codes to encourage or require water efficient landscaping.	Ongoing
☑ Revise city ordinance/codes to permit water reuse options, especially for non-potable purposes like irrigation, groundwater recharge, and industrial use. Check with plumbing authority to see if internal buildings reuse is permitted	Annually
☑ Revise ordinances to limit irrigation. Describe the restricted irrigation plan:	3-6 years following adoption of this plan
☐ Revise outdoor irrigation installations codes to require high efficiency systems (e.g. those with soil moisture sensors or programmable watering areas) in new installations or system replacements.	
☑ Make water system infrastructure improvements	Ongoing
☐ Offer free or reduced cost water use audits) for residential customers.	
☐ Implement a notification system to inform customers when water availability conditions change.	
☐ Provide rebates or incentives for installing water efficient appliances and/or fixtures indoors (e.g., low flow toilets, high efficiency dish washers and washing machines,	

Strategy to reduce residential per capita demand	Timeframe for completing work
showerhead and faucet aerators, water softeners, etc.)	
☐ Provide rebates or incentives to reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	
☐ Identify supplemental Water Resources	
☑ Conduct audience-appropriate water conservation education and outreach.	Ongoing
☐ Describe other plans	

Objective 3: Achieve at least a 1.5% per year water reduction for Institutional, Industrial, Commercial, and Agricultural GPCD over the next 10 years or a 15% reduction in ten years.
Complete Table 26 by checking which strategies you will used to continue reducing non-residential customer use demand and project a likely timeframe for completing each checked strategy (add rows for additional strategies).

Where possible, substitute recycled water used in one process for reuse in another. (For example, spent rinse water can often be reused in a cooling tower.) Keep in mind the true cost of water is the amount on the water bill PLUS the expenses to heat, cool, treat, pump, and dispose of/discharge the water. Don't just calculate the initial investment. Many conservation retrofits that appear to be prohibitively expensive are actually very cost-effective when amortized over the life of the equipment. Often reducing water use also saves electrical and other utility costs. Note: as of 2015, water reuse, and is not allowed by the state plumbing code, M.R. 4715 (a variance is needed). However several state agencies are addressing this issue.

Table 26. Strategies and timeframe to reduce institutional, commercial, industrial, and agricultural and non-revenue use demand

Strategy to reduce total business, industry, agricultural demand	Timeframe for completing work
☑ Conduct a facility water use audit for both indoor and outdoor use, including system components	Annually
☑ Continue to install enhanced meters capable of automated readings to detect spikes in consumption	Ongoing
☐ Compare facility water use to related industry benchmarks, if available (e.g., meat processing, dairy, fruit and vegetable, beverage, textiles, paper/pulp, metals, technology, petroleum refining etc.),	
☑ Install water conservation fixtures and appliances or change processes to conserve water	Ongoing
☑ Repair leaking system components (e.g., pipes, valves)	Ongoing
☑ Investigate the reuse of reclaimed water (e.g., stormwater, wastewater effluent, process wastewater, etc.)	Annually
☑ Reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	Ongoing
☑ Train employees how to conserve water	Ongoing
☐ Implement a notification system to inform non-residential customers when water availability conditions change.	
☐ [Rainwater catchment systems intended to supply uses such as water closets, urinals, trap primers for floor	

Strategy to reduce total business, industry, agricultural demand	Timeframe for completing work
drains and floor sinks, industrial processes, water features, vehicle washing facilities, cooling tower makeup, and similar uses shall be approved by the commissioner. Proposed plumbing code 4714.1702.1 http://www.dli.mn.gov/PDF/docket/4714rule.pdf	
☐ Describe other plans:	

Objective 4: Achieve a Decreasing Trend in Total Per Capita Demand

Include as **Appendix 8** one graph showing total per capita water demand for each customer category (i.e., residential, institutional, commercial, industrial) from 2005-2014 and add the calculated/estimated linear trend for the next 10 years.

Describe the trend for each customer category; explain the reason(s) for the trends, and where trends are increasing.

The overall trend for total per capita demand has been decreasing for the last 10 years. This is likely due to decreasing trend in the residential, C/I/I, and agricultural/irrigation per capita demands seen from the previous 10 years of water use data. These decreasing trends may be attributed to water efficient fixtures and public education on the importance of water conservation.

Objective 5: Reduce Peak Day Demand so that the Ratio of Average Maximum day to the Average Day is less than 2.6

Is the ratio of average 2005-2014 maximum day demand to average 2005-2014 average day demand reported in Table 2 more than 2.6? ☑ Yes ☐ No

Calculate a ten year average (2005 – 2014) of the ratio of maximum day demand to average day demand: _3.4__

The position of the DNR has been that a peak day/average day ratio that is above 2.6 for in summer indicates that the water being used for irrigation by the residents in a community is too large and that efforts should be made to reduce the peak day use by the community.

It should be noted that by reducing the peak day use, communities can also reduce the amount of infrastructure that is required to meet the peak day use. This infrastructure includes new wells, new water towers which can be costly items.

Objective 6: Implement a Conservation Water Rate Structure and/or a Uniform Rate Structure with a Water Conservation Program

Water Conservation Program

Municipal water suppliers serving over 1,000 people are required to adopt demand reduction measures that include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction. These measures must achieve demand reduction in ways that reduce water demand, water losses, peak water demands, and nonessential water uses. These measures must be approved before a community may request well construction approval from the Department of

Health or before requesting an increase in water appropriations permit volume (*Minnesota Statutes*, section 103G.291, subd. 3 and 4). Rates should be adjusted on a regular basis to ensure that revenue of the system is adequate under reduced demand scenarios. If a municipal water supplier intends to use a Uniform Rate Structure, a community-wide Water Conservation Program that will achieve demand reduction must be provided.

Current Water Rates

Include a copy of the actual rate structure in **Appendix 9** or list current water rates including base/service fees and volume charges below.

Volume included in base rate or service charge: ___1,000__ gallons or ____ cubic feet ___ other

Frequency of billing: ☐ Monthly ☐ Bimonthly ☑ Quarterly ☐ Other: _____

Water Rate Evaluation Frequency: ☑ every year ☐ every ___ years ☐ no schedule

Date of last rate change: __January 2017_____

Table 27. Rate structures for each customer category (Select all that apply and add additional rows as needed)

Customer Category	Conservation Billing Strategies in Use *	Conservation Neutral Billing Strategies in Use **	Non-Conserving Billing Strategies in Use ***
Residential	☐ Monthly Billing ☑ Increasing block rates (volume tiered rates) ☐ Seasonal rates ☐ Time of Use rates ☐ Water bills reported in gallons ☐ Individualized goal rates ☐ Excess Use rates ☐ Drought surcharge ☐ Use water bill to provide comparisons ☐ Service charge not based on water volume ☐ Other (describe)	☐ Uniform ☑ Odd/Even day watering	☐ Service charge based on water volume ☐ Declining block ☐ Flat ☐ Other (describe)
Commercial/ Industrial/ Institutional	☐ Monthly Billing ☑ Increasing block rates ☐ Seasonal rates ☐ Time of Use rates ☐ Bill water use in gallons ☐ Individualized goal rates ☐ Excess Use rates ☐ Drought surcharge ☐ Use water bill to provide comparisons ☐ Service charge not based on water volume ☐ Other (describe)	☐ Uniform ☑ Odd/Even day watering	☐ Service charge based on water volume ☐ Declining block ☐ Flat ☐ Other (describe)

Customer Category	Conservation Billing Strategies in Use *	Conservation Neutral Billing Strategies in Use **	Non-Conserving Billing Strategies in Use ***
☐ Other			

*** Rate Structures components that may promote water conservation:**

- **Monthly billing:** is encouraged to help people see their water usage so they can consider changing behavior.
- **Increasing block rates (also known as a tiered residential rate structure):** Typically, these have at least three tiers: should have at least three tiers.
    - The first tier is for the winter average water use.
    - The second tier is the year-round average use, which is lower than typical summer use. This rate should be set to cover the full cost of service.
    - The third tier should be above the average annual use and should be priced high enough to encourage conservation, as should any higher tiers. For this to be effective, the difference in block rates should be significant.
- **Seasonal rate:** higher rates in summer to reduce peak demands
- **Time of Use rates:** lower rates for off peak water use
- **Bill water use in gallons:** this allows customers to compare their use to average rates
- **Individualized goal rates:** typically used for industry, business or other large water users to promote water conservation if they keep within agreed upon goals. **Excess Use rates**: if water use goes above an agreed upon amount this higher rate is charged
- **Drought surcharge:** an extra fee is charged for guaranteed water use during drought
- **Use water bill to provide comparisons**: simple graphics comparing individual use over time or compare individual use to others.
- **Service charge or base fee that does not include a water volume** – a base charge or fee to cover universal city expenses that are not customer dependent and/or to provide minimal water at a lower rate (e.g., an amount less than the average residential per capita demand for the water supplier for the last 5 years)
- **Emergency rates** -A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

****Conservation Neutral****

- **Uniform rate**: rate per unit used is the same regardless of the volume used
- **Odd/even day watering** –This approach reduces peak demand on a daily basis for system operation, but it does not reduce overall water use.

***** Non-Conserving *****

- **Service charge or base fee with water volume:** an amount of water larger than the average residential per capita demand for the water supplier for the last 5 years
- **Declining block rate:** the rate per unit used decreases as water use increases.
- **Flat rate:** one fee regardless of how much water is used (usually unmetered).

Provide justification for any conservation neutral or non-conserving rate structures. If intending to adopt a conservation rate structure, include the timeframe to do so:

The City has implemented an odd/even watering restriction to reduce peak day demands during months of high water usage.

Objective 7: Additional strategies to Reduce Water Use and Support Wellhead Protection Planning

Development and redevelopment projects can provide additional water conservation opportunities, such as the actions listed below. If a Uniform Rate Structure is in place, the water supplier must provide a Water Conservation Program that includes at least two of the actions listed below. Check those actions that you intent to implement within the next 10 years.

Table 28. Additional strategies to Reduce Water Use & Support Wellhead Protection

☐	Consider participating in the GreenStep Cities Program, including implementation of at least one of the 20 "Best Practices" for water
☐	Prepare a Master Plan for Smart Growth (compact urban growth that avoids sprawl)
☐	Prepare a Comprehensive Open Space Plan (areas for parks, green spaces, natural areas)
☐	Adopt a Water Use Restriction Ordinance (lawn irrigation, car washing, pools, etc.)
☐	Adopt an Outdoor Lawn Irrigation Ordinance
☐	Adopt a Private well Ordinance (private wells in a city must comply with water restrictions)
☐	Implement a Stormwater Management Program
☐	Adopt Non-Zoning Wetlands Ordinance (can further protect wetlands beyond state/federal laws- for vernal pools, buffer areas, restrictions on filling or alterations)
☐	Adopt a Water Offset Program (primarily for new development or expansion)
☑	Implement a Water Conservation Outreach Program
☐	Hire a Water Conservation Coordinator (part-time)
☐	Implement a Rebate program for water efficient appliances, fixtures, or outdoor water management
☐	Other

Objective 8: Tracking Success: How will you track or measure success through the next ten years?

Continue to monitor water usage by customer category and other WSS activities (i.e. hydrant flushing, street sweeping, etc.) to determine the effectiveness of conservation measures. The City also plans to continue to monitor and document the water levels in their active production wells

Tip: The process to monitor demand reduction and/or a rate structure includes:

a) The DNR District Hydrologist or Groundwater Appropriation Hydrologist will call or visit the community the first 1-3 years after the water supply plan is completed.
b) They will discuss what activities the community is doing to conserve water and if they feel their actions are successful. The Water Supply Plan, Part 3 tables and responses will guide the discussion. For example, they will discuss efforts to reduce unaccounted for water loss if that is a problem, or go through Tables 33, 34 and 35 to discuss new initiatives.
c) The city representative and the hydrologist will discuss total per capita water use, residential per capita water use, and business/industry use. They will note trends.
d) They will also discuss options for improvement and/or collect case studies of success stories to share with other communities. One option may be to change the rate structure, but there are many other paths to successful water conservation.
e) If appropriate, they will cooperatively develop a simple work plan for the next few years, targeting a couple areas where the city might focus efforts.

A. Regulation

Complete Table 29 by selecting which regulations are used to reduce demand and improve water efficiencies. Add additional rows as needed.

Copies of adopted regulations or proposed restrictions or should be included in **Appendix 10** (a list with hyperlinks is acceptable).

Table 29. Regulations for short-term reductions in demand and long-term improvements in water efficiencies

Regulations Utilized	When is it applied (in effect)?
☑ Rainfall sensors required on landscape irrigation systems	☑ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
☑ Water efficient plumbing fixtures required	☑ New Development ☐ Replacement ☐ Rebate Programs
☑ Critical/Emergency Water Deficiency ordinance	☑ Only during declared Emergencies
☑ Watering restriction requirements (time of day, allowable days, etc.)	☑ Odd/Even ☐ 2 days/week ☐ Only during declared Emergencies
☑ Water waste prohibited (for example, having a fine for irrigators spraying on the street)	☐ -Ongoing ☐ Seasonal ☑ Only during declared Emergencies
☐ Limitations on turf areas (requiring lots to have 10% - 25% of the space in natural areas)	☐ New Development ☐ Shoreland/zoning ☐ Other
☐ Soil preparation requirement s (after construction, requiring topsoil to be applied to promote good root growth)	☐ New Development ☐ Construction Projects ☐ Other
☐ Tree ratios (requiring a certain number of trees per square foot of lawn)	☐ New development ☐ Shoreland/zoning ☐ Other
☐ Permit to fill swimming pool and/or requiring pools to be covered (to prevent evaporation)	☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
☐ Ordinances that permit stormwater irrigation, reuse of water, or other alternative water use (Note: be sure to check current plumbing codes for updates)	☐ Describe

B. Retrofitting Programs

Education and incentive programs aimed at replacing inefficient plumbing fixtures and appliances can help reduce per capita water use, as well as energy costs. It is recommended that municipal water suppliers develop a long-term plan to retrofit public buildings with water efficient plumbing fixtures and appliances. Some water suppliers have developed partnerships with organizations having similar conservation goals, such as electric or gas suppliers, to develop cooperative rebate and retrofit programs.

A study by the AWWA Research Foundation (Residential End Uses of Water, 1999) found that the average indoor water use for a non-conserving home is 69.3 gallons per capita per day (gpcd). The

average indoor water use in a conserving home is 45.2 gpcd and most of the decrease in water use is related to water efficient plumbing fixtures and appliances that can reduce water, sewer and energy costs. In Minnesota, certain electric and gas providers are required (Minnesota Statute 216B.241) to fund programs that will conserve energy resources and some utilities have distributed water efficient showerheads to customers to help reduce energy demands required to supply hot water.

Retrofitting Programs

Complete Table 30 by checking which water uses are targeted, the outreach methods used, the measures used to identify success, and any participating partners.

Table 30. Retrofitting programs (Select all that apply)

Water Use Targets	Outreach Methods	Partners
☐ low flush toilets, ☐ toilet leak tablets, ☑ low flow showerheads, ☑ faucet aerators;	☐ Education about ☑ free distribution of ☐ rebate for ☐ other	☐ Gas company ☐ Electric company ☑ Wright-Hennepin Cooperative Electric Assoc. (WHE)
☐ water conserving washing machines, ☐ dish washers, ☐ water softeners;	☐ Education about ☐ free distribution of ☐ rebate for ☐ other	☐ Gas company ☐ Electric company ☐ Watershed organization
☑ rain gardens, ☐ rain barrels, ☑ Native/drought tolerant landscaping, etc.	☑ Education about ☐ free distribution of ☐ rebate for ☐ other: grants	☐ Gas company ☐ Electric company ☑ Watershed organization – MCWD

Briefly discuss measures of success from the above table (e.g. number of items distributed, dollar value of rebates, gallons of water conserved, etc.):

WHE provides energy saving water kits (low flow shower head, kitchen sink faucet aerator, two bathroom faucent aerators, plumbers tape, and hot water temperature card) for those customers who currently use electric water heaters. MCWD's provides a cost share program to encourage clean-water landscaping.

C. Education and Information Programs

Customer education should take place in three different circumstances. First, customers should be provided information on how to conserve water and improve water use efficiencies. Second, information should be provided at appropriate times to address peak demands. Third, emergency notices and educational materials about how to reduce water use should be available for quick distribution during an emergency.

Proposed Education Programs

Complete Table 31 by selecting which methods are used to provide water conservation and information, including the frequency of program components. Select all that apply and add additional lines as needed.

Table 31. Current and Proposed Education Programs

Education Methods	General summary of topics	#/Year	Frequency
Billing inserts or tips printed on the actual bill	Educational information supplied as billing insert		☑ Ongoing ☐ Seasonal ☐ Only during declared emergencies
Consumer Confidence Reports	Annual report of City's water quality	1/year	☑ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Press releases to traditional local news outlets (e.g., newspapers, radio and TV)		1/year	☑ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Social media distribution (e.g., emails, Facebook, Twitter)			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Paid advertisements (e.g., billboards, print media, TV, radio, web sites, etc.)			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Presentations to community groups			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Staff training	General awareness among staff about the City's goals for conservation	Continuous	☑ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Facility tours	As requested	Continuous	☑ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Displays and exhibits			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Marketing rebate programs (e.g., indoor fixtures & appliances and outdoor practices)			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Community news letters	Minnetrista Messenger	4/year	☑ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Direct mailings (water audit/retrofit kits, showerheads, brochures)			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies

Education Methods	General summary of topics	#/Year	Frequency
Information kiosk at utility and public buildings		12/year	☑ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Public Service Announcements			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Cable TV Programs			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Demonstration projects (landscaping or plumbing)			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
K-12 Education programs (Project Wet, Drinking Water Institute, presentations)	Create programs to educate school age children on water resources	Annually	☑ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Community Events (children's water festivals, environmental fairs)	Prepare booth during Trista Days	Annually	☑ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Community education classes			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Water Week promotions			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Website (include address: http://www.cityofminnetrista.com)	Description of projects Minnetrista has completed, as well as future projects; consumer confidence report	Continuous	☑ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Targeted efforts (large volume users, users with large increases)			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Notices of ordinances			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Emergency conservation notices			☐ Ongoing ☐ Seasonal ☐ Only during declared Emergencies
Other:			☐ Ongoing

Education Methods	General summary of topics	#/Year	Frequency
			☐ Seasonal ☐ Only during declared Emergencies

Briefly discuss what future education and information activities your community is considering in the future:

Minnetrista will maintain all of the above-mentioned activities in order to educate, promote, and facilitate water conservation within the City. The City also plans to prepare a booth to promote water conservation and wellhead protection during Trista Day.

Part 4. ITEMS FOR METROPOLITAN AREA COMMUNITIES

Minnesota Statute 473.859 requires WSPs to be completed for all local units of government in the seven-county Metropolitan Area as part of the local comprehensive planning process.

Much of the information in Parts 1-3 addresses water demand for the next 10 years. However, additional information is needed to address water demand through 2040, which will make the WSP consistent with the Metropolitan Land Use Planning Act, upon which the local comprehensive plans are based.

This Part 4 provides guidance to complete the WSP in a way that addresses plans for water supply through 2040.

A. Water Demand Projections through 2040

Complete Table 7 in Part 1D by filling in information about long-term water demand projections through 2040. Total Community Population projections should be consistent with the community's system statement, which can be found on the Metropolitan Council's website and which was sent to the community in September 2015.

Projected Average Day, Maximum Day, and Annual Water Demands may either be calculated using the method outlined in *Appendix 2* of the *2015 Master Water Supply Plan* or by a method developed by the individual water supplier.

B. Potential Water Supply Issues

Complete Table 10 in Part 1E by providing information about the potential water supply issues in your community, including those that might occur due to 2040 projected water use.

The *Master Water Supply Plan* provides information about potential issues for your community in *Appendix 1 (Water Supply Profiles).* This resource may be useful in completing Table 10.

You may document results of local work done to evaluate impact of planned uses by attaching a feasibility assessment or providing a citation and link to where the plan is available electronically.

C. Proposed Alternative Approaches to Meet Extended Water Demand Projections

Complete Table 12 in Part 1F with information about potential water supply infrastructure impacts (such as replacements, expansions or additions to wells/intakes, water storage and treatment capacity, distribution systems, and emergency interconnections) of extended plans for development and redevelopment, in 10-year increments through 2040. It may be useful to refer to information in the community's local Land Use Plan, if available.

Complete Table 14 in Part 1F by checking each approach your community is considering to meet future demand. For each approach your community is considering, provide information about the amount of

future water demand to be met using that approach, the timeframe to implement the approach, potential partners, and current understanding of the key benefits and challenges of the approach.

As challenges are being discussed, consider the need for: evaluation of geologic conditions (mapping, aquifer tests, modeling), identification of areas where domestic wells could be impacted, measurement and analysis of water levels & pumping rates, triggers & associated actions to protect water levels, etc.

D. Value-Added Water Supply Planning Efforts (Optional)

The following information is not required to be completed as part of the local water supply plan, but completing this can help strengthen source water protection throughout the region and help Metropolitan Council and partners in the region to better support local efforts.

Source Water Protection Strategies

Does a Drinking Water Supply Management Area for a neighboring public water supplier overlap your community? ☑ Yes ☐ No

If you answered no, skip this section. If you answered yes, please complete Table 32 with information about new water demand or land use planning-related local controls that are being considered to provide additional protection in this area.

Table 32. Local controls and schedule to protect Drinking Water Supply Management Areas

Local Control	Schedule to Implement	Potential Partners
☐ None at this time		
☑ Comprehensive planning that guides development in vulnerable drinking water supply management areas	Wellhead Protection Plan; Comprehensive Plan Update	City of St. Bonifacius and Mound
☐ Zoning overlay		
☐ Other:		

Technical assistance

From your community's perspective, what are the most important topics for the Metropolitan Council to address, guided by the region's Metropolitan Area Water Supply Advisory Committee and Technical Advisory Committee, as part of its ongoing water supply planning role?

- ☑ Coordination of state, regional and local water supply planning roles
- ☐ Regional water use goals
- ☑ Water use reporting standards
- ☑ Regional and sub-regional partnership opportunities
- ☐ Identifying and prioritizing data gaps and input for regional and sub-regional analyses
- ☐ Others: _____

GLOSSARY

Agricultural/Irrigation Water Use - Water used for crop and non-crop irrigation, livestock watering, chemigation, golf course irrigation, landscape and athletic field irrigation.

Average Daily Demand - The total water pumped during the year divided by 365 days.

Calcareous Fen - Calcareous fens are rare and distinctive wetlands dependent on a constant supply of cold groundwater. Because they are dependent on groundwater and are one of the rarest natural communities in the United States, they are a protected resource in MN. Approximately 200 have been located in Minnesota. They may not be filled, drained or otherwise degraded.

Commercial/Institutional Water Use - Water used by motels, hotels, restaurants, office buildings, commercial facilities and institutions (both civilian and military). Consider maintaining separate institutional water use records for emergency planning and allocation purposes. Water used by multi-family dwellings, apartment buildings, senior housing complexes, and mobile home parks should be reported as Residential Water Use.

Commercial/Institutional/Industrial (C/I/I) Water Sold - The sum of water delivered for commercial/institutional or industrial purposes.

Conservation Rate Structure - A rate structure that encourages conservation and may include increasing block rates, seasonal rates, time of use rates, individualized goal rates, or excess use rates. If a conservation rate is applied to multifamily dwellings, the rate structure must consider each residential unit as an individual user. A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

Date of Maximum Daily Demand - The date of the maximum (highest) water demand. Typically this is a day in July or August.

Declining Rate Structure - Under a declining block rate structure, a consumer pays less per additional unit of water as usage increases. This rate structure does not promote water conservation.

Distribution System - Water distribution systems consist of an interconnected series of pipes, valves, storage facilities (water tanks, water towers, reservoirs), water purification facilities, pumping stations, flushing hydrants, and components that convey drinking water and meeting fire protection needs for cities, homes, schools, hospitals, businesses, industries and other facilities.

Flat Rate Structure - Flat fee rates do not vary by customer characteristics or water usage. This rate structure does not promote water conservation.

Industrial Water Use - Water used for thermonuclear power (electric utility generation) and other industrial use such as steel, chemical and allied products, paper and allied products, mining, and petroleum refining.

Low Flow Fixtures/Appliances - Plumbing fixtures and appliances that significantly reduce the amount of water released per use are labeled "low flow". These fixtures and appliances use just enough water to be effective, saving excess, clean drinking water that usually goes down the drain.

Maximum Daily Demand - The maximum (highest) amount of water used in one day.

Metered Residential Connections - The number of residential connections to the water system that have meters. For multifamily dwellings, report each residential unit as an individual user.

Percent Unmetered/Unaccounted For - Unaccounted for water use is the volume of water withdrawn from all sources minus the volume of water delivered. This value represents water "lost" by miscalculated water use due to inaccurate meters, water lost through leaks, or water that is used but unmetered or otherwise undocumented. Water used for public services such as hydrant flushing, ice skating rinks, and public swimming pools should be reported under the category "Water Supplier Services".

Population Served - The number of people who are served by the community's public water supply system. This includes the number of people in the community who are connected to the public water supply system, as well as people in neighboring communities who use water supplied by the community's public water supply system. It should not include residents in the community who have private wells or get their water from neighboring water supply.

Residential Connections - The total number of residential connections to the water system. For multifamily dwellings, report each residential unit as an individual user.

Residential Per Capita Demand - The total residential water delivered during the year divided by the population served divided by 365 days.

Residential Water Use - Water used for normal household purposes such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. Should include all water delivered to single family private residences, multi-family dwellings, apartment buildings, senior housing complexes, mobile home parks, etc.

Smart Meter - Smart meters can be used by municipalities or by individual homeowners. Smart metering generally indicates the presence of one or more of the following:

- Smart irrigation water meters are controllers that look at factors such as weather, soil, slope, etc. and adjust watering time up or down based on data. Smart controllers in a typical summer will reduce water use by 30%-50%. Just changing the spray nozzle to new efficient models can reduce water use by 40%.
- Smart Meters on customer premises that measure consumption during specific time periods and communicate it to the utility, often on a daily basis.
- A communication channel that permits the utility, at a minimum, to obtain meter reads on demand, to ascertain whether water has recently been flowing through the meter and onto the

premises, and to issue commands to the meter to perform specific tasks such as disconnecting or restricting water flow.

Total Connections - The number of connections to the public water supply system.

Total Per Capita Demand - The total amount of water withdrawn from all water supply sources during the year divided by the population served divided by 365 days.

Total Water Pumped - The cumulative amount of water withdrawn from all water supply sources during the year.

Total Water Delivered - The sum of residential, commercial, industrial, institutional, water supplier services, wholesale and other water delivered.

Ultimate (Full Build-Out) - Time period representing the community's estimated total amount and location of potential development, or when the community is fully built out at the final planned density.

Unaccounted (Non-revenue) Loss - See definitions for "percent unmetered/unaccounted for loss".

Uniform Rate Structure - A uniform rate structure charges the same price-per-unit for water usage beyond the fixed customer charge, which covers some fixed costs. The rate sends a price signal to the customer because the water bill will vary by usage. Uniform rates by class charge the same price-per-unit for all customers within a customer class (e.g. residential or non-residential). This price structure is generally considered less effective in encouraging water conservation.

Water Supplier Services - Water used for public services such as hydrant flushing, ice skating rinks, public swimming pools, city park irrigation, back-flushing at water treatment facilities, and/or other uses.

Water Used for Nonessential Purposes - Water used for lawn irrigation, golf course and park irrigation, car washes, ornamental fountains, and other non-essential uses.

Wholesale Deliveries - The amount of water delivered in bulk to other public water suppliers.

Acronyms and Initialisms

AWWA – American Water Works Association

C/I/I – Commercial/Institutional/Industrial

CIP – Capital Improvement Plan

GIS – Geographic Information System

GPCD – Gallons per capita per day

GWMA – Groundwater Management Area – North and East Metro, Straight River, Bonanza,

MDH – Minnesota Department of Health

MGD – Million gallons per day

MG – Million gallons

MGL – Maximum Contaminant Level

MnTAP – Minnesota Technical Assistance Program (University of Minnesota)

MPARS – MN/DNR Permitting and Reporting System (new electronic permitting system)

MRWA – Minnesota Rural Waters Association

SWP – Source Water Protection

WHP – Wellhead Protection

APPENDICES TO BE SUBMITTED BY THE WATER SUPPLIER

Appendix 1: Well records and maintenance summaries – see Part 1C

Appendix 2: Water level monitoring plan – see Part 1E

Appendix 3: Water level graphs for each water supply well - see Part 1E

Appendix 4: Capital Improvement Plan - see Part 1E

Appendix 5: Emergency Telephone List – see Part 2C

Appendix 6: Cooperative Agreements for Emergency Services – see Part 2C

Appendix 7: Municipal Critical Water Deficiency Ordinance – see Part 2C

Appendix 8: Graph showing annual per capita water demand for each customer category during the last ten-years – see Part 3 Objective 4

Appendix 9: Water Rate Structure – see Part 3 Objective 6

Appendix 10: Adopted or proposed regulations to reduce demand or improve water efficiency – see Part 3 Objective 7

Appendix 11: Implementation Checklist – summary of all the actions that a community is doing, or proposes to do, including estimated implementation dates – see www.mndnr.gov/watersupplyplans

Appendix 1

Well Records and Maintenance Summaries

Minnesota Unique Well Number

208864

County Hennepin
Quad Mound
Quad ID 105B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 08/24/1991
Update Date
Received Date 03/30/2015

Well Name	Township	Range	Dir	Section	Subsection
MINNETRISTA 1	117	24	W	11	DCACBA

Elevation 980 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact 7701 110 CR W MINNETRISTA MN 55364-9552
Well GAMEFARM RD MINNETRISTA MN 55364

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	20	BROWN	
CLAY	20	60	GRAY	
SANDY CLAY STONES	60	70	GRAY	
CEMENTED SAND	70	142	GRAY	
SAND-COARSE	142	155	BROWN	
SANDY CLAY	155	168	TAN	
SANDY CLAY	168	176	TAN	
STONES-ROCKS	176	177	BROWN	
GRAVEL	177	178	TAN	
STONES-ROCK	178	179	BROWN	
GRAVEL	179	185	TAN	
CLAY STONES	185	195	BROWN	
CLAY	195	200	GRAY	
CLAY STONES	200	210	GRAY	
SANDY CLAY	210	225	BRN/RED	
SHALE	225	233	LIGHT	
JORDAN AND	233	250	BROWN	
JORDAN AND	250	265	LIGHT	
ST. LAWRENCE	265	300	GREEN	
SANDSTONE, SHALE	300	375	BLU/RED	
FRANCONIA SHALE	375	380	RED	
FRANCONIA	380	390	TAN	
FRANCONIA SHALE	390	420	GREEN	
GALESVILLE &	420	465	TAN	
SHALE	465	467	TAN	
SANDSTONE	467	480	WHITE	
SHALE	480	503	TAN	
EAU CLAIRE SHALE	503	515	GREEN	
SANDSTONE	515	520	GRAY	
SHALE	520	530		
EAU CLAIRE SHALE	530	540	GREEN	
EAU CLAIRE	540	600		
GALESVILLE	600	670		
EAU CLAIRE	670	678		

Remarks

DICK BIALON 466-1660 MP=1.5.
M.G.S. NO. 617. INTERVAL 233-265 SAMPLE INDICATES

Well Depth 678 ft. **Depth Completed** 678 ft. **Date Well Completed** 02/01/1971

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Casing Diameter **Weight**
16 in. To 264 ft. lbs./ft.

Open Hole From 264 ft. To 678 ft.

Screen? ☐ **Type** **Make**

Static Water Level
75 ft. Land surface Measure 02/01/1971

Pumping Level (below land surface)
145 ft. hrs. Pumping at 1200 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Tunnel City Group Aquifer Tunnel City-Mt.
Last Strat Mt.Simon Sandstone Depth to Bedrock 265 ft
Located by Minnesota Department of Health
Locate Method GPS SA On (averaged)
System UTM - Mad83, Zone 15, Meters X 446944 Y 4977849
Unique Number Verification Inpute Date 10/12/1999

Angled Drill Hole

Well Contractor
Renner E.H. & Sons 02015
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

773393

County Hennepin
Quad Mound
Quad ID 105B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/16/2010
Update Date 12/01/2010
Received Date 04/16/2015

Well Name	Township	Range	Dir	Section	Subsection
MINNETRISTA	117	24	W	11	DDABCC

Elevation 974 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact 7701 110 CR W MINNETRISTA MN 55364
Well 5666 GAME FARM RD MINNETRISTA MN 55364

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY GRAVEL	0	15	BROWN	
CLAY GRAVEL	15	105	GRAY	
CLAY GRAVEL ROCKS	105	136	GRAY	
SAND	136	162	GRAY	
CLAY ROCKS	162	175	BROWN	HARD
SAND GRAVEL	175	200	BROWN	
SAND	200	210	BROWN	
SAND GRAVEL	210	247	BROWN	
SHALE SANDSTONE	247	248	BRN/BLU	HARD
SHALE SANDSTONE	248	263	BRN/BLU	HARD
SHALE SANDSTONE	263	278	VARIED	HARD
SHALE SANDSTONE	278	364	GRN/WHT	
SHALE SANDSTONE	364	416	GRN/BRN	
SHALE SANDSTONE	416	420	GRN/WHT	HARD
SHALE SANDSTONE	420	435	GRN/WHT	HARD
SANDSTONE	435	471	GRAY	HARD
SHALE GRN GRY BRN	471	479	VARIED	
SHALE LAYERED W/S.	479	490	VARIED	
SHALE	490	498	BROWN	

Remarks

GAMMA LOGGED 4-15-2010. M.G.S. NO. 4989. LOGGED BY JIM

Well Depth 498 ft. **Depth Completed** 498 ft. **Date Well Completed** 08/31/2010

Drill Method Cable Tool **Drill Fluid** Additive (+ Bentonite)

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter		Weight		Hole Diameter	
24 in. To	385 ft.	94.6 lbs./ft.		30 in. To	498 ft.
30 in. To	254. ft.	118. lbs./ft.			

Open Hole From 385 ft. To 498 ft.

Screen? ☐ **Type** **Make**

Static Water Level
81.7 ft. Land surface Measure 08/17/2010

Pumping Level (below land surface)
205. ft. 24 hrs. Pumping at 500 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model 8PS2426
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
Neat Cement	24	Cubic yards	ft. 385	ft.

Nearest Known Source of Contamination
53 feet South Direction Sewer Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 09/30/2010
Manufacturer's name GOULD
Model Number 11WAHC HP 75 Volt 460
Length of drop pipe 260 ft Capacity 500 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock St.Lawrence Formation Aquifer Tunnel City-
Last Strat Eau Claire Formation Depth to Bedrock 248 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000)
System UTM - Mad83, Zone 15, Meters X 447310 Y 4977878
Unique Number Verification Info/GPS from data Inpute Date 04/16/2010

Angled Drill Hole

Well Contractor

EH Renner and Sons, Inc.	1431	COX, A.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

161408

County Hennepin
Quad Mound
Quad ID 105B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 08/24/1991
Update Date
Received Date 08/18/2014

Well Name	Township	Range	Dir	Section	Subsection
MINNETRISTA 3	117	24	W	35	BDACAD

Elevation 978 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact 7701 110 CR W MINNETRISTA MN 55364
Well 4270 44 CR MINNETRISTA MN 55364

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SANDY CLAY	0	120	YELLOW	
MUDDY SAND	120	235	YELLOW	
MUDDY SAND	235	244	YELLOW	
SAND ROCK	244	322	YELLOW	
HARD GREEN SHALE	322	333		
RED ROCK	333	336		
SHALE	336	385		
SHALE	385	502		
SHALE	502	505		
SAND ROCK W/SHALE	505	560		
SAND ROCK W/SHALE	560	595		
SAND ROCK	595	645		
SAND ROCK	645	775		
SHALE	775	785	RED	

Remarks

DICK BIALON 466-1660 MP=3.4 WELL#3- MUNI WELL.
M.G.S. NO. 1547. GAMMA LOGGED 5-27-1980.
STONEBRIDGE ADD. OUTLOT A.

Well Depth 785 ft. **Depth Completed** 785 ft. **Date Well Completed** 08/24/1980

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Casing Diameter			Weight		Hole Diameter		
16 in. To	340 ft.		62	lbs./ft.	24 in. To	340 ft.	
24 in. To	244 ft.		98	lbs./ft.	16 in. To	785 ft.	

Open Hole From 340 ft. To 785 ft.

Screen? ☐ **Type** **Make**

Static Water Level
125 ft. Land surface Measure 08/20/1980

Pumping Level (below land surface)
170 ft. 40 hrs. Pumping at 1000 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
Neat Cement	52	Cubic yards	0 ft.	340 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Tunnel City-Mt.
Last Strat Mid.Prot. sed. undivided Depth to Bedrock 235 ft
Located by Minnesota Department of Health
Locate Method GPS SA On (averaged)
System UTM - Mad83, Zone 15, Meters X 446522 Y 4972189
Unique Number Verification Information from Inpute Date 10/12/1999

Angled Drill Hole

Well Contractor
Bergerson-Caswell 27058 HENRICH, E.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

554097

County Hennepin
Quad Mound
Quad ID 105B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 12/14/1995
Update Date
Received Date 08/18/2014

Well Name	Township	Range	Dir	Section	Subsection
MINNETRISTA 4	117	24	W	35	CACADC

Elevation 985 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact 7701 110 CR W MINNETRISTA MN 55364-9552
Well 6300 LOTUS DR MINNETRISTA MN 55364

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT	0	272	VARIED	SOFT
JORDAN	272	303	YELLOW	SOFT
ST. LAWRENCE	303	338	GRAY	MEDIUM
ST. LAWRENCE	338	385	GRAY	MEDIUM
FRANCONIA	385	387	GRN/RED	SOFT
FRANCONIA	387	517	GRN/RED	SOFT
IRONTON/GALESVILLE	517	563	GREEN	SOFT
EAU CLAIRE	563	642	GREEN	SOFT
MT. SIMON/HINCKLEY	642	787	WHITE	SOFT

Remarks

GAMMA LOGGED 2-2-1995. M.G.S. NO. 3556 & 3696.
WELL WAS RECONSTRUCTED IN 2013. SANDSTONE COLLAPSED
SEE RECONSTRUCTION LOG FOR DETAILS.

Well Depth 787 ft. **Depth Completed** 712 ft. **Date Well Completed** 09/20/1995

Drill Method Cable Tool **Drill Fluid** Water

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter		Weight	Hole Diameter	
30 in. To	162 ft.	lbs./ft.	23 in. To	700 ft.
18 in. To	650 ft.	lbs./ft.	17 in. To	787 ft.
24 in. To	279 ft.	lbs./ft.		

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
in.	25	62 ft.	632 ft.	712 ft.

Static Water Level
158 ft. Land surface Measure 06/26/1995

Pumping Level (below land surface)
198 ft. 16 hrs. Pumping at 500 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
Neat Cement	40	Cubic yards	0 ft.	650 ft.
Neat Cement	30	Cubic yards	0 ft.	279 ft.

Nearest Known Source of Contamination
80 feet North Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Mt.Simon
Last Strat Mt.Simon Sandstone Depth to Bedrock 272 ft
Located by Minnesota Department of Health
Locate Method GPS SA On (averaged)
System UTM - Mad83, Zone 15, Meters X 446383 Y 4971600
Unique Number Verification Information from Inpute Date 10/12/1999

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Bergerson-Caswell	27058	MANTHIE, D.

Minnesota Unique Well Number

638450

County Hennepin
Quad Mound
Quad ID 105B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/22/2000
Update Date
Received Date 01/12/2016

Well Name	Township	Range	Dir	Section	Subsection
MINNETRISTA 5	117	24	W	22	DACADB

Elevation 1001 **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact 7701 110 CR W MINNETRISTA MN 55364-9552
Well 6587 SAUNDERS LAKE DR S MINNETRISTA MN 55364

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	21	BROWN	
SAND & GRAVEL	21	28	BROWN	
CLAY	28	31	GRAY	
SAND	31	43	BROWN	
CLAY	43	49	BROWN	
SAND	49	76	BROWN	
CLAY	76	94	BROWN	
SAND	94	108	GRAY	
SAND	108	171	GRAY	
GRAVEL & SHALE	171	254	BROWN	
SHALE	254	255	GREEN	

Remarks

SAUNDERS LAKE ADD. BLK 8 LOT 4.

Well Depth	Depth Completed	Date Well Completed
255 ft.	253 ft.	12/10/1999

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use community supply(municipal) **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☒ **From** **To**

Casing Type Step down **Joint**
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below**

Casing Diameter		Weight		Hole Diameter	
12 in. To	213 ft.	lbs./ft.		24 in. To	96 ft.
20 in. To	96 ft.	lbs./ft.		19 in. To	255 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
12 in.	120	40 ft.	213 ft.	253 ft.

Static Water Level
94 ft. Land surface Measure 12/10/1999

Pumping Level (below land surface)
250 ft. 47 hrs. Pumping at 1000 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
Neat Cement	7	Cubic yards	2 ft.	203 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock St.Lawrence Formation Aquifer Quat. buried
Last Strat St.Lawrence Formation Depth to Bedrock 254 ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged)
System UTM - Mad83, Zone 15, Meters X 445636 Y 4974896
Unique Number Verification Information from Inpute Date 01/08/2001

Angled Drill Hole

Well Contractor
Traut M.J. Well Co. 71536 BRUCE/LYLE
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

818310

County Hennepin
Quad Mound
Quad ID 105B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/14/2016
Update Date 09/19/2016
Received Date 08/16/2016

Well Name	Township	Range	Dir	Section	Subsection
MINNETRISTA 6	117	24	W	34	CACCCC

Elevation 1051 **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Contact 7701 COUNTY ROAD 110W RD MINNETRISTA MN 55364
Well 4691 KINGS POINT RD MINNETRISTA MN 55331

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	5	BROWN	SOFT
SANDY CLAY	5	15	TAN	SOFT
CLAY & GRAVEL	15	215	GRAY	SOFT
SAND	215	217	BROWN	SOFT
COARSE GRAVEL	217	230	BROWN	SOFT
CLAY & GRAVEL	230	249	BROWN	SOFT
SANDSTONE	249	342	TAN	SOFT
SHALE W/SILTSTONE	342	380	RED/GRN	SOFT
SHALE W/SILTSTONE	380	387	RED/GRN	SOFT
SANDSTONE W/SOME	387	477	GRAY	SFT-MED
SANDSTONE W/SOME	477	485	GRAY	MEDIUM
SHALE W/SOME	485	498	RED	MEDIUM
SHALE W/SOME	498	500	RED	MEDIUM
SHALE W/SOME	500	505	GREEN	MEDIUM
SANDSTONE W/SOME	505	555		MEDIUM
GREEN SHALE LENSE	555	560	VARIED	MEDIUM
SANDSTONE CHIPPY	560	580		MED-HRD
SANDSTONE & GREEN	580	587		MEDIUM
SHALE & TRACE	587	590	GRN/RED	SFT-MED
FAT SHALE	590	593	RED	SFT-MED

Remarks

GAMMA LOGGED 6-11 & 13-2016 BY JIM TRAEN.
M.G.S. NO. 5602.
0-249 QUUU, 249-342 CJDN, 342-380 CSTL, 380-498 CTCG.
CUTTINGS 380-505 CTCG, 505-580 CWOC, 580-593 CECR.
DRILLERS: BRIAN TRAUT AND DAN POHLKAMP.

Well Depth 593 ft. **Depth Completed** 593 ft. **Date Well Completed** 07/27/2016

Drill Method Dual Rotary **Drill Fluid** Water

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter		Weight		Hole Diameter	
18 in. To	425 ft.	70.6 lbs./ft.		23 in. To	593 ft.
24 in. To	270 ft.	94.7 lbs./ft.			

Open Hole From 425 ft. To 593 ft.

Screen? ☐ **Type** **Make**

Static Water Level
189 ft. land surface Measure 07/15/2016

Pumping Level (below land surface)
275 ft. 4 hrs. Pumping at 262 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
driven casing seal	18	Sacks	ft. 270	ft.
neat cement	35	Cubic yards	ft. 425	ft.

Nearest Known Source of Contamination
70 feet West Direction Sewer Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Tunnel City-
Last Strat Eau Claire Formation Depth to Bedrock 249 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000)
System UTM - Mad83, Zone 15, Meters X 444606 Y 4971513
Unique Number Verification Info/GPS from data Inpute Date 06/14/2016

Angled Drill Hole

Well Contractor
Mark J Traut Wells, Inc. 1404 SEE REMARKS
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Well Index Report **818310**

Printed on 03/01/2017
HE-01205-15

Minnesota Unique Well Number

818311

County Hennepin
Quad Mound
Quad ID 105B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 05/31/2016
Update Date 11/25/2016
Received Date 10/06/2016

Well Name	Township	Range	Dir	Section	Subsection
MINNETRISTA 7	117	24	W	34	BCDAAA

Elevation 1006 **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 7701 110W CR MINNETRISTA MN 55364
Contact 4342 KINGS POINT RD MINNETRISTA MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SANDY LOAM/CLAY	0	5	BLK/YEL	MEDIUM
CLAY W/ SOME	5	10	TAN	MEDIUM
CLAY W/ FINE GRAVEL	10	15	TAN	MEDIUM
CLAY W/ FINE GRAVEL	15	20	TAN	MEDIUM
CLAY W/ FINE GRAVEL	20	25	TAN	MEDIUM
CLAY W/ FINE GRAVEL	25	30	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	30	35	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	35	40	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	40	45	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	45	50	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	50	55	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	55	60	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	60	65	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	65	70	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	70	75	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	75	80	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	80	85	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	85	90	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	90	95	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	95	100	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	100	105	GRAY	MEDIUM
CLAY W/ FINE GRAVEL	105	110	BROWN	MEDIUM
CLAY W/ FINE GRAVEL	110	115	BROWN	MEDIUM
CLAY W/ FINE GRAVEL	115	120	BROWN	MEDIUM
CLAY W/ FINE GRAVEL	120	125	BROWN	MEDIUM
CLAY W/ FINE GRAVEL	125	130	BROWN	MEDIUM
BOULDERS BLK MULTI	130	135	BLACK	HARD
BOULDER BLK MULTI	135	140	BLACK	HARD
BOULDER BLK MULTI	140	145	BLACK	MEDIUM
SAND W/ FINE GRAVEL	145	150	BROWN	SOFT
SAND	150	155	BROWN	SOFT
SAND W/ FINE GRAVEL	155	160	BROWN	SOFT
SAND W/ FINE GRAVEL	160	165	BROWN	SOFT
FINE SAND W/ FINE	165	170	BROWN	SOFT
FINE SAND W/ MED	170	175	BROWN	SOFT
FINE TO MED GRAVEL	175	180	VARIED	SOFT
FINE TO MED GRAVEL	180	185	VARIED	SOFT
FINE TO MED GRAVEL	185	190	VARIED	SOFT
FINE TO MED GRAVEL	190	195	VARIED	MEDIUM
CLAY	195	200	BROWN	HARD
SANDSTONE	200	205	TAN	MEDIUM
CEMENTED	205	210	TAN/BRN	SOFT
SANDSTONE	210	215	TAN	MEDIUM
SANDSTONE/CEMENTE	215	220	DK. TAN	SOFT
SANDSTONE - SHALE	220	225	TAN/YEL	MEDIUM
SANDSTONE	225	230	TAN/YEL	SOFT
SANDSTONE	230	235	TAN	SOFT
SANDSTONE	235	240	TAN/YEL	SOFT
SANDSTONE W/	240	245	TAN	MEDIUM
SANDSTONE W/ SHALE	245	250	TAN/YEL	SOFT
SANDSTONE	250	255	TAN/YEL	SOFT

Remarks
GAMMA LOGGED 5-27-2016. M.G.S. NO. 5593. LOGGED BY JIM FRAEN.

Well Depth 530 ft. **Depth Completed** 517 ft. **Date Well Completed** 07/15/2016

Drill Method Dual Rotary **Drill Fluid** Water

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter		Weight		Hole Diameter	
18 in. To	364 ft.	lbs./ft.		23 in. To	530 ft.
24 in. To	202 ft.	lbs./ft.			

Open Hole From 364 ft. To 517 ft.

Screen? ☐ **Type** **Make**

Static Water Level
184 ft. land surface Measure 07/15/2016

Pumping Level (below land surface)
284 ft. 24 hrs. Pumping at 500 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
driven casing seal	7	Sacks	ft. 202	ft.
neat cement	23.5	Cubic yards	ft. 364	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Tunnel City-
Last Strat Eau Claire Formation Depth to Bedrock 195 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000)
System UTM - Mad83, Zone 15, Meters X 444602 Y 4972118
Unique Number Verification Info/GPS from data Inpute Date 05/31/2016

Angled Drill Hole

Well Contractor
Mark J Traut Wells, Inc. 1404 GAUSTAD,E.
Licensee Business Lic. or Reg. No. Name of Driller

SANDSTONE	255	260	RED/TAN	SOFT
SANDSTONE W/ SHALE	260	265	YEL/TAN	SOFT
SANDSTONE W/ SHALE	265	270	YEL/TAN	MEDIUM
CEMENTED	270	275	GRN/TAN	MEDIUM
CEMENTED	275	280	GRN/RED	HARD
CEMENTED SILTSTONE	280	285	RED/GRN	MEDIUM
CEMENTED SILTSTONE	285	290	RED/GRN	MEDIUM
CEMENTED SHALE,	290	295	RED/GRN	HARD
CEMENTED SHALE,	295	300	GRN/RED	HARD
CEMENTED SHALE,	300	305	GRN/TAN	HARD
CEMENTED SHALE,	305	310	GRN/TAN	HARD
CEMENTED SHALE,	310	313	GRN/TAN	HARD
CEMENTED SHALE,	313	315	GRN/TAN	HARD
CEMENTED SHALE,	315	320	GRN/BLK	MEDIUM
SILTSTONE	320	325	GRN/GRY	MEDIUM
SILTSTONE	325	330	GRN/TAN	MEDIUM
SILTSTONE	330	335	GRN/RED	MEDIUM
CEMENTED S/S	335	340	GRY/GRN	MEDIUM
SHALE W/ CEMENTED	340	345	GRN/GRY	MEDIUM
SHALE W/ CEMENTED	345	350	GRN/GRY	MEDIUM
CEMENTED SHALE,	350	355	GRN/TAN	MEDIUM
CEMENTED SHALE,	355	360	GRN/RED	HARD
SHALE W/ CEMENTED	360	365	GRN/RED	HARD
CEMENTED	365	370	GRN/RED	HARD
CEMENTED	370	375	GRN/GRY	HARD
CEMENTED	375	380	GRN/GRY	MEDIUM
SILTSTONE W/ SHALE	380	385	GRN/RED	MEDIUM
SHALE/SILTSTONE	385	390	GRN/GRY	MEDIUM
SHALE W/ SILTSTONE	390	395	GRN/RED	MEDIUM
SHALE/GLAUCONITE/SI	395	400	GRN/GRY	MEDIUM
SHALE/GLAUCONITE/SI	400	405	GRN/GRY	MEDIUM
SHALE	405	410	GRN/GRY	MEDIUM
GLAUCONITE W/	410	415	GRN/GRY	MEDIUM
SHALE/CEMENTED S/S	415	420	GRN/GRY	MEDIUM
SHALE/CEMENTED S/S	420	425	GRN/GRY	MEDIUM
SILTSTONE W/	425	430	RED/GRY	HARD
SILTSTONE W/	430	435	RED/GRY	HARD
SILTSTONE W/	435	440	GRN/GRY	MEDIUM
SANDSTONE	440	445	TAN	SOFT
SANDSTONE W/ SHALE	445	450	TAN	SOFT
SANDSTONE W/ SHALE	450	455	TAN	SOFT
SANDSTONE W/ SHALE	455	460	TAN	SOFT
SANDSTONE W/ SHALE	460	465	TAN	SOFT
SANDSTONE W/ SHALE	465	470	TAN	SOFT
SANDSTONE W/ SHALE	470	475	TAN	SOFT
SANDSTONE W/ SHALE	475	480	TAN	SOFT
SANDSTONE W/ SHALE	480	485	TAN	SOFT
SANDSTONE W/ SHALE	485	490	TAN	SOFT
SANDSTONE W/ SHALE	490	495	TAN	SOFT
SANDSTONE W/ SHALE	495	500	TAN	SOFT
SANDSTONE W/ SHALE	500	505	TAN	SOFT
SANDSTONE	505	510	TAN	SOFT
CEMENTED	510	512	TAN	MEDIUM
CEMENTED	512	515	TAN	MEDIUM
CEMENTED	515	520	TAN/GRN	MEDIUM
CEMENTED	520	525	TAN/GRN	MEDIUM
SHALE	525	530	GRN/BRN	MEDIUM

Minnesota Unique Well Number

206937

County Hennepin
Quad Mound
Quad ID 105B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 08/24/1991
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
ST. BONIFACIUS	117	24	W	32	BABDCA

Elevation 950 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W ST BONIFACIUS MN 55375

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT	0	444		
DRIFT	444	480		
COARSE SANDROCK	480	500	WHITE	

Remarks

GAMMA LOGGED 7-3-91.

SEE M.G.S. BULL. 27, P. 156. KEYS HAS LOG ON THEIR LETTERHEAD.

Well Depth 500 ft. **Depth Completed** 500 ft. **Date Well Completed**

Drill Method **Drill Fluid**

Use commercial **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**

Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Casing Diameter **Weight**

8 in. To 450 ft. lbs./ft.

Open Hole From 450 ft. To 500 ft.

Screen? ☐ **Type** **Make**

Static Water Level

30 ft. land surface Measure null

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump [X] Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Mt.Simon Sandstone Aquifer Mt.Simon

Last Strat Mt.Simon Sandstone Depth to Bedrock 444 ft

Located by Minnesota Geological Survey

Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)

System UTM - Mad83, Zone 15, Meters X 441564 Y 4972573

Unique Number Verification Information from Inpute Date 01/01/1990

Angled Drill Hole

Well Contractor

Minnesota Geological Survey MGS

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

208866

County Hennepin
Quad Mound
Quad ID 105B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 08/24/1991
Update Date 01/12/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
MOUND 4	117	24	W	13	BBCCAA

Elevation 952 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 5549 THREE POINTS RD MOUND MN 55364
Contact MOUND MN 55364

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	108	BROWN	
SAND	108	190	TAN	
CLAY	190	243	BROWN	
CLAY	243	250	BROWN	
SHALE	250	266	LT. BLU	
SHALE	266	277	LT. BLU	
JORDAN SANDSTONE	277	298	GRAY	
JORDAN SANDSTONE	298	303	GRAY	
ST. LAWRENCE	303	439	GREEN	
ST. LAWRENCE	439	440	GREEN	
FRANCONIAN	440	485		
FRANCONIAN	485	505		
DRESBACH	505	567		
DRESBACH	567	600		
MT. SIMON	600	700		
HINCKLEY	700	719	RED	
RED CLASTICS	719	729	RED	

Remarks

DNR OBWELL 27043.
M.G.S. NO.251.
GAMMA LOGGED 12-18-1982.

Well Depth 729 ft. **Depth Completed** 729 ft. **Date Well Completed** 11/06/1962

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below** 2.7 ft.

Casing Diameter		Weight	Hole Diameter	
10 in. To	600 ft.	lbs./ft.	10 in. To	729 ft.
12 in. To	270 ft.	lbs./ft.		

Open Hole From 600 ft. To 729 ft.

Screen? ☐ **Type** **Make**

Static Water Level
65.3 ft. land surface Measure 03/04/1980

Pumping Level (below land surface)
120 ft. hrs. Pumping at 625 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump [X] Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Mt.Simon-Red
Last Strat Solor Church Formation Depth to Bedrock 243 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - Mad83, Zone 15, Meters X 447572 Y 4977247
Unique Number Verification Information from Inpute Date 01/01/1990

Angled Drill Hole

Well Contractor
Renner E.H. & Sons 27015
Licensee Business Lic. or Reg. No. Name of Driller

Appendix 2

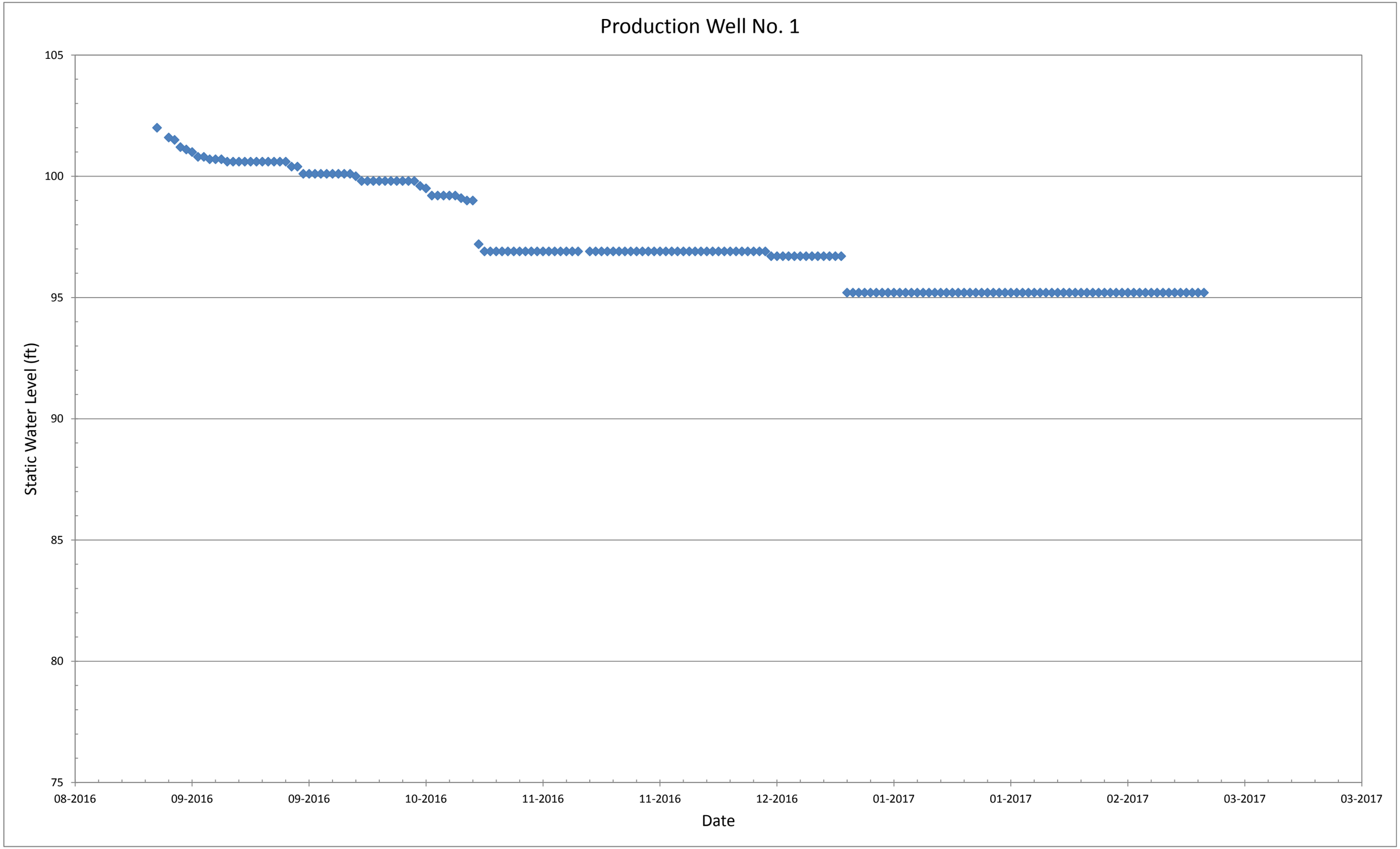
Water Level Monitoring Plan

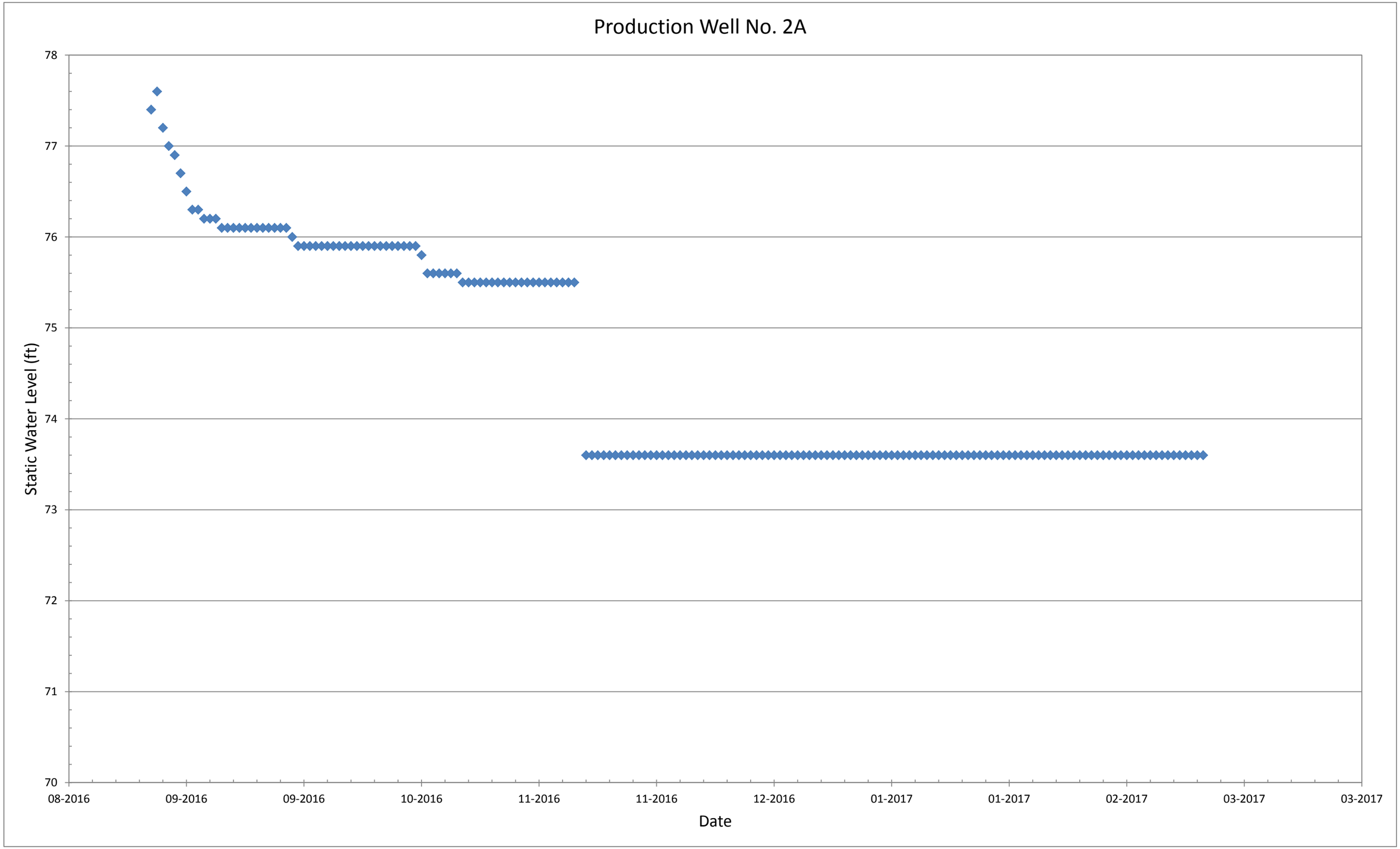
Minnetrista Water Level Monitoring Plan

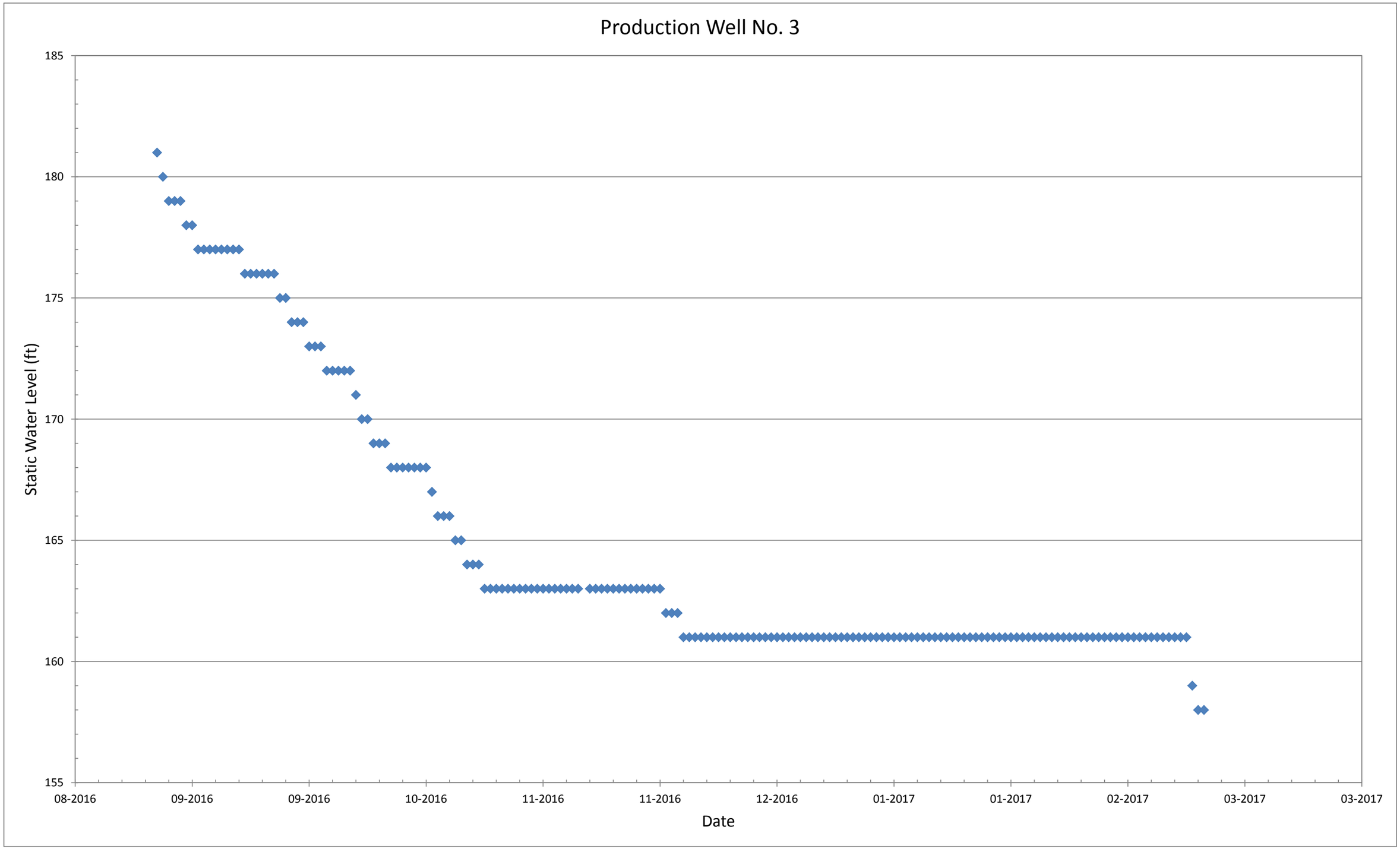
Source	Monitoring Type	Frequency
Well 1	SCADA	Daily
Well 2A	SCADA	Daily
Well 3	SCADA	Daily
Well 4	SCADA	Daily
Well 5	SCADA	Daily
Well 6	SCADA	Daily
Well 7	SCADA	Daily

Appendix 3

Water Level Graphs for Production and Observation Wells


Production Well No. 1
Static Water Level (ft)
105
100
95
90
85
80
75
08-2016
09-2016
09-2016
10-2016
11-2016
11-2016
12-2016
01-2017
01-2017
02-2017
03-2017
03-2017
Date


Production Well No. 2A
Static Water Level (ft)
78
77
76
75
74
73
72
71
70
08-2016
09-2016
09-2016
10-2016
11-2016
11-2016
12-2016
01-2017
01-2017
02-2017
03-2017
03-2017
Date


Production Well No. 3
Static Water Level (ft)
185
180
175
170
165
160
155
08-2016
09-2016
09-2016
10-2016
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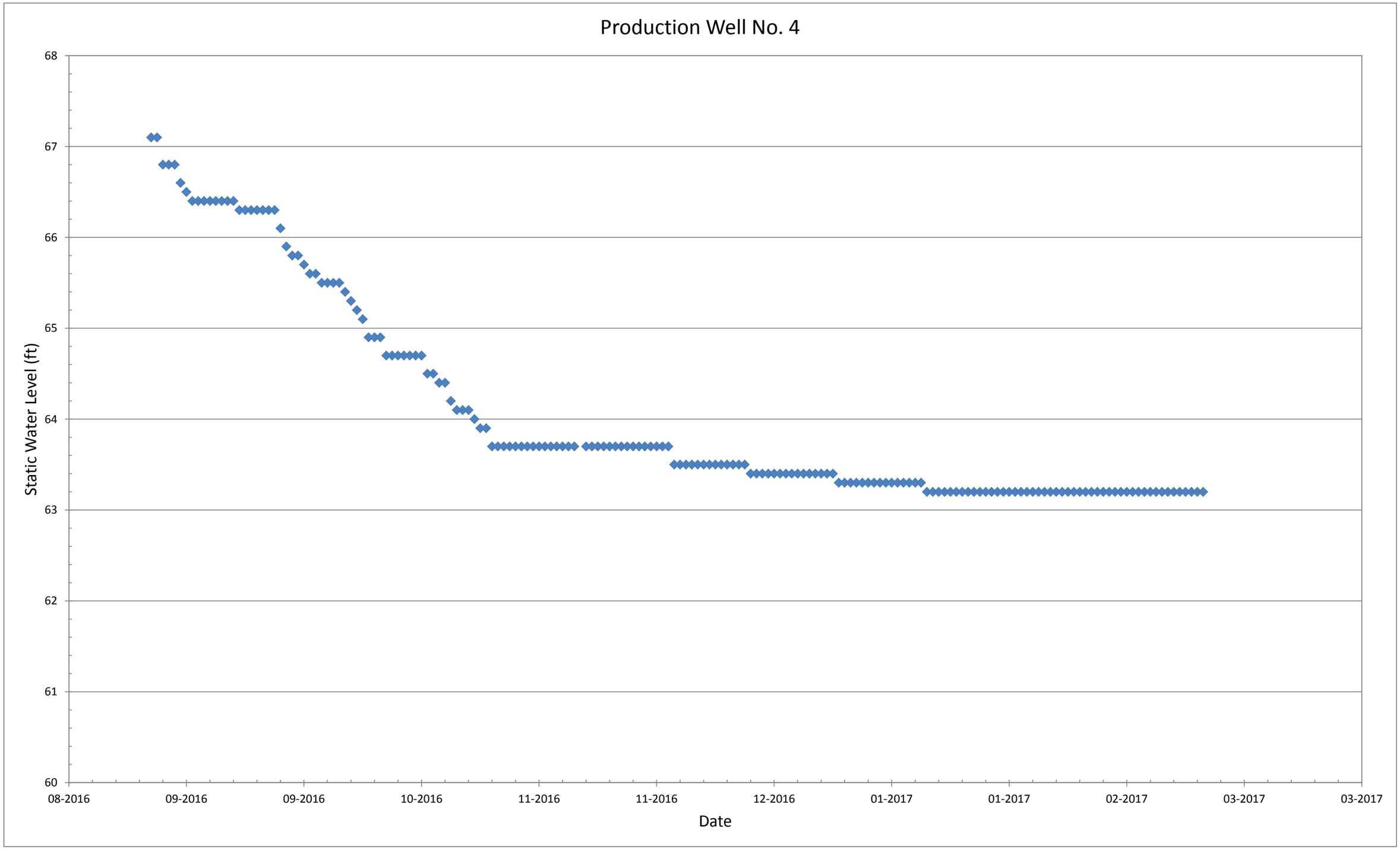
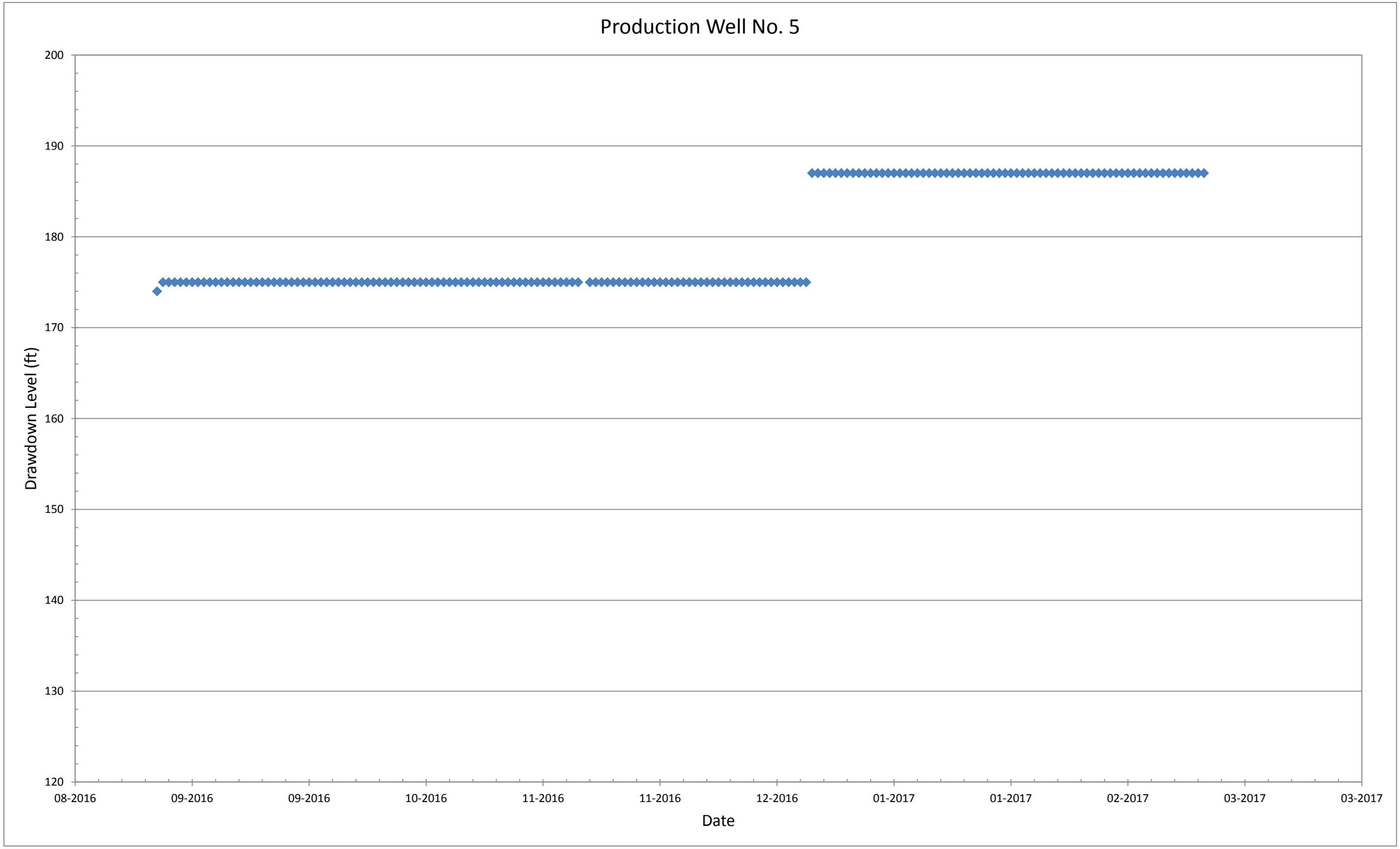
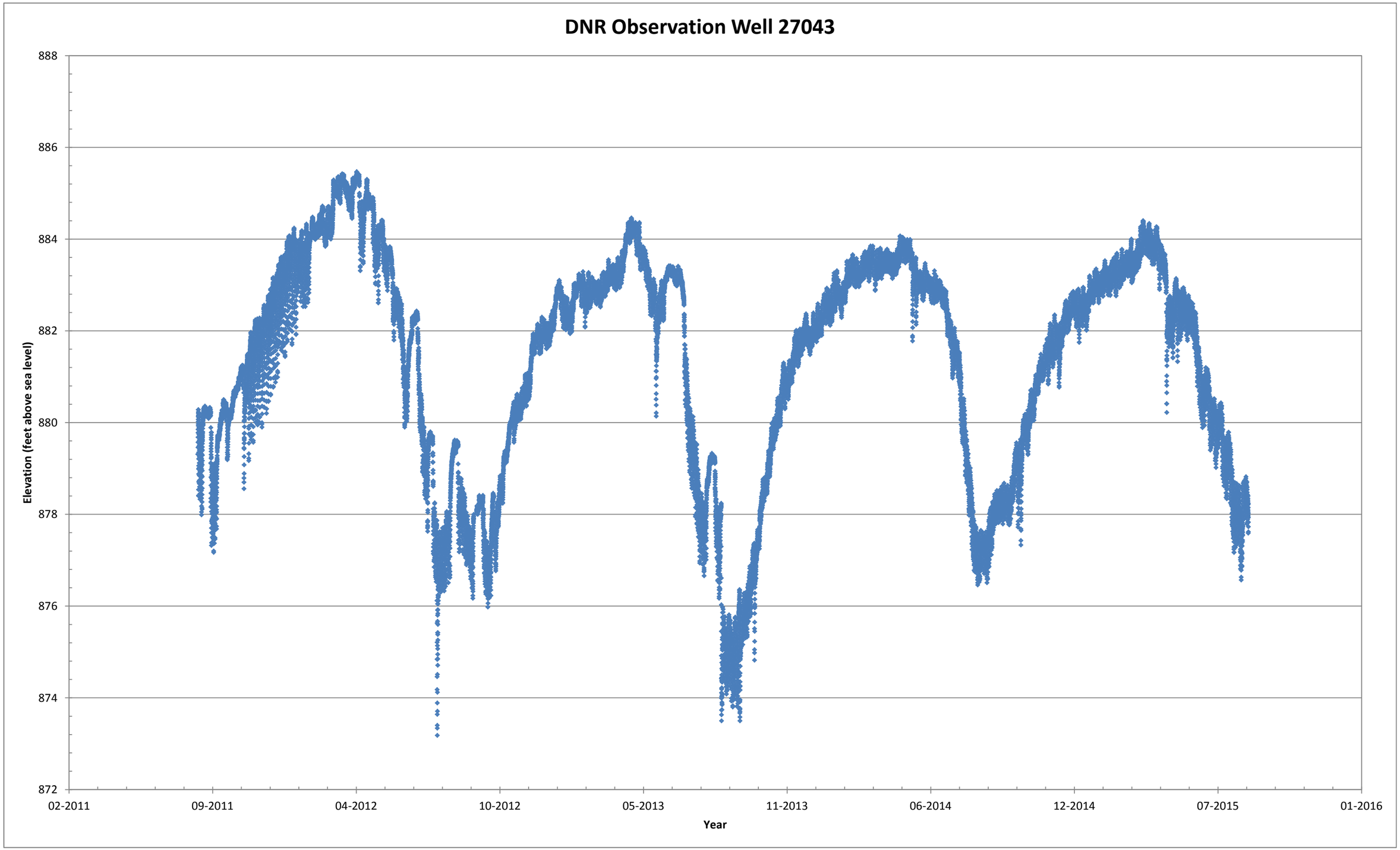
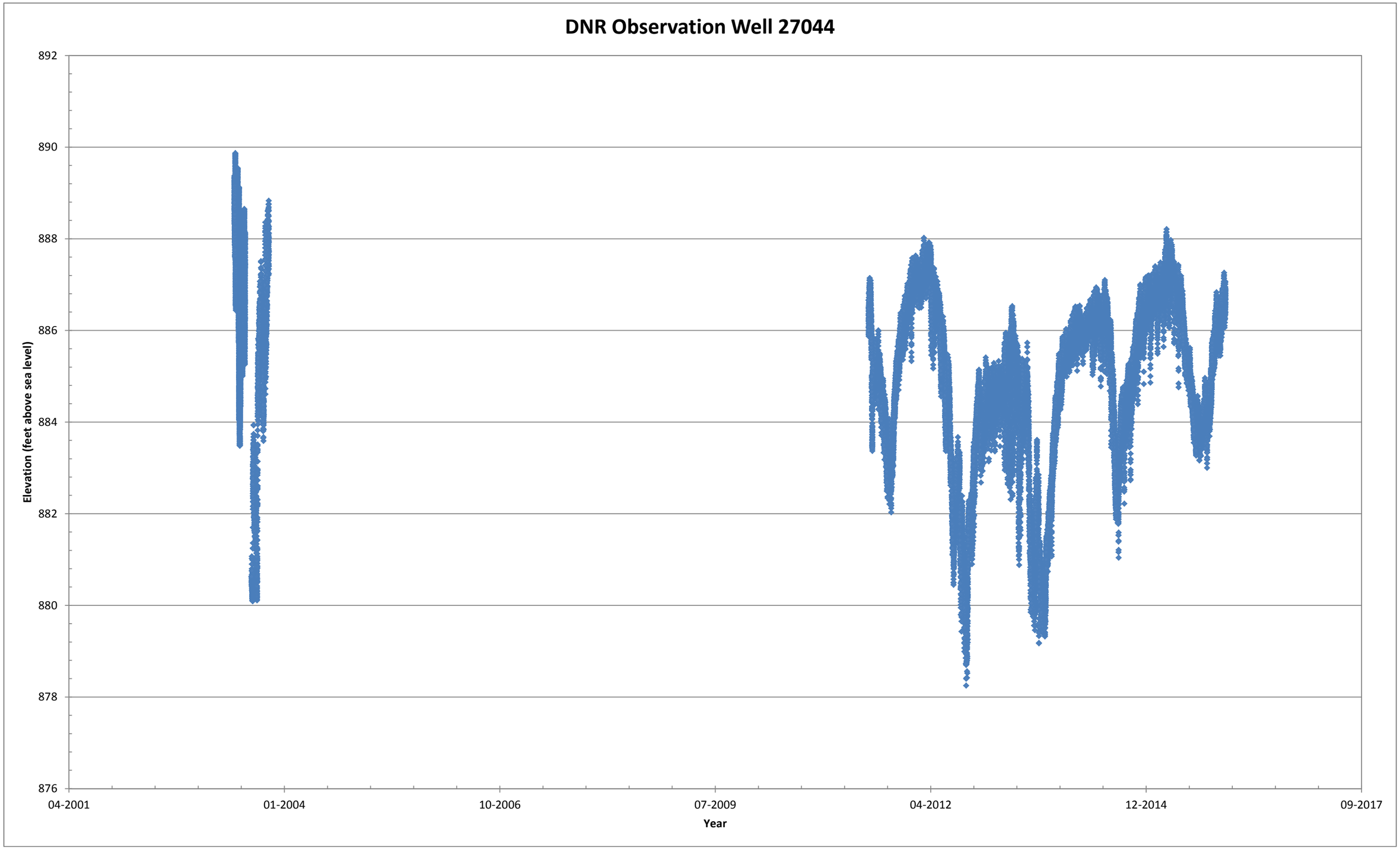
11-2016
12-2016
01-2017
01-2017
02-2017
03-2017
03-2017
Date


Production Well No. 4
Static Water Level (ft)
68
67
66
65
64
63
62
61
60
08-2016
09-2016
09-2016
10-2016
11-2016
11-2016
12-2016
01-2017
01-2017
02-2017
03-2017
03-2017
Date


Production Well No. 5
Drawdown Level (ft)
200
190
180
170
160
150
140
130
120
08-2016
09-2016
09-2016
10-2016
11-2016
11-2016
12-2016
01-2017
01-2017
02-2017
03-2017
03-2017
Date


DNR Observation Well 27043
Elevation (feet above sea level)
888
886
884
882
880
878
876
874
872
02-2011
09-2011
04-2012
10-2012
05-2013
11-2013
06-2014
12-2014
07-2015
01-2016
Year


DNR Observation Well 27044
892
890
888
886
884
882
880
878
876
Elevation (feet above sea level)
04-2001
01-2004
10-2006
07-2009
04-2012
12-2014
09-2017
Year

Appendix 4

Capital Improvements Plan

6.0 CAPITAL IMPROVEMENTS PLAN (CIP)

6.1 Estimated Cost of Trunk System Improvements

The total estimated cost associated with construction of the 2030 water system is approximately $17,074,000 including water treatment and $11,991,000 without as shown in ***Table 6-1*** below. Detailed cost estimates for construction of this infrastructure are included in ***Appendix 2***.

The following assumptions were made in estimating future system costs. Additional details regarding over-sizing payments follows in ***Table 6-1***.

- Connected Systems Alternative (Alternate No. 1) described in section 5 and shown in ***Figure D***.
- Storage, treatment, and supply would be fully funded by the City
- All 20-inch transmission mains between water systems would be fully funded by the City with the exception of the portion through Woodland Cove for which the City would fund over-sizing costs.
- 8-inch water mains would be the minimum size necessary for providing water to new development; however, estimating costs over-sizing payments would be based on the size of main necessary to serve a specific development.
- Areas of existing development that are not currently served with water, would be provided the opportunity to connect to City water if a trunk main was extended near their development to serve a new development or for connecting the City's water systems. The cost of serving the existing development with an 8-inch main would be fully assessed at no cost to the City.

Table 6-1
2030 Water System Infrastructure Estimated Costs

Description	2030 System Improvements
Water Supply, Storage, and Distribution System	$11,991,000
Water Treatment System (if constructed with new supply)	$5,083,000
Total	**$17,074,000**

The total system costs shown in ***Table 6-1*** are not identical to those included in section 5. Cost evaluations included in section 5, account only for infrastructure that would be different under each alternative (mostly distribution mains and back-up wells). Estimated costs included in ***Table 6-1*** account for all water system infrastructure necessary for the 2030 water system.

Future improvement costs are based on 2010 construction prices, including a 10% construction contingency and including 30% indirect costs (i.e., legal, engineering, and administrative). Street, easements, and other miscellaneous costs that may be related to final construction are not included because it is unknown exactly how projects will be constructed which will be determined in final project design.

It is anticipated that as development occurs developers will extend water main necessary for serving their development. If a trunk water main is planned to be located near the proposed development, the City could construct the trunk facility through the proposed development while paying the developer for "over-sizing" the water infrastructure necessary for serving their development. Constructing the ultimate system through this method has two advantages. First, it only extends the water system as development demands. Second, it provides economic efficiency so the City is not responsible for entire construction cost.

6.2 Trunk System Funding

Providing water service to future development will require supply capacity increases, trunk main extensions, and treatment capacity increases. The cost for future water system expansion should be paid for by the new development, through development fees, that is causing the need for increased capacity. Generally, it assumed that treatment benefits all users in the system, therefore related costs for treatment should be paid for by all users through water rates. However, from another perspective, if new development is demanding higher quality water, then costs for treatment should be funded by new development.

The City currently has a trunk area charge of $8,000/acre (net developable acre) and a $2,500/unit water connection charge. Based on the remaining net developable acres and the planned units to be constructed on those acres, it is recommended to increase the current development fees to $8,530/acre (trunk area charge) and $2,700/unit (water connection charge) to fund the future water system excluding water treatment. Should water treatment be funded by development fees, they would need to be increased to $12,145/acre and $3,850/unit as shown in ***Table 6-2*** below:

The following assumptions were made in projecting future system funding:

- Remaining net developable acres within 2030 system is 703 acres per Comprehensive Plan development projections.
- Remaining residential units to be constructed is 2,219 (3.15 units/net acre) per Comprehensive Plan development projections.
- 50% of 2030 system cost would be funded by trunk area charge collected at the time of plat. Trunk area charge equals 50% of 2030 system cost divided by remaining developable net acres.
- 50% of 2030 system cost would be funded by water connection charge collected at the time of building permit. Water connection charge equals 50% of 2030 system cost divided by remaining units to be developed.

Table 6-2
2030 Water System Infrastructure Funding Development Fees

Description	Trunk Area Charge	Water Connection Charge
2030 system with new development funded water treatment	$12,145	$3,850
2030 system with water treatment funded through user rates, or new water treatment constructed	$8,530	$2,700

The recommended development fees should be increased at a rate equal to inflation at a minimum so that infrastructure costs are adequately funded as construction costs inflate over time. Also, a detailed financial evaluation should be completed on a biannual basis to ensure their adequacy for the following reasons:

- The above development fee evaluation has been completed under the assumption that capital projects can be completed without financing. However, due to varying City financial conditions, some projects to be funded by the City may require financing. Financing costs are not included in the previously discussed funding estimates, since it is not possible to make accurate financing projections at this time due to the uncertainty of development timing and financial market conditions.

- Also, development fees for surrounding communities vary widely and can be influenced by a City's financial structure and its desire to promote growth. For example, some communities may have higher water rates, but lower development fees, or visa versa. It is possible to have very high water development fees, but very low sewer development fees. A City may leave development fees artificially low for a time to promote development.

6.3 Water Treatment Funding

WSB recommends that operations, maintenance, and new infrastructure that benefits all water system customers be funded by water usage rates. Since higher quality water will benefit all water customers, it is recommended the cost of the providing higher quality water be funded by all water customers. However, there is another perspective that new development demanding higher-quality water should fund treatment improvements.

Existing water usage rates for Minnetrista are tiered water conservation rates shown in ***Table 6-3***. If water treatment were funded by usage rates, it is projected usage rates would need to be increased by $0.87/1000 gallons for construction of the facility and $0.19/1000 gallons for operation.

The following assumptions were made in projecting water treatment funding.

- Project financing 5% for 20-year term.
- Water sales projected to be approximately 447 million gallons per year (mg/yr) consistent with 2030 demand projections
- Annual operational and maintenance cost of 2.5%

Table 6-3
Existing Water Usage Charges

Usage Tier (Gal/quarter)	Existing Charge/1000 gal
Residential/Commercial	
Base	$19.50
0-80,000 gal	$2.99
80,001 - 150,000 gal	$3.99
150,001 gal and over	$4.99
Schools	
Base	$19.50
0-700,000 gal	$2.99
700,001 - 900,000 gal	$3.99
900,001 gal and over	$4.99

Similar to trunk system funding, should water treatment be considered in the future, it is recommended to complete a detailed feasibility study to provide a more detailed cost estimate and financing projection.

Similar to development fees, water usage rates should be reviewed on a biannual basis due to timing of new development, changing market conditions, and competition amongst municipalities.

Appendix 5

Emergency Telephone List

City of Minnetrista's
Emergency Telephone List

Emergency Response Team	Name	Work Telephone	Alternate Telephone
Emergency Response Lead	Gary Peters	952-241-2532	
Alternate Emergency Response Lead	Mike Pawelk	952-466-2538	612-701-0312
Water Operator	Mike Pawelk	952-466-2538	612-701-0312
Alternate Water Operator	Gary Peters	952-241-2532	
Public Communications	Gary Peters	952-241-2532	

State and Local Emergency Response Contacts	Name	Work Telephone	Alternate Telephone
State Incident Duty Officer	Minnesota Duty Officer	800/422-0798 Out State	651-649-5451 Metro
County Emergency Director	Hennepin County	612-596-0250	
National Guard	Minnesota Duty Officer	800/422-0798 Out State	651-649-5451 Metro
Mayor/Board Chair	Lisa Whalen	612-900-9556	
Fire Chief	Gregory Pederson	952-472-3533	
Sheriff	Richard Stanek-Hennepin County	612-348-3744	
Police Chief	Paul Falls	952-446-1131	
Ambulance	Ridgeview Medical Center	911	
Hospital	Ridgeview Medical Center	911	
Doctor or Medical Facility	Ridgeview Medical Center	952-442-2191	

State and Local Agencies	Name	Work Telephone	Alternate Telephone
MDH District Engineer	James Loveland	651-201-3710	
MDH	Drinking Water Protection	651-201-4700	
State Testing Laboratory	Minnesota Duty Officer	800/422-0798 Out State	651-649-5451 Metro
MPCA	Chuck Regan	651-757-2866	
DNR Area Hydrologist	Kate Drewry	651-259-5753	
County Water Planner	Joel Settles	612-348-6157	

Utilities	Name	Work Telephone	Alternate Telephone
Electric Company	Xcel	612-321-7435	
Gas Company	CenterPoint Energy	612-372-4727	
Telephone Company	Frontier	1-88-535-4353	
Gopher State One Call	Utility Locations	800-252-1166	651-454-0002
Highway Department	Main Office	763-745-7500	

Mutual Aid Agreements	Name	Work Telephone	Alternate Telephone
Neighboring Water System	City of St. Bonifacius – Rick Weible	952-446-9889	
Emergency Water Connection	City of Mound – Mark Wegscheid	612-581-6710	

Technical/Contracted Services/Supplies	Name	Work Telephone	Alternate Telephone
MRWA Technical Services	MN Rural Water Association	800-367-6792	
Well Driller/Repair	Mark Traut	320-251-5090	
Pump Repair	Mark Traut	320-251-5090	
Electrician	A-1 Electric Service - Ted Grim	952-442-5332	952-200-5641
Watermain and Sewer Break	Widmer Construction – Tony Vanderlinde	952-955-5062	
Watermain and Sewer Break	Pride Construction & Excavating – Ken Vanderlinde	952-446-9804	

Backhoe	City of Minnetrista or plumber	612-226-8332	
Chemical Feed	John Gadbois	612-807-4562	
Meter Repair	City of Minnetrista or Michael McNabb	612-226-8332 612-840-5060	
Generator	City of Minnetrista	612-226-8332	
Valves	City of Minnetrista	612-226-8332	
Pipe & Fittings	Al Gartman	763-560-5200	
Water Storage	City of Minnetrista	612-226-8332	
Engineering firm	WSB & Associates – Paul Hornby	651-286-8453	651-325-6849

Communications	Name	Work Telephone	Alternate Telephone
News Paper	Laker & the Pioneer	952-442-4414	
Radio Station	MPR	800-228-7123	
School Superintendent	Westonka School District – Kevin Borg	952-491-8001	

Critical Water Users	Name	Work Telephone	Alternate Telephone
Hospital Critical Use:			
Nursing Home Critical Use:			
Public Shelter Critical Use:			

Appendix 6

Cooperative Agreements for Emergency Services

The City of Minnetrista has emergency interconnections with the City of Mound and the City of St. Bonifacius. Written cooperative agreements for these emergency services do not exist at this time.

Appendix 7

Municipal Critical Water Deficiency Ordinance

CHAPTER VII - PUBLIC UTILITIES

Section 700 - City water system

700.01. Consent to article.

Every person applying for water service from the city system, and every user of water or owner of property for which such application is made, will be deemed by such application to consent to all the rules, regulations and rates contained in the ordinances of the city, as amended, and all new rules, regulations or rates duly adopted.

700.03. Private water supplies.

No water pipe of the city's water supply system may be connected by any pump, well or tank that is connected with any other source of water supply and when such are found the city administrator will notify the owner of the water supply to immediately disconnect from the city's water supply. If not done immediately, the city will turn off the city's water supply.

700.05. Water deficiency.

The city is not liable to consumers for any deficiency or failure in the supply of water, whether occasioned by shutting water off for the purpose of making repairs or connections, or from any other cause. The city may shut off the water in cases of (1) fire or alarm of fire to ensure a supply for fire fighting; (2) repairs or constructing new works; or, (3) an emergency. The water may be shut off at any time as long as necessary for completion of the project or until the cessation of the emergency.

700.07. Access to buildings.

City officials and employees must have free access at reasonable hours of the day to all parts of every building and premises connected with the city water supply system for reading of meters and inspections.

700.09. Water service connections.

<u>Subdivision 1. Permit required.</u>

No connection or service tapping will be made with a city service tap or water main without a permit issued by the city upon application by a master plumber.

Subd. 2. Application.

An application for a permit must be made in writing and signed by the owner or owner's agent duly authorized to do the work. The application must state clearly the kind of service for which the connection is intended, the size and kind of pipe to be used, the street and number, which side of the street, if on a corner, on which street to be tapped, with a diagram of the property to be supplied, showing the streets, the boundary, the block on which it is situated, with the distance from the nearest corner, the full name and address of the owner, the purpose for which the water is to be used, and what plumbing work in the premises, if any, has been done by an unlicensed plumber; and the application must show all other particulars necessary to the full understanding of the subject. No permit will authorize anything not stated in the application.

Subd. 3. Permit revocation or suspension.

For any misrepresentation in the permit application the permit may be suspended; and if the misrepresentation appears to be willful, the permit will be revoked.

Subd. 4. Connection size.

Permits must describe the location and size of each connection, and size must not be departed from in any degree. Water connections to the service tap for ordinary domestic supply will be three-quarters inch unless permission of the city is obtained for the desired change.

700.11. Tapping and connection fees and charges.

Subdivision 1. Permit fees.

Before any permit will be issued, the permit applicant must pay a fee for water main tapping or connecting in the amount established by a resolution of the city council and any other sums that may be required under this section.

Subd. 2. Assessment charges.

No permit will be issued to tap or connect with any water main of the city either directly or indirectly from any lot or tract of land unless the city administrator will have certified:

(a) That such lot or tract of land to be served by such connection or tap has been assessed for the cost of construction of the water main with which the connection is made; or

(b) If no assessment has been levied for such construction cost, that proceedings for levying such assessment have been or will be commenced in due course; or

(c) If no assessment has been levied, and no assessment proceedings will be completed in due course, but a sum equal to the portion of cost of constructing the water main which would be assessable against the lot or tract has been paid to the city.

If no such certificate can be issued by the city administrator, no such permit to tap or connect to any water main will be issued unless the applicant pays an additional connection fee which must be equal to the portion of the cost of construction of the said main which would be assessable against said lot or tract to be served by such tapping or connection. The assessable cost is to be determined by the city administrator upon the same basis as any assessment previously levied against other property for that main.

Subd. 3. Fee disbursement.

Any sum received by the city under subdivision 1 above will be paid into a special suspense account until it is determined by the council whether the property served by the connection under permit will be assessable for any other water main. If it is determined that no other main will be so assessable, then the fee will be credited to the fund for the water main to which the connection was made, but if the tract or lot served by the connection is subsequently assessed for another water main, such sum will be transferred to the fund for said main and credited against the amount assessable against the tract or lot.

700.13. Connections beyond city boundaries.

In all cases where water mains of the city have been or will be extended to or constructed in any road, street, alley or public highway adjacent to or outside the corporate limits of the city, the administrator is authorized to issue permits to the owners or occupants of properties adjacent to, or accessible to, such water mains to tap and make proper water service pipe connections with such water mains of the city in conformity with and subject to all the terms, conditions and provisions of this section relating to the tapping of the city water mains and making water service pipe connections, and to furnish and supply water from the water works system of the city to such owners and occupants of properties adjacent or accessible to such water mains of the city through and by means of water meters duly installed.

Water service rendered to such persons will be subject to all provisions of this section, and persons accepting such service will agree to be bound and obligated by same.

700.15. Excavation permits required.

No person except city personnel and its contractors will excavate in a public street to service a water main, make connection or for any purpose which will expose a water main, unless given a permit to do so by the city in accordance with the provisions of this section, and the filing of a bond in the amount of $5,000 guaranteeing satisfactory performance of such work.

700.17. Turning on water.

No person will turn on any water supply at the stop box without a permit from the city administrator. No permit will be issued unless the house number, as given by the building inspector, is prominently displayed, and no such permit will be given to anyone but a master plumber. The city reserves the right to turn off any water supply if said number is not displayed after a written notice has been sent to the owner as appearing on its books.

700.19. Supply from one corporation cock or stop box.

No more than one house or building will be supplied from one corporation cock, except by special permission of the city administrator. Whenever two or more parties are supplied from one pipe, connecting with the distribution main, each building or part of building must have a separate stop box at the property line unless other provisions are made by agreement with the city administrator.

700.21. Repair of leaks.

In case of failure upon the part of any consumer or owner to repair any leak occurring upon their water service pipe within 24 hours after verbal or written notice has been given, the water will be shut off and will not be turned on until the defect is corrected and a sum in the amount established by resolution has been paid. The city may act without such notice to repair or correct an emergency situation resulting from malfunction of the water system.

700.23. Use confined to premises.

No person will permit water from the city water supply system to be used for any purpose except upon their own premises without prior approval of the city.

700.25. Water meters.

(a) Except for extinguishment of fires, or when authorized by special permit from the city administrator and for temporary purposes only, no person will use water from the water supply system of the city, or permit

water to be drawn from it, except the same be metered by passing through a meter supplied or approved by the city.

(b) No person unless authorized by the city administrator will connect, disconnect, take apart, or in any manner change, or cause to be changed, or interfere with any such meter or its function.

(c) The council will by resolution fix the charge to be paid by customers for new water meters in original connection installations and payment of such charges will be made before delivery for installation.

(d) Whenever any meter becomes obstructed or out of order, the city will cause it to be repaired. The cost of such repairs must be paid out of the water fund unless the meter had been damaged by freezing or willful neglect by someone outside of the city employ. On request of any customer and payment to the city administrator of a fee in the amount established by resolution, the city will test such water meter. All water meters obtained from the city will remain the property of the city and may be replaced at any time by the city if found to be worn or defective beyond repair. Such replacement will be paid for by the property owner or agent.

(e) No person will damage or knowingly or negligently permit damage to be done to a water meter on their premises or elsewhere. Any person damaging any such meter or knowingly or negligently permitting the same to be damaged must pay all costs of making the required repairs to the meter upon demand by the city.

700.27. Cost of installations borne by consumer.

The cost of original installation of all plumbing between the water service tap and the meter, as well as all repairs to the same, will be borne entirely by the consumer. Such plumbing will be subject to inspection by the city. Any repairs found to be necessary by such representatives must be made promptly or the city will be authorized to discontinue service.

700.29. Fire hydrants.

(a) It will be unlawful for any person, except when authorized by the city administrator, or except members of the city fire, street or water departments performing their official duties, to open or interfere with any of the hydrants or gates of the city water supply system. Such permit will be granted by the city administrator only upon application in writing, subject to such regulations as may be prescribed by the council, upon payment of a deposit fee in the amount established by resolution.

(b) Any person withdrawing water from a fire hydrant or other outlet of the city water supply, except for extinguishment of a fire or other city

purposes, will be obligated to pay the city a fee in the amount established by resolution.

(c) No person will be granted a permit to withdraw water from a hydrant or gate without a meter for a period in excess of 20 days.

(d) Upon return of any equipment furnished by the city and deduction of charges, any balance of the deposit must be returned to the depositor.

(e) In case of withdrawal of water from a hydrant or other outlet without permit the above charge will be in addition to other penalties provided for violation of this section.

700.31. Discontinuance of service.

Water service may be discontinued at any time if:

(a) The owner or occupant of the premises served, or any person working on any pipes or equipment which are connected with the city water supply system, has intentionally violated any of the requirements of this section.

(b) Any charge for water, service, meter, meter parts or any other similar financial obligations imposed on the present or former owner or occupant of the premises served by the provisions of this section is unpaid.

(c) There has been fraud or misrepresentation by the owner or occupant in connection with an application for service.

Water will not be turned off from any service pipe between the hours of 9:00 a.m. on Friday and 9:00 a.m. on the following Monday.

700.33. Water Conservation.

Subdivision 1. Purpose.

The purpose of this section is to promote outdoor water consumption conservation measures, to conserve water resources, and to assist the city in effective utilization of its annual Water Appropriation Permit limits as established by the Minnesota Department of Natural Resources. A reduction in the level of outdoor water consumption demand during peak demand periods will assist in maintaining sufficient amounts of water for fire fighting, and reduce the urgency for the construction of additional storage and wells.

Subd. 2. Definitions.

Irrigate/Irrigation means the watering of shrubs, trees, sod, seeded areas, gardens, lawns, or any other outdoor vegetation.

Odd/Even Basis means the limitation on Irrigation in relation to calendar dates and odd/even street addresses. If a property's address ends in an even number, Irrigation shall only take place on even numbered days of the week. If the property's address ends in an odd number, Irrigation shall only take place on odd numbered days of the week.

Time of Day Restriction means the certain hours of the day when Irrigation is prohibited.

Subd. 3. Water Conservation Measures.

(a) Time of Day Restriction. In order to conserve water resources and prevent wasteful and harmful effects of Irrigation during the midday hours, no person shall Irrigate using the public water supply between the hours of 10:00 a.m. and 6:00 p.m. on any day of the week from May 1st until September 30th. This Time of Day Restriction applies to established lawns, vegetation, shrubs, trees and gardens and also applies to new sod and seed unless written permission to Irrigate during the restricted times is obtained from the city administrator or his or her designee.

(b) Odd/Even Restriction. To reduce demand on the city's water supply, no person shall Irrigate using the public water supply except on an Odd/Even Basis unless written permission to Irrigate during the restricted days is obtained from the city administrator or his or her designee.

(c) Rainfall Sensors. All commercial, industrial, institutional and residential automatic sprinkling systems shall have rainfall sensors installed in accordance with Minnesota Statutes Section 103G.298, as amended.

Subd. 4. Emergency Reduction Measures.

The city administrator or his or her designee, is authorized to implement additional water conservation measures at such times where water demand exceeds supply capabilities or the public water reserve capacities are insufficient to protect the community. Such emergency reduction measures may include, but are not limited to, changes to the Time of Day Restriction or a complete ban on Irrigation. Notice of such emergency reduction measures may be given by publication, posting, mail or hand-delivered pamphlets.

Subd. 5. Exceptions.

The Water Conservation Measures required by this section do not apply to the following situations:

(a) Hoses that are being hand held by a person;

(b) Playfields and parks owned by the city that contain lawn, grass or turf which requires more frequent watering in order to prevent unreasonable damage;

(c) Properties of commercial or business enterprises whose economic well-being is dependent upon the Irrigation of lawns, grasses, or turf. Written permission must be obtained from the city administrator or his or her designee. The written permission may be subject to certain terms and conditions;

(d) Water toys or sprinklers that are used by children, provided that the children are present and actively playing with the toys or sprinklers; and

(e) Properties that contain new sod or seed, new trees or other new vegetation. Written permission must be obtained from the city administrator or his or her designee.

Subd. 6. Enforcement.

Any person violating the provisions of this section will be guilty of a misdemeanor and upon conviction must be punished in accordance with the provisions in Section 609.03 of Minnesota Statutes.

700.35 Rates and charges.

Subdivision 1. Water rates.

(a) The rate due and payable to the city by each water user within the city for water taken from the city water supply system will be set by resolution of the city council, which may be amended from time to time. In case the meter is found to have stopped, or to be operating in a faulty manner, the amount of water used will be estimated in accordance with the amount used previously.

(b) The owner or contractor must make an application to the city when water is desired for construction purposes and, if for any reason the meter cannot be installed at that time, the charges for the water will be set forth under water rates. When the building is completed the meter will be set in the regular way.

(c) Water bills must be mailed to customers quarterly and must specify the water consumed and the charge in accordance with the established rates, and in addition a penalty of 15 percent will be added to the amount due if not paid within 45 days after the date of the bill. Payments received by mail postmarked on or before the 45th day will be deemed as paid within such period.

(d) Rates due and payable to the city by each water user located beyond the territorial boundaries of the city will be on the same basis as specified in this section plus a percentage to be determined at the discretion of the council.

Subd. 2. Connection charges.

Connection charges for connection with the city water system will be set by resolution of the council for each project.

Subd. 3. Service charges.

(a) Charges will be collected for tapping and making connections with the city water system at the service lead. Such charges will be paid at the time of application for connection in the amount established by resolution of the city council.

(b) In all cases where a connection to a water main is required, the charges will be established by the city administrator and the work will be subject to the supervision and specifications of the city engineer. In each case, a separate bond of $5,000 will be required to guarantee satisfactory performance.

Subd. 4. Delinquent accounts.

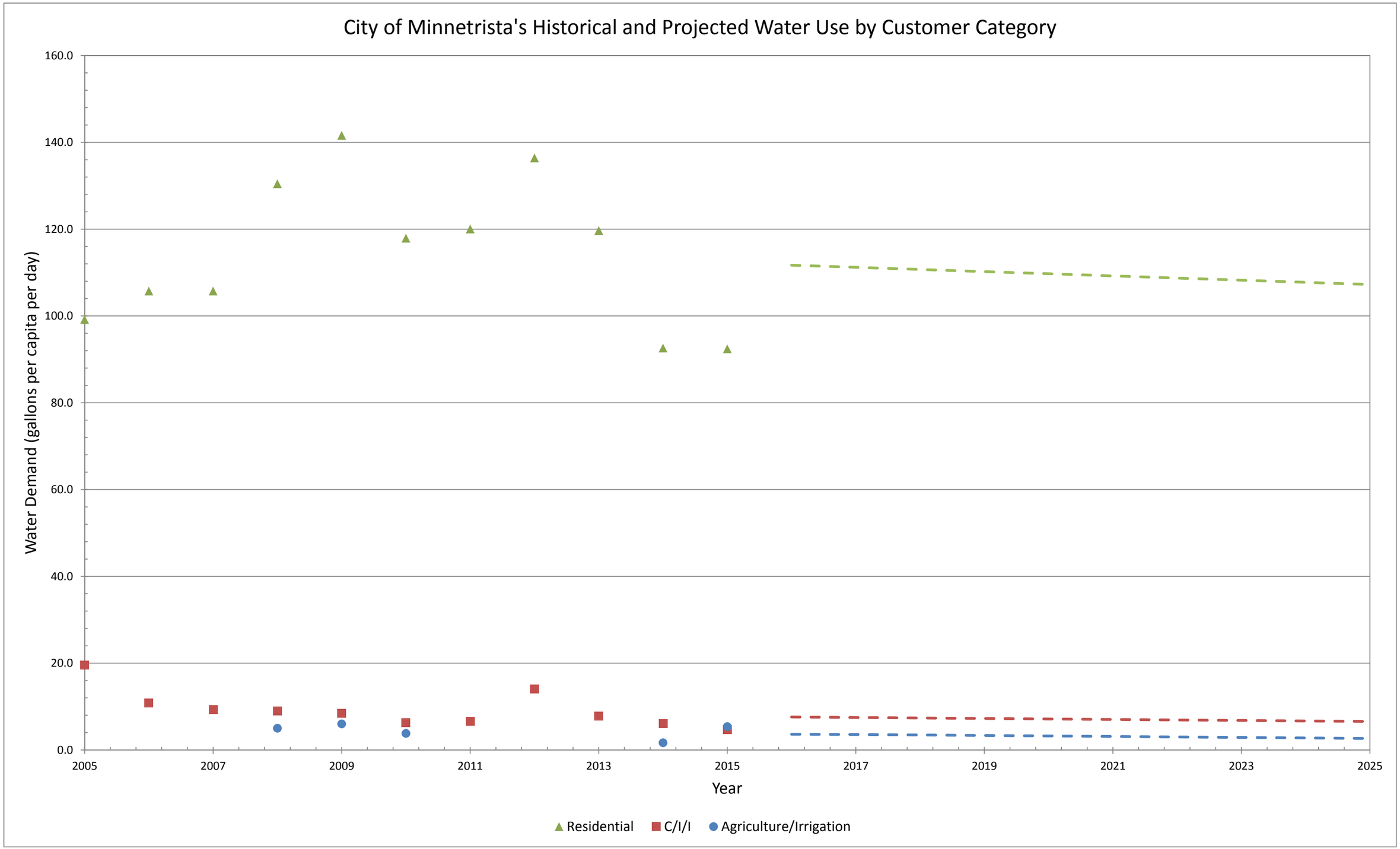
It will be the duty of the city administrator to promptly collect delinquent accounts and in all cases where satisfactory arrangements for payment have not been made, service may be discontinued. All delinquent accounts will be certified by the administrator who will prepare an assessment roll each year providing for assessment of the delinquent amounts against the respective properties served, which assessment roll will be delivered to the city council for adoption on or before October 1 of each year.

Subd. 5. Adjustments.

The city administrator will be authorized to make adjustments in water charges where, in administrator's opinion, the amount billed was erroneous due to meter deficiency or other mistake.

Appendix 8

Graph Showing Historical and Projected Annual Water Demand for Each Customer Category


City of Minnetrista's Historical and Projected Water Use by Customer Category
Water Demand (gallons per capita per day)
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
Year
Residential
C/I/I
Agriculture/Irrigation

Appendix 9

Water Rate Structure

Utility Rates for 2017

2017 Rates

Base rate of $26.28 a quarter for Residential
$3.39 per 1,000 gallons up to 25,000 gallons
$4.23 per 1,000 gallons 25,001 to 50,000 gallons
$5.42 per 1,000 gallons 50,001 and over

Base rate of $26.28 a quarter for Commercial
$3.60 per 1,000 gallons up to 80,000 gallons
$4.20 per 1,000 gallons 80,001 to 150,000 gallons
$5.89 per 1,000 gallons 150,001 and over

Base rate of $26.28 a quarter for Schools
$3.60 per 1,000 gallons up to 700,000 gallons
$4.20 per 1,000 gallons 700,001 to 900,000 gallons
$5.89 per 1,000 gallons 900,001 and over

Appendix 10

Adopted or Proposed Regulations to Reduce Demand or Improve Water Efficiency

DEMAND REDUCTION PROCEDURES

DEMAND REDUCTION POTENTIAL

In essence, demand reduction measures are focus on two areas. 1: Reduction in the demand of customers that is represented by winter reduction in use. 2: Reduction in seasonal warm months demand that is represented by the seasonal increase use.

Base Demand Reduction Potential

A reduction in base demand can generally be achieved through several methods. The following paragraphs address several demand management programs that may be implemented by the community to reduce base demand.

Metering water use may motivate some customers because the charge for water use is according to the volume of water used. All customer water use within the city is currently metered.

Regulations are generally aimed at reducing peak short-term demands versus reducing long-term demands. Regulations that reduce base demands are generally tied to the locally adopted building code. The City of Minnetrista has adopted the Uniform State Building Code that references the Minnesota Plumbing Code. Provisions in this code regulate the flush volumes on all new floor-mounted water closets. In addition, Minnetrista is under the provision of the Model Energy Code that limits the flow rate of all new showerheads installed or remodeled to three gallons per minute. Continued growth is anticipated in Minnetrista, the percentage of housing units affected by these codes within the city will continue to increase.

Education is a demand reduction program that enlists voluntary cooperation from the user to reduce consumption. Educational programs that affect reduction in base demands generally require users to change personal habits. Examples of these types of habits include items from turning off the water when brushing teeth to washing cars with a bucket and sponge rather than a garden hose. The major disadvantage of these types of programs is they rely on behavioral changes in the users of the system and therefore, must be repeated frequently as a means of reinforcing g these changes. Current, bill memos, city newsletters and local cable access channel provides the most readily available means by which the City of Minnetrista can distribute information.

As shown above, the City of Minnetrista is currently utilizing programs to reduce base demand. Further, based on the current usage rates, there does not appear to be additional programs the city can use to significantly reduce base demand.

2. Initiate an education program that describes the severity of the situation. Maintain program throughout the duration of the emergency

3. Initiate a reduction in water use for public works purposes that may affect the city aesthetically but will not harm city facilities on a long-term basis. These actions many include the following:

    - Reduce water main and sanitary sewer flushing activities to an absolute minimum.

    - Eliminate street cleaning activities.

4. Enact an emergency water use resolution that addresses the specific situation. The resolution may include but is not limited to the following:

    - Limit or prohibit non-essential residential outdoor water uses such as sprinkling, vehicle washing and swimming pool filling.
    - Fines or penalties to be assessed for non-compliance.

Type II Emergency (Sudden)

This type of emergency can produce a variety of effects on the water supply system. The effects can range from temporary, localized loss of water service to temporary reduction or loss of production capability to system-wide contamination.

The key to minimizing adverse effects, which may result from these types of emergencies, is rapid response from the appropriate personnel. Prior to responding, however, the city first must receive notification of the situation. For this reason, the notification system outlined later in this report is part of the emergency plan.

Once notified, the city staff will take the immediate steps necessary to contain and remedy the effects caused by the emergency in accordance with the mission, goals and objectives of the utility. If dictated by the circumstances, the city council will authorize allocation of available supply as previously described.

ALLOCATION OF WATER

In the event an emergency situation limits water production to the extent that demand reduction procedures alone cannot sufficiently reduce demand to the necessary levels, the allocation of water supply will be authorized by the city council by resolution. Allocation will proceed according to the following priorities as established by Minnesota Statute 103G.261.

Appendix 11

Implementation Checklist

City of MInnetrista
Implementation Spreadsheet

Action	Description	Timeframe				
		ongoing	annually	1-3 yrs	1-5 yrs	3-6 yrs
Review city ordinances/codes	To encourage or require water efficient landscaping.	✓				
Review city ordinance/codes	To permit water reuse options, especially for non-potable purposes like irrigation, groundwater recharge, and industrial use.		✓			
Revise ordinances to limit irrigation	Review outdoor irrigation installations codes to require high efficiency systems (e.g. those with soil moisture sensors or programmable watering areas) in new installations or system replacements					✓
Make water system infrastructure improvements		✓				
Provide rebates or incentives for installing water efficient appliances and/or fixtures	e.g. low flow toilets, high efficiency dish washers and washing machines, showerhead and faucet					
Provide reabtes or incentives to reduce outdoor water use	e.g. turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use					
Conduct audience-appropriate water conservation education and outreach		✓				
Conduct a facility water use audit	For both indoor and outdoor use, including system components		✓			
Install enhanced meters	Capable of automated readings to detect spikes in consumption	✓				
Install water conservation fixtures and appliances or change processes to conserve water	Toilets, faucets, etc.	✓				
Repair leaking system components	(e.g., pipes, valves)	✓				
Investigate the reuse of reclaimed water	(e.g., stormwater, wastewater effluent, process wastewater, etc.)		✓			
Reduce outdoor water use	(e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	✓				
Train employees how to conserve water	Include for new employee training	✓				
Increasing block rates billing strategy	Rate structure for Residential, Commercial, Industrial, and Institutional customers	✓				
Consider participating in the GreenStep Cities Program	Voluntary program to aid cities in achieving their sustainability and quality-of-life goals					

Rainfall sensors required on landscape irrigation systems	Conserve water and reduce utility bill when there is a sufficient moisture for landscape area.	✓				
Watering restriction requirements	Odd/Even day watering	✓				
Billing inserts or tips printed on the actual bill	Educational information supplied as billing insert	✓				
Consumer Confidence Reports	Report of City's water quality		✓			
Direct mailings (water audit/retrofit kits, showerheads, brochures)	City is looking into using direct mailings to further educate residents on the benefits of water conservation.	✓				
K-12 Education programs (Project Wet, Drinking Water Institute, presentations)	Making programs to educate school age children on water resources.		✓			

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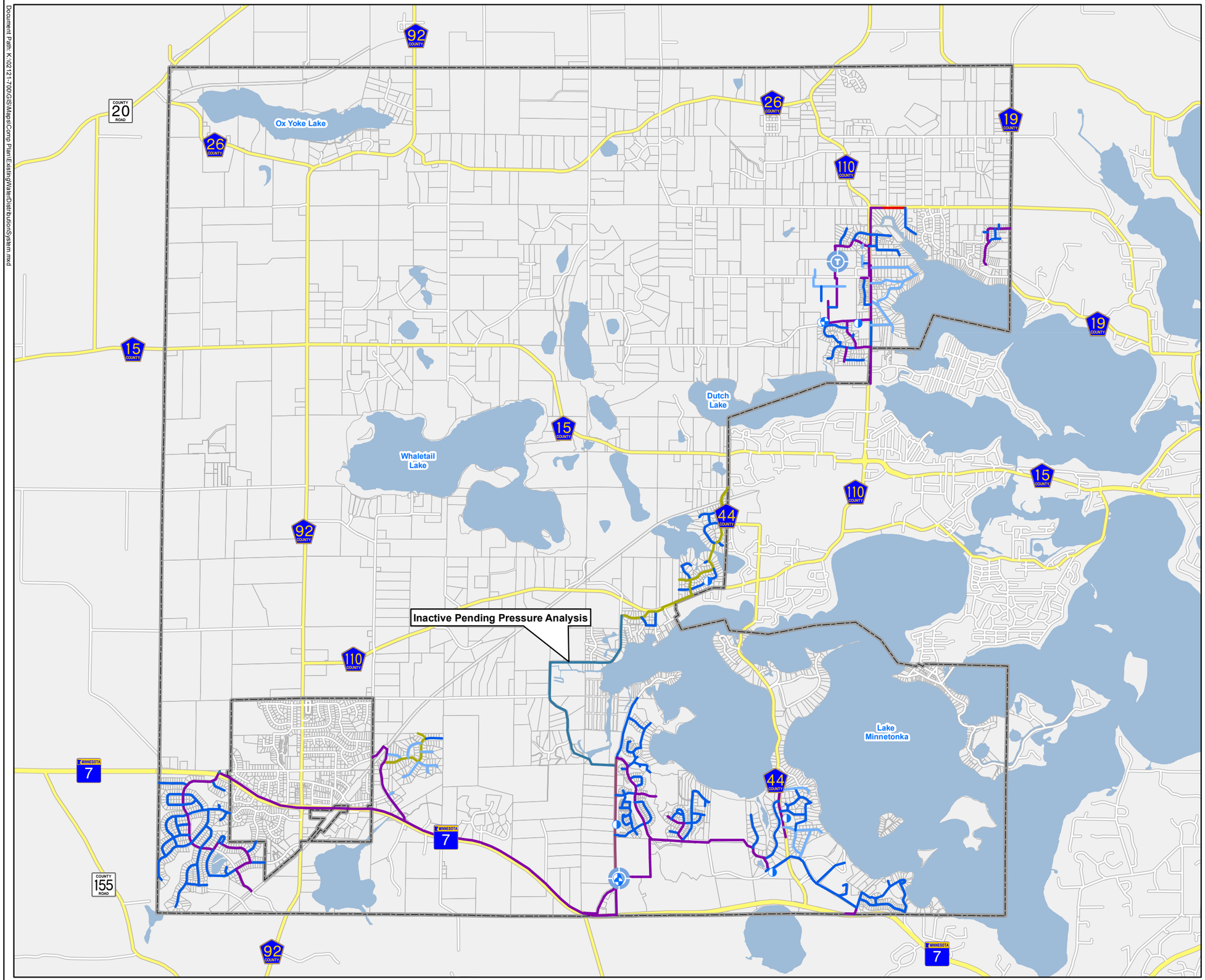

APPENDIX 12
Minnetrista Comprehensive Plan
Existing Water Distribution System
Minnetrista, MN

Existing Watermain

- 6
- 8
- 10
- 12
- 16
- 20
- 24
- Enclosed Storage Facility
- Production Well
- Water Treatment Plant
- **Minnetrista Boundary**
- **Parcel Boundary**

N

0 3,500 Feet

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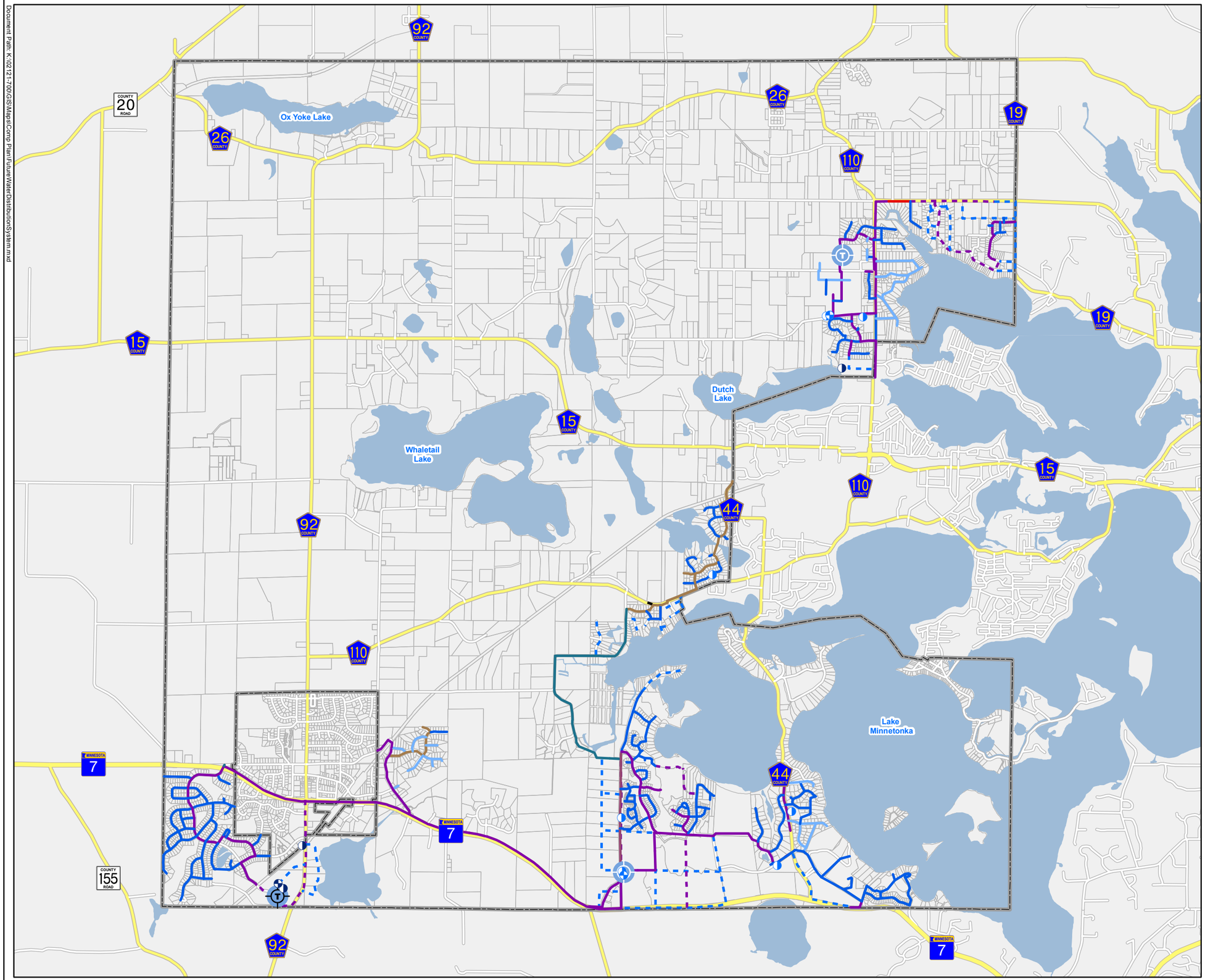

CITY OF MINNETRISTA

APPENDIX 13
Minnetrista Comprehensive Plan
Future Water Distribution System
Minnetrista, MN

Existing Watermain	Future Watermain
6"	8"
8"	12"
10"	16"
12"	Future Tower
16"	Future Well
20"	Future WTP
24"	**Minnetrista Boundary**
Existing Tower	**Parcel Boundary**
Existing Well	
Existing WTP	

N

0 3,500 Feet

WSB

COMPREHENSIVE SURFACE WATER MANAGEMENT PLAN FOR THE CITY OF MINNETRISTA, MINNESOTA

WSB Project No. 2121-700

Final Draft April 2018

PREPARED BY

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TABLE OF CONTENTS

SECTION 7-1

1. EXECUTIVE SUMMARY

1.1. Introduction and Purpose

This Comprehensive Surface Water Management Plan (CSWMP, Plan, local plan) for the City of Minnetrista has been developed to meet local watershed management planning requirements of Minnesota Statutes 103B.235, Minnesota Rules 8410, Minnesota Statute 103B.201, the Metropolitan Council, the Minnehaha Creek Watershed District Comprehensive Water Resources Management Plan, and the Pioneer-Sarah Creek Watershed Management Organization Third Generation Watershed Management Plan. This document and its referenced literature is intended to provide a comprehensive inventory of pertinent water resource related information that affects the City and management of those resources as well as serve as a guide to reach goals related to water quality, volume reduction, and flood management. The purposes of the water management programs are to:

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

The Minnetrista Surface Water Management Plan addresses these purposes.

1.2. Plan Organization

The Minnetrista Surface Water Management Plan is divided into seven sections:

- ***Section 7-1 Executive Summary*** provides an introduction and purpose and summarizes the plan contents.

- ***Section 7-2 Land and Water Resource Inventory*** presents information about the topography, geology, groundwater, soils, land use, public utilities, surface waters, hydrologic system and data, and the drainage system.

- ***Section 7-3 Assessment of Problems and Corrective Actions*** provides an assessment of the existing and potential water resource related concerns within the City. These concerns were identified based on an analysis of the land and

resource data collected as part of this plan preparation and through public input.

- ***Section 7-4 Establishment of Goals and Policies*** outlines water resource management related goals and policies of the City. Goals and policies have been developed for the City concerning water quantity, water quality, recreation, fish and wildlife management, enhancement of public participation, information and education, public ditch system, ground water, wetlands, and erosion.

- ***Section 7-5 Implementation Program*** outlines implementation priorities and develops an implementation program. This section contains a prioritized listing of the studies, programs and capital improvements that have been identified as necessary to respond to the water resource needs within the City.

- ***Section 7-6 Financial Considerations*** discusses the financial considerations of implementing the proposed regulatory controls, programs and improvements, which have been identified in this plan and their financial impact on the City. Funding sources available for implementing the policies and corrective actions identified within this plan are included.

- ***Section 7-7 Amendment Procedures*** discusses the procedures to be followed in the event this Surface Water Management Plan is amended.

Appendices are included in the back of the plan and are summarized below. These documents are included because they provide supporting information to the main body of the plan.

Appendix A: Figures. This section contains all figures referenced in the plan.

Appendix B: Water Resource Related Agreements. This section contains copies of any agreements that the City has entered into regarding water resource management.

Appendix C: Storm Water System Modeling Information. A summary of the storm water model that was developed for the City is included in this appendix. This includes drainage areas, high water levels, and peak discharge rates.

Appendix D: Ordinances. A copy of the City's water resource related ordinances are included in this appendix.

Appendix E: NPDES Phase II Information. Information about the City's NPDES permit is included here.

Appendix F: Wetland Management Classification. This appendix includes the wetland management classifications based on the MCWD Functional Assessment of Wetlands.

Appendix G: Water Quality Information. Information collected about water quality monitoring and results are included here.

Appendix H: SHPO Information. Summary data from the State Historic Preservation Office is included here.

Appendix I: Phosphorus Load Reduction Study. This appendix includes information on the City's plan to meet the MCWD requirements for phosphorus load reductions.

Appendix J: Wellhead Protection Plan. This appendix contains information about the City's Wellhead Protection Plan.

Appendix K: Groundwater Sensitivity Information. The County map showing sensitivity to groundwater contamination is included in this section.

Appendix L: Conceptual Greenway Plan. The City's map from the Parks, Trails, and Open Space Plan is include in this appendix.

Additional material is referenced within this report and is available from the Engineering Department.

1.3. Personnel Contacts

To implement this plan, a coordinated water resource management approach must be used. This approach utilizes the services of staff personnel within the City and surrounding communities, as well as staff associated with the Watershed District and Watershed Management Organization having jurisdiction over areas within the City. The Watershed District and Watershed Management Organization having jurisdiction within the City are shown in **Figure 1.**

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

City of Minnetrista
Michael Barone
City Administrator
7701 County Road 110 West
Minnetrista, MN 55364
(952) 241-2511
mbarone@ci.minnetrista.mn.us

City of Minnetrista
Department of Public Works
Gary Peters
7701 County Road 110 West
Minnetrista, MN 55364
(952) 241-2532
gpeters@ci.minnetrista.mn.us

Minnehaha Creek Watershed District
Becky Christopher
15320 Minnetonka Boulevard
Minetonka, MN 553545
(952)471-0590
www.minnehahacreek.org

Pioneer-Sarah Creek Watershed Management Organization
James Kujawa
3235 Fernbrook Lane
Plymouth, MN 55447
(612) 348-7338

2. LAND AND WATER RESOURCE INVENTORY

In conformance with the Metropolitan Surface Water Management Act and as required in Minnesota Rules Section 8410.0060, this section of the plan provides a general description and summary of the climate, geology, surficial topography, surface and ground water resource data, soils, land use, public utilities services, water-based recreation, fish and wildlife habitat, unique features, scenic areas, and pollutant sources. This section also identifies where detailed information can be obtained for many of these areas of concern.

2.1. Physical Setting

2.1.1. Climate

The climate within the Minneapolis/St. Paul metropolitan area is described as a humid continental climate with moderate precipitation, wide daily temperature variations, warm humid summers and cold winters. The total average annual precipitation is approximately 31 inches, of which approximately one-third occurs in the months of June, July and August. The annual snowfall average is about 54 inches and is equivalent to approximately 5.4 inches of water. Average monthly temperature and precipitation are shown in Table 2-1. Additional climatological information for the area can be obtained from State Climatologist website at http://climate.umn.edu/.

2.1.2. Precipitation

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

TABLE 2-1 Average Monthly Temperature and Precipitation Data

Months	**Average Temp** (F°)	**Precipitation** (inches)	**Snowfall** (inches)
January	15.6	0.90	12.2
February	20.8	0.77	7.7
March	32.8	1.89	10.3
April	47.5	2.66	2.4
May	59.1	3.36	0.0
June	68.8	4.25	0.0
July	73.8	4.04	0.0

August	71.2	4.30	0.0
September	62.0	3.08	0.0
October	48.9	2.43	0.6
November	33.7	1.77	9.3
December	19.7	1.16	11.9
Totals	**46.2**	**30.61**	**54.4**

Source: Minnesota Climatology Working Group, MSP Airport (1981-2010)

Table 2.2 – Atlas 14 Rainfall Frequencies

Recurrence Interval (yrs)	**24-hr Rainfall Depth (in)**	**Chance of Occurrence Each Year**
1	2.47	99%
2	2.84	50%
10	4.21	10%
50	6.18	2%
100	7.19	1%
100-year 10-day Runoff	7.3	1%

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

2.1.3. Geology

The City of Minnetrista is located in western Hennepin County (**Figure 2**). The City is bordered by the Cities of Independence, Orono, Mound, Shorewood, Victoria, and the Townships of Laketown and Watertown. The City of St. Bonifacius is completely surrounded by the City of Minnetrista. Total area within the corporate limits is approximately 32 square miles.

The general surficial geology in the City consists of Des Moines Lobe loamy glacial till with inclusions of areas with clayey glacial till. In the northeast part of the City, the clayey glacial till deposits are predominant. Postglacial deposits of peat and muck occur throughout the City in small depressions to extensive low land basins. A ridge of sand and gravel (an esker) runs along the south side of Ox Yoke Lake and joins a north-south trending esker which runs west of Little Long Lake, east of Whaletail Lake and down to Halsted Bay. These surficial deposits are generally more than 50 feet thick and overlay older glacial deposits.

Below the majority of the City, the bedrock consists of fine-grained sandstone and shale (Franconia Formation). The Jordan sandstone, which is situated on top of the Franconia Formation, underlies the southeast corner of the City. The buried river valleys cut through the Franconia Formation to expose the Ironton and Galesville sandstones, the Eau Claire Formation, and in the deepest areas, the Mt. Simon sandstone. The bedrock is generally at a depth of 150 to 250 feet, but in the buried river valley that crosses the City from southwest to northeast, the depth of bedrock is as much as 400 feet.

Additional geologic information for areas within the City can be found in the following plans:

- Hennepin County Geologic Atlas
- Minnehaha Creek Watershed District Plan
- Pioneer Sarah Creek Watershed Management Commission Plan

2.1.4. Topography

The topography of the City consists of gently to steeply rolling hills, separated by nearly level wetlands and lake basins reflecting the topography of a glacial end moraine. Surface elevations range from 1,050 feet above sea level west of Whaletail Lake, to 910 feet above sea level along Deer Creek in the northwest part of the City. A significant portion of the City drains to the east to Lake Minnetonka at an elevation of approximately 930 feet above sea level. The specific drainage patterns, which depict topography for areas within the City, are shown on the subwatershed delineation map (**Figure 3** and **Appendix C**). As can be observed from the subwatershed delineation map, the City is divided into many small watersheds. The subwatershed delineations utilized City topographic mapping, storm sewer as-builts, aerial photos, and field investigations.

2.1.5. Soils

The soils within the City area range from having low to high infiltration rates and are very susceptible to erosion. The hydrologic soil classification map is shown in **Figure 4**. The four soil classifications are defined as follows:

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

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

Group C - These soils have slow infiltration rates generally ranging from 0.06 to 0.2 inches per hour when thoroughly wetted. Group C have moderately fine to fine texture.

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

The western portion of the City contains mostly soils from the Lester-Peaty Muck Association. This association consists of rolling to hilly, well-drained soils on hills and knolls that are separated by very poorly drained soils in swales and in larger closed depressions. The slopes pose a moderate to severe limitation for use and are susceptible to erosion.

The northeast portion of the City contains mostly soil from the Erin-Kilkenny-Peaty Muck Association. This association consists of gently undulating to hilly, well-drained soils on hills with very poorly drained soils in large depressions which are commonly connected by drainageways. The soils in this association have severe limitations for on-site sewage disposal due to slow percolation rates and/or highwater table. Erosion control on the sloping soils is a significant management concern.

The southeast portion of the City contains mostly soils from the Hayden-Cordova-Peaty Much Association. This association consists of undulating to rolling soils on low hills and knolls that are separated by nearly level soils in broad drainageways. These soils have moderate to severe limitations for residential and commercial development due to slopes, wetness, and/or frost heaving. Erosion control on the sloping soils is a significant management concern.

Additional information on the geology and soil for the City is included in the Hennepin County Soil Survey.

2.1.6. Land Use

The City's land use practices include residential, commercial, industrial, agricultural, and public and private open space areas. **Figure 5** is a representation of the existing land use as of 2016. **Figure 6** shows the future land use. **Figure 17** shows the properties owned by the City.

Future land use will be predominantly detached single family homes. The remaining developable land within 2020 MUSA can be seen on Chapter Three land use plan. The following properties can still be developed: Park Cover 7170 Hwy 7 Palmer Pointe, Hermitage Shores, Thorson/Smith Property, Cardinal Cove 2nd, Halsted Pointe, Direcks Property, Gulse Property, Wallace Estate, and other Multiple Properties. For more information, see Chapter Three - Land Use Plan of the 2040 Comprehensive plan.

The City of Minnetrista recognizes and supports the efforts from Minnehaha Creek Watershed District to emphasize collaboration with communities to align water resource goals with local land use goals. As plans and programs are subject to change from time to time, the City would be willing to meet periodically with the District to share and discuss current and upcoming projects that benefit targeted natural resources. Development activity is difficult to project; however, the City will seek to involve the District as early as possible in the review process to allow for the integration of watershed capital improvements or design enhancements into the development plans.

Most of the residences are not served by public water and sewer systems. The City does, however, provide public water and sewer to some of its residents. The City has a Wellhead Protection Plan available for review at City Hall. Selected information from the Plan is located in **Appendix J**.

2.2. Water Resources Data

Available surface water resource data within the City is summarized in this section. Detailed information has been included either in the appendices to this report or has been identified by reference and is available from the Engineering Department.

The hydrologic system of the City consists of wetlands, streams, and major water bodies as outlined below.

2.2.1.Wetlands

The general locations of wetlands within the City are shown in **Figures 7 and 8**. These figures show the National Wetland Inventory and the DNR Public Waters Map, respectively. These wetlands provide habitat to many species of plants and animals. **Appendix E** includes a map **(Figure 16)** of functional assessed wetlands provided by the MCWD.

The City is the Local Government Unit (LGU) for the Wetland Conservation Act (WCA). The City uses staff and consultants for expertise in wetlands and the WCA rules. The City actively administers the WCA, reviews wetland delineations, permit applications, and enforces the WCA.

2.2.2. Major Bodies of Water

There are several major water bodies that convey and store water within and through the City. Some of these include: Dutch Lake, Little Long Lake, Mud Lake, Ox Yoke Lake, Whaletail Lake, Six Mile Creek, and Lake Minnetonka (**Figure 8**). More information about these water bodies is included in various portions of this section.

2.2.3. Hydrologic Modeling

A HydroCAD hydrologic analysis was completed in 2004 by the engineering firm MFRA as part of the City's first generation Surface Water Management Plan. This modeling was not modified with this plan update. The analysis is limited to areas within the Minnehaha Creek Watershed Distirct, which are tributary to Lake Minnetonka. The modeled portion of the City is divided into approximately 119 subwatershed areas, which are shown in Appendix B.

The hydrologic/hydraulic modeling effort quantifies the 10-year, and 100-year rainfall events, peak discharge rates, storage requirements, other pertinent hydrologic/hydraulic information for storm water retention areas, and trunk storm water conveyance systems within the City. The hydrologic/hydraulic modeling results are included as **Appendix C**.

Additional hydrological modeling is needed to identify subdrainage basins within the Pioneer-Sarah Creek Watershed. Also needed is expanded modeling of the City as the current model does not analyze or determine flood elevations along the creeks streams or ditches within the Minnehaha Creek Watershed.

For updated hydrologic modeling, the City will coordinate with MCWD to use the most recent version of their model as needed.

2.2.4.Monitored Water Quality and Quantity Data

Water quality data for the City has been obtained from the MPCA's Environmental Data Access site at https://www.pca.state.mn.us/environmental-data. This database is utilized by participating agencies to compile water quality testing data and is almost entirely used for the storage of water quality parameters.

Specific lake and stream water quality data can be located through MPCA's interactive mapping tool located here: https://cf.pca.state.mn.us/water/watershedweb/wdip/index.cfm

Figure 9 shows the location of monitoring sites listed on the MPCA website. Some of the available water quality information is summarized below and in **Appendix G**:

Table 2-3

	Mean Total Phosphorus (ppb)	Mean Chlorophyll a (ppb)	Secchi Disk (meters)	Carlson Trophic Status
North Little Long Lake	11	4.2	5.0	Oligotrophic
South Whaletail Lake	41	39.4	0.8	Eutrophic
North Whaletail Lake	73	46.3	0.5	Eutrophic
Dutch Lake	70	46.9	1.2	Eutrophic
Lake Minnetonka	NA	NA	1.0	Eutrophic

To effectively monitor BMP performance and water quality, the City of Minnetrista has implemented the Stormwater Asset Management Program (SWAMP). This program uses construction as-builts, pond inventory, drainage areas, field inspections, and storm sewer maps to rank BMPs based on cost/benefit pollutant removal efficiency. Basins are prioritized based on a set of parameters and a schedule can be determined for maintenance needs. The program is continually updated to include new BMPs, updated stormwater infrastructure or changed drainage areas. The City will be able to incorporate SWAMP to include the following:

- Scheduling, tracking, and storing MS4 infrastructure inspections
- Budget stormwater inspection and maintenance activities
- Track TSS and TP load reductions
- Prioritize inspection and maintenance activities through a ranking system
- Provide information to the public on BMP maintenance priorities and schedules
- Compliance for written procedure and treatment effectiveness requirements as part of the MS4 permit

The SWAMP will be done in coordination with the watershed districts to remain consistent with their TMDL and WRAPS studies and other water quality reports. Specific information regarding the program can be requested from the City.

2.2.5. Impaired Waters

The MPCA lists the following water bodies (Table 2-4) located within or near the City as being impaired, meaning that the waters are too polluted or otherwise degraded to meet the water quality standards set by governing bodies. A Total Maximum Daily Load (TMDL) study is undertaken to determine the amount

of pollutant that is currently entering the water, and the maximum amount that can be present in the water while meeting water quality standards.

Table 2-4

Waterbody/Watercourse	Year Added to List	Affected Use	Pollutant/Stressor	TMDL Status
North Whaletail Lake[5]	2008	Aquatic Recreation	Mercury, Fish Consumption Advisory, Excess Nutrients	Complete
South Whaletail Lake[5]	2006	Aquatic Recreation	Mercury, Fish Consumption Advisory, Excess Nutrients	Complete
Little Long Lake[2,5]	2007	Aquatic Consumption	Mercury, Fish Consumption Advisory	Complete
Lake Minnetonka[2]	1998	Aquatic Consumption	Mercury, Fish Consumption Advisory	Complete
Jennings Bay[2]	2007	Aquatic Recreation	Mercury, Fish Consumption Advisory, Excess Nutrients	Complete
Halstead Bay[2]	2007	Aquatic Recreation	Mercury, Fish Consumption Advisory, Excess Nutrients	Complete
Dutch Lake[1]	2009	Aquatic Recreation	Excess Nutrients	Complete
Langdon Lake[1]	2009	Aquatic Recreation	Excess Nutrients	Complete
Six Mile Marsh	2008	Aquatic Recreation	Excess Nutrients	Not Yet Underway
Stone Lake[1]	2007	Aquatic Recreation	Excess Nutrients	Complete
Forest Lake[1]	2007	Aquatic Recreation	Excess Nutrients	Complete
Parley Lake[1]	2011	Aquatic Recreation	Excess Nutrients	Complete
West Arm[1]	2009	Aquatic Recreation	Excess Nutrients	Complete
Painter Creek (County Ditch 10)	2009	Aquatic Recreation	E. Coli	Complete
Deer Creek[5]	2016	Aquatic Life, Aquatic Recreation	Dissolved Oxygen, E. Coli	E. Coli TMDL complete
Sixmile Creek	2016	Aquatic Life	Excess Nutrients	Not Yet Underway

[1] Outside municipal boundary
[2] Statewide Mercury TMDL developed, no action is necessary
[3] Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Study
[4] Added to the2016 Impaired Waters List
[5]Part of the Pioneer-Sarah Creek Watershed WRAPS/TMDL Study

If not already complete, each of these waterbodies/watercourses listed above will have a designated Total Maximum Daily Load (TMDL) for acceptable levels of those pollutants. Approved studies are identified in the table. **Figure 8** also shows the location of the impaired waters.

The City will continue to implement BMPs to meet required TMDLs. The City will reference the Pioneer-Sarah Creek Subwatershed WRAPS and Upper Minnehaha Creek Watershed Nutrients and Bacteria TMDL study to implement identified projects as appropriate. The City will also continue to partner with MCWD and PSCWMC to identify potential opportunities for additional BMPs.

In 2009, the City completed a Load Reduction Plan to target areas of phosphorus discharge and specific projects to address this issue. The City will continue to implement projects identified in this report that have not yet been completed due to a lack of funding. Partnership opportunities for funding will be explored with MCWD and PSCWMC.. This report can be found in **Appendix I** of this plan.

2.2.6. Groundwater Appropriations

Ground water resource data for areas within the City is contained within the Hennepin County Geologic Atlas. The primary aquifers within the City are the Prairie Du Chien-Jordan Aquifer, the Franconia-Ironton-Galesville Aquifer, and the Mt. Simon-Hinckley Aquifer. The Prairie Du Chien-Jordan Aquifer is of special concern since it is the most heavily used ground water source in Hennepin County.

Generally, the City has low sensitivity to groundwater contamination. However, the areas near Six Mile Marsh have a higher susceptibility to groundwater contamination. **Appendix K** contains the County map for groundwater sensitivity.

Within the City, ground water wells serve the City and private water needs. Each of these wells has a ground water appropriation permit from the DNR. **Figure 10** shows the types and locations of the DNR permitted ground water appropriation sites within the City.

2.2.7. Floodplain Management

A Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) was completed for areas within the City in 1985. The Flood Insurance Study consists of a study report, a set of floodway and floodplain delineation maps, and a set of Flood Insurance Rate Maps (FIRM) maps. The FIRM maps were revised in 2016. The FIRMs are available from the City Planning Department at Minnetrista City Hall. The floodplain boundaries for the City are shown in **Figure 11**.

Based on the FEMA flood insurance study, the City has adopted Floodplain Management Regulations. A copy of these regulations can be found in **Appendix D**. These regulations prohibit uses or activities within the floodplain or floodway that include structures or fill or that obstruct flood flows or cause increased flood elevations.

Flood maps are available showing the different flood zones mentioned in the ordinance by going to FEMA's website at https://msc.fema.gov/portal.

2.2.8. Water Resource Problem Areas

A number of water resource problem areas were identified within the City. **Figure 12** shows the locations of these water resource problem areas. These areas were identified through information obtained from City Staff and from the public input process.

1. Poor water quality in Jennings Bay and Halsted Bay of Lake Minnetonka, Little Long Lake, Whaletail Lake, Dutch Lake, Stone Lake and Ox Yoke Lake according to the MPCA. The City will partner with MCWD to address internal loading requirements and potential floc treatments for impaired waters.

2. Erosion of steep slopes long Painters Creek and around Lake Minnetonka. A project located where Painters Creek intersects West Branch Road is to be complete to address this issue.

3. Within the residential area of Cardinal Cove and Halsted Avenue is an antiquated drainage system of roadway ditches and culverts that function poorly and cause street and property flooding and erosion and sedimentation in the right-of-way and on private property. *This issue will be addressed with the Serenity Hills development to be completed within the next few years.*

4. Localized flooding occurs near the intersection of County Road 151 and Apple Garden Road because the area is landlocked and has no drainage outlet.

5. Portions of Enchanted Lane and private property near Phelps Bay are below the highwater level of Lake Minnetonka and are subject to recurring lake flooding. *This issue will be addressed with the Enchanted Lane and Tuxedo Drive project in 2017.*

6. The Saunders Lake outlet is a 12-inch metal culvert in poor condition. The culvert drains the lake through an earthen berm into a natural drainage way. The lack of a structural outlet in proper operating condition could cause the lake elevation to rise to undesirable levels in the cities of Mound and Minnetrista, and thereby allowing varying discharges downstream.

7. The drainageway south of Wildwood Avenue within western St. Bonifacius which receives surface water discharges from Minnetrista has limited capacity and may drain poorly in its current condition. Additional future discharges and volumes resulting from development in Minnetrista may exacerbate this problem. In addition, the drainageway and culverts along State Highway 7 and downstream to Mud Lake may not function properly under existing or future conditions.

8. High groundwater levels and surface water flows to Six Mile Creek may be affecting the performance of on-site sewage systems along Highland Road near Kennedy Drive.

9. The Minnehaha Creek Watershed District (MCWD) has performed a hydrological analysis of its watershed within Minnetrista and has identified potential flooding problems along Six Mile Creek Road and Grimm Road. Flow velocity issues were identified at subwatershed LL-2, SMC-51, and SMC-60.

2.2.9. Shoreland Management

The City has adopted a Shoreland District. This District regulates the development of public water shoreland in an effort to preserve and enhance surface water quality. A copy of these regulations can be found on the City's web-site at www.ci.minnetrista.mn.us and in Appendix C. Based on these regulations, the City has classified the following DNR Public Waters/Wetlands:

DNR ID #	*Water Body Name*	*Classification*
27-178P	Ox Yoke Lake	Natural Environment
27-185P	Saunders Lake	Natural Environment
27-186P	Mud Lake	Natural Environment
10-56P	Stone Lake	Natural Environment
27-183W	Unnamed	Natural Environment
27-179P	Long Lake	Recreational Development
27-181P	Dutch Lake	Recreational Development
27-184P	Whaletail Lake	Recreational Development
27-133P	Lake Minnetonka	General Development
	Six Mile Creek	Tributary Streams
	Deer Creek	Tributary Streams
	Pioneer Creek	Tributary Streams
	Painter Creek	Tributary Streams

Figure 8 shows the location of these water bodies with the Ordinary High Water (OHW) level, if applicable.

2.3. Natural Resources Data

2.3.1. Water-Based Recreation Areas

There are a number of water bodies that offer active recreation such as fishing and passive recreation such as walking. These recreational resources are outlined below:

Lake Minnetonka: Lake Minnetonka provides excellent fishing, boating, and other recreational water activities. Winter activities include cross-country skiing, snowmobiling, and ice fishing. There is a public boat launch at the Lake Minnetonka Regional Park, Halsted Bay, and Phelps Bay. There is also a swimming beach at the Lake Minnetonka Regional Park. This lake is often stocked by the DNR to enhance the fishing opportunities.

Dutch Lake: Dutch Lake is used for fishing, boating, and swimming. There is a swimming beach on the north side of the lake. The public access is located in the City of Mound.

Little Long Lake: Little Long Lake is commonly used for fishing and other forms of lake recreation. The lake is accessible by a DNR boat launch; however, motor boats are limited to 10 horsepower.

Whaletail Lake: Whaletail Lake is used for fishing, boating, and other recreational activities. The lake can be accessed by a DNR public boat launch.

Other Areas: The foundation of Minnetrista's Parks, Trails, and Open Space Plan rests on natural resource protection. Most importantly, the Greenway Opportunities Plan (located in the park plan) was created by conducting extensive environmental research using MLCCS data and the results of the Natural Resources Inventory conducted by Hennepin Conservation District to determine the location of high value water and other natural resources. The Greenway

Opportunities Plan serves as the backbone for preserving environmental features through the subdivision process, in conjunction with the city's other ordinances, such as the tree preservation, shoreland overlay, Six Mile Marsh overlay, wetland buffering ordinances. Furthermore, the first consideration for determining the location and types of trail to be constructed is wetland protection. Lastly, the Parks, Trails, and Open Space Plan has identified "Special Use" Parks as parks that can be used as passive parks to protect sensitive natural resources and mentions the specific purpose of implementing the Greenway Opportunities Plan through the use of this type of park. The City has extensively incorporated water resource priorities into the park and open space planning for the City.

Additional information regarding recreational opportunities within the City is available at www.ci.minnetrista.mn.us or www.dnr.state.mn.us. The Parks, Trails, and Open Space Plan is available for review at City Hall. A map showing the concept greenway opportunities is shown in **Appendix L**.

2.3.2. MLCCS and MCBS

The Minnesota Land Cover Classification System, or MLCCS, categorizes urban and built up areas in terms of land cover rather than land use. MLCCS serves as a tool for City staff to integrate natural area preservation into land planning, land use, and zoning decisions. The City is dominated primarily by planted or cultivated vegetation and forested areas with some areas of herbaceous vegetation. **Figure 13** provides MLCCS coverage for Minnetrista.

According to the MnDNR, the Minnesota County Biological Survey (MCBS) began in 1987 as a systematic survey of rare biological features on a county-by-county basis. Minnetrista has two identified areas with rare biological features. The survey shows an area of moderate rating of biodiversity surrounding Little Long Lake and a small area on the southeast corner of the City near Halstead Bay.

Figure 14 provides the locations of rare and biological features in the City of Minnetrista

2.3.3. Unique Features and Scenic Areas

Unique features and scenic areas include State designated Scientific and Natural Areas, designated scenic areas, areas containing rare and endangered species, biologically diverse areas, and historic areas.

The City has many natural areas, water bodies, and city/regional parks. Some of these areas contain a moderate significance of biodiversity and special habitats. Areas of interest include the Hardscrabble Point Woods and the osprey nest near Kings Point Road. For the osprey nest, the DNR recommends protection of the wetlands near Six Mile Creek to minimize disturbance of the osprey's habitat.

The City does have a number or historical and architectural resources as identified by the Minnesota State Historical Preservation Office. Additional information can be found in **Appendix H.**

The Minnehaha Creek Watershed District has developed a map of "Key Conservation Areas" within the City of Minnetrista. The City will be able to use this, along with the MLCCS data as a tool to integrate preservation of natural resources, including upland areas, into land planning, land use, and zoning decisions. These areas are identified on **Figure 14**.

2.3.4. Fish and Wildlife Habitat

The City provides habitat for a variety of small mammals, reptiles, birds, amphibians, and insects. Maintenance of habitat for wildlife species is important in maintaining ecological stability of the City's natural areas.

Information from the DNR indicates there is a variety of moderately unique fish and wildlife habitat within the City, much of which is located in or near the major water bodies throughout the City.

The DNR has developed fish management plans for the following lakes within the City of Minnetrista: Dutch, Little Long, Minnetonka, and Whaletail. The plans include existing or proposed management practices such as fish stocking, winter oxygen monitoring, lake investigations, etc. Further information can be found on the DNR's Lake Finder website at www.dnr.state.mn.us/lakefind/index.html.

The DNR has prepared a Fish Population Assessment for Lake Minnetonka (see www.dnr.state.mn.us/areas/fisheries/westmetro/minnetonka.html). The DNR has also prepared limited lake depth maps for certain lakes. The reports, management plans, and lake depth maps are available at DNR's Lake Finder at www.dnr.state.mn.us/lakefind/index.html.

2.4. Pollutant Source Location

Information from the MPCA is shown on **Figure 15**. This figure shows the approximate locations of a variety of pollutant sites. There is no known water quality information about these sites. Many of the sites on the figure have been cleaned up or are in the process of being cleaned up. The MPCA should be contacted for site-specific details.

2.5. Water Resources Related Agreements

The City has entered into water resource-related agreements that govern in part how the City must manage its water resources. These agreements include agreements between the City and adjoining communities or agreements it may have with other governmental units or private parties. Listed below is a description of the water resource related agreements which the City has entered into. A copy of these agreements or appropriate portions thereof is included in Appendix A.

- Joint Powers Agreement with the Pioneer-Sarah Creek Watershed Management Commission

2.6. NPDES Phase 2

The Minnesota Pollution Control Agency (MPCA) implemented the National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater Program in March 2003. Phase II requires

municipal separate storm sewer systems (MS4's) in urban areas with populations over 10,000 and under 100,000 to obtain an NPDES permit. Permits for construction sites greater than 1 acre will also be required as part of the Phase II. The City has submitted its Stormwater Pollution Prevention Plan and Notice of Intent in conformance with the MPCA guidelines. The application that was sent to the MPCA is included in **Appendix E**.

3. PROBLEMS AND CORRECTIVE ACTIONS

Outlined below is an assessment of existing and potential water resource-related problems that are known at this time. These problems have been identified based on a review of the land and water resource data collected as part of this plan and through information from the City. A description of any existing or potential problem within the topic area has been listed and future corrective actions have been incorporated into an implementation plan.

A. Lake and stream water quality problems

1. Jennings Bay, Halstead Bay, Dutch Lake, Langdon Lake, Stone Lake, Forest Lake, Parley Lake, Mud Lake, West Arm and Whaletail Lake are listed as impaired waters due to excess nutrients.

   Corrective Actions: The City shall participate in the Total Maximum Daily Load (TMDL) stakeholder process for the impaired waters within their boundaries. Once the TMDL report is complete for each water body and impairment, the City will complete a feasibility study to identify actions to be undertaken to address the TMDL.

2. The Minnesota Pollution Control Agency (MPCA) has cited Six Mile Marsh as a potential "Impaired Status" based on poor water quality from monitoring data.

   Corrective Actions: The MCWD has assigned a load reduction in phosphorus for the City for this lake. The City has developed a plan to address this as outlined in **Appendix I.**

3. Erosion of steep slopes along Painters Creek and around Lake Minnetonka (Problem Area 2 on **Figure 12**).

   Corrective Actions: The City will monitor land development activities to reduce and prevent further land altering activities in areas susceptible to erosion. A project has been identified where Painters Creek intersects with West Brach road to help address this issue.

4. Failing on-site sewage systems adjacent to city lakes and wetlands

   Corrective Actions: The County has the authority to permit, inspect, and enforce septic systems. The City will inform the County of septic system failures within the City.

5. Erosion and sedimentation in stormwater ponds

   Corrective Actions: Continue to implement the stormwater facility inspection and monitoring plan in conformation with the NPDES permit.

6. High *E. coli* levels were noted by the MCWD at the Rolling Hills Development.

   Corrective Actions: Minnesota Statutes and Rules state that the County has the regulatory and enforcement authority on Individual Sewage Treatment Systems (ISTS). It is the County's responsibility to address this issue. The City has notified the County on this issue.

7. The Minnehaha Creek Watershed District Rules requires an annual reduction of phosphorus to the following water bodies:
   - **31 pounds** for areas that discharge through Painters Creek to **Jennings Bay**

- **24 Pounds** for areas that discharge **To Dutch Lake**
- **7 pounds** for areas that discharge to **Langdon Lake**
- **24 Pounds** for areas that discharge to **Lake Minnetonka** through Halsted Bay, Jennings Bay, Priests Bay, West Arm, Cooks Bay, Harrisons Bay, Phelps Bay, Seton Bay and Spring Park Bay.
- **20 pounds** for areas that discharge to **Six Mile Marsh**
- **25 pounds** for areas that discharge to **Mud Lake**

Corrective Actions: The City has developed a Phosphorus Load Reduction Study that outlines the City's plan to address these load reductions. This plan is contained in **Appendix I.**

B. Flooding and stormwater rate control concerns

Corrective Actions: The City will conduct a field survey on the location and condition of all uncontrolled outfalls in the City. From this inventory outfall conditions will be rated and prioritize and the City will look at funding options and timelines towards completion.

1. Within the residential area of Cardinal Cove and Halsted Avenue is an antiquated drainage system of roadway ditches and culverts that function poorly and cause street and property flooding and erosion and sedimentation in the right-of-way and on private property.

   Corrective Actions: Encourage homeowners to convert impervious surface to grass or other pervious options. Enforce the City's impervious surface requirements, as area houses are re-constructed. Reconstruct the stormwater management system as part of a future street improvement project. This will be addressed with the Serenity Hills development to be completed in 2017.

2. Localized flooding occurs near the intersection of County Road 151 and Apple Garden Road (Problem Area 5 on **Figure 12**) because the area is landlocked and has no drainage outlet.

   Corrective Actions: The City will address this issue in the future as part of street improvements or other capital improvement projects. Improvements may require special assessments to benefiting properties. The timing of capital improvements will be based on the available City resources and other financial responsibilities.

3. Portions of Enchanted Lane and private property near Phelps Bay are below the high water level of Lake Minnetonka and are subject to recurring lake flooding (Problem Area 6 on **Figure 12**).

   Corrective Actions: The City will address this issue in the future as part of street improvements or other capital improvement projects. Improvements may require special assessments to benefiting properties. The timing of capital improvements will be based on the available City resources and other financial responsibilities. This will be addressed with the Enchanted Lane and Tuxedo Drive project in 2017.

4. The Saunders Lake outlet is a 12-inch metal culvert in poor condition (Problem Area 7 on **Figure 12**). The culvert drains the lake through an earthen berm into a natural drainage way. The lack of a structural outlet in proper operating condition could cause the lake elevation to rise to undesirable levels in the cities of Mound and Minnetrista, and thereby allowing varying discharges downstream.

Corrective Actions: Repairs may be discussed with the respective adjacent community and a mutual plan of action may be developed consistent with both communities' needs and available resources. Assistance from the MCWD will be requested if the communities cannot reach a satisfactory joint solution.

5. The drainage way south of Wildwood Avenue within western St. Bonifacius, which receives surface water discharges from Minnetrista, has limited capacity and may drain poorly in its current condition (Problem Area 8 on **Figure 12**). Additional future discharges and volumes resulting from development in Minnetrista may exacerbate this problem. In addition, the drainage way and culverts along State Highway 7 and downstream to Mud Lake may not function properly under existing or future conditions.

   Corrective Actions: Repairs may be discussed with the respective adjacent community and a mutual plan of action may be developed consistent with both communities' needs and available resources. Assistance from the MCWD will be requested if the communities cannot reach a satisfactory joint solution.

6. High groundwater levels and surface water flows to Six Mile Creek may be affecting the performance of on-site sewage systems along Highland Road near Kennedy Drive (Problem Area 9 on **Figure 12**).

   Corrective Actions: The City will continue to clean culverts within right-of-ways and retain natural drainage patterns.

7. Six Mile Creek Road and Grimm Road–MCWD has identified potential flooding issues in these areas through the District's stormwater model (Problem Area 10 on **Figure 12**).

   Corrective Action: These areas have not been identified in previous City studies as an issue. The City will monitor these areas for erosion and determine the need for corrective action, if any.

8. The MCWD has identified a flow velocity issue in this area through the District's stormwater model in Subwatersheds LL-2 (railroad culvert), SMC-51 (Private Drive Culvert), and SMC-60 (railroad culvert).

   Corrective Actions: These areas have not been identified in previous City studies as an issue. The City will monitor these areas for erosion and determine the need for corrective action, if any.

9. The MCWD has identified the area north of Stone Lake as landlocked.

   Corrective Actions: The City's model does not indicate that this area is landlocked. Additionally, preliminary development plans for that area showed two existing culverts under TH7 in this area. If development occurs in the area, the outlet and the impact on downstream subwatershed will be evaluated.

C. Impacts of water quantity or quality management practices on recreational opportunities

1. Existing land use practices and land development may adversely impact water related recreational activities in City waterbodies.

   Corrective Action: The City will consider water related activities in land use decisions and in reviewing recreational development proposals. The City will attempt to retain the natural character of waterbodies and watercourses within the community and trails will be designed to encourage water related recreational opportunities.

D. Impacts of stormwater quality on fish and wildlife resources

1. Sediment, nutrients and pollutants (both urban and agricultural) in stormwater discharges adversely impact water quality, fish and wildlife resources.

   Corrective Actions: Stormwater discharges will be pre-treated prior to release into City waterbodies and wetlands upon development in conformance with City and Watershed District/Management Organization requirements.

2. Manicured lawns and loss of vegetative buffers adjacent to lakes and wetland allow lawn chemicals to runoff directly into waterbodies.

   Corrective Actions: Encourage vegetative buffers around all wetlands, lakes and waterbodies.

E. Impacts of erosion and sedimentation on water resources

1. Construction related soil erosion and sediment deposits occur on both small and large constructions sites and have an adverse effect on the storm sewer system and receiving waterbodies.

   Corrective Actions: Maintain an inspection and enforcement program of construction site erosion control as outlined in the City's SWPPP.

2. Erosion of steep slopes and bluffs due to encroachment and/or lack of vegetation.

   Corrective Actions: The City will maintain a list of erosion control issues throughout the City and develop a prioritized improvement plan. Address identified problem areas with new development proposals as they arise.

F. Impact of land use practices and development on water resource issues
See Item D.

G. Adequacy of existing regulations to address adverse impacts on water resources

1. The City is an MS4 community and is required to obtain an NPDES permit from the MPCA. In addition, the City is within both the Minnehaha Creek Watershed District (MCWD) and the Pioneer-Sarah Creek Watershed Management Commission (PSCWMC), which both have Watershed Management Plans.

Corrective Actions: The City has developed a Stormwater Pollution Prevention Plan (SWPPP) and submitted the permit in conformance with MPCA rules and is required to comply with the rules of the MCWD and PSCWMC.

2. The City has ordinances related to floodplain protection, Six Mile Marsh, wetlands and buffers, shoreland, erosion control, and stormwater.

   Corrective Actions: The erosion control ordinance, which contains stormwater management information, needs to be updated to add post-construction stormwater management in conformance with the MS4 NPDES regulations.

   The City will develop an illicit discharge ordinance in conformance with the NPDES MS4 regulations

3. The protection of significant natural resources is important to the City.

   Corrective Action: The City will continue to use the Parks, Trails, and Open Space Plan along with its tree ordinance to guide the protection of natural resources.

H. Identification of potential problems, which are anticipated to occur in the next 20 years, based on growth projections and planned urbanization.

1. General – Urbanization with added areas of impervious surfaces has the potential to decrease water quality and increase flooding potential both during construction and after development is complete. During construction, erosion and sedimentation can degrade water quality and in the longer-term, additional phosphorus and other pollutants may be discharged to waterbodies due to urbanization.

   Corrective Actions: To maintain water quality and protect against flooding, urbanization will need to follow an orderly process of site evaluation, design and project construction. Construction activities will need to include erosion control practices and site development will need to incorporate proper stormwater ponding and storm drainage facilities for the control of surface waters.

2. Roadways – Public or private roads in the City have the potential to degrade water quality by roadway erosion, insufficient culvert size or length, and road encroachment into wetlands.

   Corrective Actions: Public or private road maintenance and improvement projects will need to address stormwater quantity and quality issues such as wetland protection, slope stabilization, culvert capacity, erosion and pretreatment of stormwater, where feasible.

I. Availability and adequacy of existing technical information to manage water resources

1. Additional information is needed in the northwest portion of the City within the Pioneer-Sarah Creek Watershed including subwatershed delineation and surface water modeling. The City also needs to expand the current model as it does not analyze or determine flood elevations along the creeks streams or ditches within the Minnehaha Creek Watershed.

   Corrective Actions: The City will develop and update the hydrologic/hydraulic model and GIS database.

2. The PSCWMC and the Metropolitan Council requires cities to complete a wetland management plan to assess wetland resources.

   Corrective Action: The City will develop a wetland assessment/management plan for the wetlands within the PSCWMC.

K. Adequacy of capital improvements program to correct problems related to water resources.

1. Currently the City has a stormwater utility fund which generates revenues to fund stormwater management projects and programs deemed by the City to be in the public's best interest. The CIP identifies a higher number of stormwater-related projects than can be funded through the current stormwater utility fund.

   Corrective Action: This plan has identified stormwater-related improvements in the CIP and additional methods of project financing. However, the current revenue generated by the stormwater utility is not adequate. The City will consider reviewing its stormwater utility rates to determine if increases are needed.

4. ESTABLISHMENT OF GOALS AND POLICIES

The City has developed a number of goals, strategies, and policies for the management of storm water within the City. These goals and policies have been developed to complement any county, regional, or state goals and policies. The goals of the City are as follows:

Goals

1. Protect, preserve and utilize natural surface and groundwater storage and retention systems

2. Minimize public expenditures needed to correct flooding and water quality problems

3. Comply with the TMDL guidelines set forth by the Minnehaha Creek Watershed District and the Minnesota Pollution Control Agency

4. Identify and plan for means to effectively protect and improve surface and ground water quality

5. Establish uniform local policies and official controls for surface and ground water quality

6. Minimize erosion of soil into surface water systems.

7. Promote groundwater recharge.

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

9. Secure the other benefits associated with the proper management of surface and ground water.

To order to achieve the City's goals for managing storm water, four strategies were developed. These strategies will assist the City in targeting its main audiences for the purposes of storm water management as follows:

Strategies

Cooperation with other agencies: This strategy recognizes that the City is not alone in managing storm water within its boundaries. There are a number of other local, state, and federal agencies that also have rules and regulations related to storm water management. Through this strategy, the City has recognized these other agencies' role in this endeavor and will cooperate and coordinate with these agencies as necessary.

Education: This strategy includes educating various groups within the City about proper storm water management. Education of residents, City Staff, City Council, business owners, and developers is included in this strategy to assist in meeting the City's goals.

Regulation: Much of storm water management comes in the form of regulations put on new or redevelopment within the City. These regulations will also assist the City in achieving their water management goals. Policies related to the management of storm water are included in the regulation strategy.

The City currently has permitting authority related to Wetland Conservation Act (WCA). The MCWD has permitting authority relating to erosion control (Rule B), floodplain alteration (Rule C), non-WCA items for wetland protection (Rule D), Dredging (Rule E), shoreland and streambank improvements (Rule F), stream and lake crossings (Rule G) and stormwater management (Rule N). No change to this relationship is planned.

Internal operations: The final strategy relates to the internal operations of the City. By outlining policies related to how the City's operations will treat and manage storm water, the City can work to achieve its storm water management goals.

The City has identified target audiences for polices outlined in each strategy. The target audiences and strategies are as follows:

AUDIENCE	STRATEGY
Public – Residents and Business Owners	Education, Regulation
City Staff and City Council	Cooperation, Education, Operation
Developers	Education, Regulation
Review Agencies	Cooperation

Based on the target audience and the strategy, the City has developed a number of policies. These policies are outlined below.

4.1. COOPERATION WITH OTHER AGENCIES

There are a number of other local, state, and federal agencies that have rules and regulations related to storm water management. Through this strategy, the City recognizes these other agencies' role in this endeavor and will cooperate and coordinate with these agencies as necessary.

This Plan is in conformance with but does not restate all other agency rules that are applicable to water quality and natural resource protection. The other agency rules and policies include rules, policies, and guidelines associated with the following organizations:

- Minnesota Department of Health www.health.state.mn.us
- Minnesota Pollution Control Agency www.pca.state.mn.us
- Board of Water and Soil Resources www.bwsr.state.mn.us and the Wetland Conservation Act www.bwsr.state.mn.us/wetlands/wca/index.html
- Minnesota Department of Natural Resources www.dnr.state.mn.us
- US Army Corps of Engineers www.mvp.usace.army.mi
- Minnesota Department of Agriculture www.mda.state.mn.us
- US Fish and Wildlife Service www.fws.gov
- Minnehaha Creek Watershed District www.minnehahacreek.org
- Pioneer-Sarah Watershed Management Organization www.pioneersarahcreek.org

While these other agency rules, policies, and guidelines are not restated in this Plan, they are applicable to projects, programs, and planning within the City. The Minnesota Stormwater Manual, which is a document intended to be frequently updated, is incorporated by referenced into this Plan and can be found at www.pca.state.mn.us/water/stormwater/stormwater-manual.html.

4.2. EDUCATION

The purpose of the education strategy in meeting the City's goals is to foster responsible water quality management practices by educating residents, business owners, City Staff, City Council, and developers about proper storm water management. If these targeted audiences recognize their role in responsible storm water management in their homes, businesses, and practices, it is another means for the City to meet its goals. This education strategy has also been designed to be in conformance with the NPDES requirements.

STRATEGY: EDUCATION		
Policy No.	***Policy***	***Target Audience***
1	The City will implement public education as part of the NPDES Phase II program. *(New policy)*	Residents, Developers, City Staff and Council
2	The City will develop and update its website for water resource management information. *(New policy)*	Residents, Developers, City Staff
3	The City will collaborate with the MCWD, PSCWMC, and other agencies in storm water management education efforts. *(New policy)*	Residents, Developers, City Staff
4	The City will develop and distribute annual newsletter and public education aimed at fostering responsible water quality management practices. Topics may include, but not be limited to: ● Wetland buffers ● Groundwater quality and protection ● Controlling invasive species ● Water conservation and the water cycle ● Proper hazardous waste disposal ● Yard waste management ● Agricultural BMP's ● Pet waste disposal *(Revised policy)*	Residents, Developers

5	The City will provide annual training opportunities to City Staff regarding housekeeping and construction BMPs and the NPDES permit requirements. *(New policy)*	City Staff and Council
6	The City will conduct pre-construction meetings with contractors and developers to review erosion control methods and inspections for projects that disturb one acre or more within the City. *(New policy)*	City Staff, Contractors, Developers
7	The City will submit public notice 30 days in advance and hold and annual public meeting to review the SWPPP, Surface Water Management Plan and BMPs. *(New policy)*	Residents, Developers MPCA
8	The City will consider forming an Environmental Commission to address water resource-related public education and information, solicit public concerns and issues, and develop further water resource management strategies as issues arise. *(Existing policy)*	Residents, City Staff, Developers, Council
9	The City will request builders operating within the community to have Erosion and Sediment Control homeowner handouts to be provided to homeowners at closing/property possession transfer, to appropriately manager open construction sites until properly vegetated. *(Existing policy)*	Residents, City Staff, Developers

4.3. REGULATION

The policies developed in this strategy outline specific storm water management elements that are required to be implemented through the development and/or permitting process. The regulation strategy is targeted at the public, developers, City Staff, and City Council.

The City's website at www.ci.minnetrista.mn.us contains information about how to obtain a permit from the City. From this page, go to the Permit Information link. There are forms and directions on that webpage. Permits and/or approvals from the MCWD or the PSCWMC may also be necessary. These agencies should be contacted for additional permitting information. If there is a conflict between the City requirements and the MCWD or PSCWMC, a variance from the Watershed will need to be obtained by the applicant or the project will need to be revised.

STRATEGY: REGULATION		
No.	***Policy***	***Target Audience***
Rate Control		
1	Design calculations for the 1%, 10%, 99% chance storm event must be submitted to the City for review and approval. The City will require that proposed stormwater discharges as a result of development be consistent with the subwatershed and subdistrict discharges and water levels identified in this SWMP. If discharge rates are not specified, the discharge rates will be limited to pre-development rates. *(Existing policy)*	Developers
2	Where practical and feasible, stormwater facilities will be developed on a regional basis, rather than on an individual site basis. For land development projects, the City will determine whether regional stormwater facilities are required and the level of City participation in planning and construction. *(New policy)*	Developers
3	The design of the storm drainage system shall be based on a critical duration rainfall event having a 20% chance of occurrence in any given year for local storm sewer, a 10% chance of occurrence for trunk storm sewer, and a 1% chance of occurrence for ponds and open channels. *(Existing policy)*	Developers
4	An emergency spillway (emergency outlet) from ponding areas shall be installed a minimum of 1 foot below the lowest building opening and shall be designed to have a capacity to overflow water at an elevation below the lowest building opening at a rate not less than 3 times the 100-year peak discharge rate from the basin or the anticipated 100-year peak inflow rate to the basin, whichever is higher. *(New policy)*	Developers
5	Any new or redevelopment building construction within the City will maintain a minimum building opening elevation 3 feet above the projected 100-year high water elevation and DNR Ordinary High Water	Homebuilders, Developers, Residents

STRATEGY: REGULATION		
No.	***Policy***	***Target Audience***
	level (if applicable) for the area. If this 3 foot building opening freeboard requirement is considered a hardship, the standard could be lowered to 2 feet if the following can be demonstrated: ● That, within the 2-foot freeboard area, storm water storage is available which is equal to or exceeds 50% of the storm water storage currently available in the basin below the 100-year elevation. ● That a 25% obstruction of the basin outlet over a 24 hour period would not result in more than 1 foot of additional bounce in the basin. ● An adequate overflow route from the basin is available that will provide assurance that one foot of freeboard will be maintained for the proposed low building opening. *(New policy)*	
6	The City prohibits filling activities within the 100-year floodplain that will cause an increase in the stage of the 100-year or regional flood or cause an increase in the flood damages in the reach affected unless compensatory storage is provided. Filling within the floodway is prohibited unless the filling meets FEMA, DNR, and Watershed Commission requirements. The City's floodplain ordinance can be found in **Appendix D** of this document. *(Revised policy)*	Developers
7	The City will review downstream stormwater-related impacts (within the community) of development proposals and proactively address water resource-related concerns. *(Existing policy)*	Developers, Residents
8	Stormwater facilities receiving discharges from adjacent communities will be designed to accommodate existing runoff rates and anticipated volumes. *(Existing policy)*	Developers, Residents
9	Landlocked depressions that do not have a defined outlet may be allowed a positive outlet at or above the 100-year High Water Level provided downstream impacts are addressed and the outlet plan is approved by the Watershed District/Management Organization. Outlets below the 100-year High Water Level cannot be installed except to prevent significant potential property damage or serious risk of injury. *(Revised policy)*	Developers, HOAs

10	The City will encourage the use of natural drainage ways for conveying stormwater where the drainage way can accommodate or be improved to accommodate proposed flows and volumes. *(Existing policy)*	Developers
11	Public stormwater facilities will be regularly inspected and maintained as necessary for adequate operations. For private stormwater facilities, the City will require a maintenance agreement with the development proposal identifying adequate inspection and maintenance of stormwater facilities. *(Existing policy)*	Developers, Residents, HOAs, City Staff
12	The City will encourage the use of Low Impact Development (LID) techniques when developers approach the City with concept plans. Developers will be encouraged to talk with Watershed District/Management Commission staff about LID techniques as well. This will be implemented as part of the City's development review process. *(New policy)*	
Water Quality Treatment		
13	No net increase in phosphorus loads is allowed as a result of development. This standard can be achieved through the use of ponding, Low Impact Development techniques, reduction in impervious surfaces, or other Best Management Practices deemed reasonable by the City. The City shall consider a variance or flexibility to this policy if impacts to other natural resources would occur to meet this requirement. *(New policy)*	Developers
14	Treatment of storm water to NURP guidelines is required prior to storm water discharge to a lake, stream, or wetland and prior to discharge from the site as part of development. The NURP guidelines for the design of storm water treatment basins are as follows: a) A permanent pool ("dead storage") volume below the principal spillway (normal outlet) which shall be greater than or equal to the runoff from a 2.5-inch storm over the entire contributing drainage area assuming full development. b) A permanent pool average depth (basin volume/basin area) which shall be $\geq$ 4 feet, with a maximum depth of $\leq$ 10 feet. c) Basin side slopes above the normal water level should be no steeper than 3:1, and preferably flatter. A basin shelf with a minimum width of 10 feet and 1 foot deep below the normal water level is recommended to enhance wildlife habitat, reduce potential safety hazards, and improve access for long-term maintenance. *(Existing policy)*	
15	The City requires skimmers or other devices in the construction of new	Developers

	pond outlets and the addition of skimmers to existing systems whenever feasible and practical. The designs shall provide for skimmers that extend a minimum of 4 inches below the water surface and minimize the velocities of water passing under the skimmer to less than 0.5 feet per second for rainfall events having a 99% frequency. *(New policy)*	
16	New storm water management ponds, inlet and outlet basins, swales, ditches, rate control structures and overflow routes that are constructed shall be covered by drainage and utility easements to the 100 year storm elevation. *(New policy)*	Developers
17	The City encourages the design of storm water ponds to provide an opportunity to enhance habitat and aesthetic features of the pond. This includes providing upland buffers around the ponds, seeding the area with native vegetation, and designing the slopes flatter than 4:1. *(New policy)*	Developers
18	The City will develop a maintenance program to regularly inspect and maintain public stormwater management facilities to assure their effectiveness. The City will require the owner of private stormwater facilities to execute a maintenance agreement with the City for regular inspection and maintenance of private systems. *(Existing policy)*	City Staff, HOAs
19	The City will participate with the respective watershed management organizations and Metropolitan Council on water quality monitoring programs proposed within the community. *(Existing policy)*	City Staff, Residents
Infiltration/Volume Control		
20	Abstraction via infiltration, evapotranspiration, capture, and/or reuse of one inch of rainfall from the site or on a regional basis within the MCWD upon development or redevelopment is required for projects that increase storm water runoff volume, provided that past and existing land use practices do not have a significant potential to contaminate the storm water runoff and the soil characteristics are suitable for infiltration. Treatment of storm water is required prior to infiltration. *(New policy)*	Developers

21	New development and redevelopment shall consider and incorporate to the extent practical and feasible low impact development techniques that have been reviewed and approved by the City. A maintenance plan for these features will be submitted to the City for review and approval. *(New policy)*	Developers
Wetlands		
22	The City is the Local Government Unity (LGU) for the Wetland Conservation Act (WCA) and therefore requires any projects that impact wetlands to conform to the WCA and the City's wetland ordinance. *(Existing policy)*	Developers, Residents
23	The City requires wetlands to be delineated and surveyed for any proposed subdivision or project that impacts wetlands. *(Existing policy)*	Developers, Residents
24	The City requires principle structure setbacks and buffers from all wetlands as outlined in the wetland ordinance in **Appendix D**. *(Existing policy)*	Developers, Residents
25	The City will notify parties proposing land disturbing activities (i.e.: altering, dredging, filling, and draining) in wetlands of possible permit requirements from the DNR, MPCA, Watershed District/Management Organization, and US Army Corps of Engineers (COE). *(Existing policy)*	Developers, City Staff, HOAs, Residents
26	The City may cooperate with interested private or governmental parties on wetland restoration projects and may participate in the State's wetland banking program if the City's interests are benefited. *(Existing policy)*	Developers, City Staff, HOAs, Residents
Groundwater		
27	The City will cooperate with County and State agencies to inventory and seal abandoned wells and notify its residents of State standards on well abandonment. *(Existing policy)*	City Staff and Council
28	The City will consider the significance of sensitive ecological and geologic areas and the MCWD identified "Key Conservation Areas" when making land use decisions, when reviewing development proposals, or when proposing construction of stormwater facilities. Activities that may have significant contamination potential will be required to include groundwater protection measures. *(Revised policy)*	Developers, City Staff, Residents

29	The City will encourage the use of infiltration methods to promote groundwater recharge where groundwater will not be significantly impacted by the land use or stormwater runoff. *(Existing policy)*	Developers
30	The City will develop a spill response program for containment, neutralization and disposal of spilled materials illegally discharged onto the ground or into stormwater facilities. *(Existing policy)*	Developers, City Staff, HOAs, Residents
Erosion and Sediment Control		
31	A storm water pollution control plan in conformance with the NPDES permit and City ordinance is required for projects that disturb 1 acre or that requires a variance, subdivision approval, or grading permit per the City's erosion control ordinance in **Appendix D** and at www.ci.minnetrista.mn.us/. *(Existing policy)*	Developers, Residents
32	The City will cooperate with State and Federal requirements for stormwater permits on land alteration activities. The City will adhere to all NPDES guidelines and requirements. *(Existing policy)*	Developers, City Staff, HOAs, Residents
33	The City will enforce the erosion and sediment control plan and best management practices on construction sites to control erosion, soil loss, and sedimentation. Areas adjacent to waterbodies and wetlands will receive highest priority. Areas for development will receive routine inspection during the entire construction process involving land disturbance activity. *(Existing policy)*	Developers, City Staff, HOAs, Residents
34	The City may prohibit work in areas having steep slopes and/or high erosion potential where the impacts of significant erosion cannot be protected against or mitigated. In addition, as part of the development proposal, the City may require restrictive easements on areas having steep slopes or high erosion potential. *(Existing policy)*	Developers, City Staff, HOAs, Residents

4.4. INTERNAL OPERATIONS

The City's internal operations can have a significant impact on storm water management. This strategy is targeted primarily at the City with some areas targeted at the public and/or another agency. These policies are aimed at operation and maintenance activities associated with water resource management within the City.

Many of the following items are current, internal housekeeping activities. Some of the policies have been updated or added. By maintaining the existing storm water infrastructure, the City anticipates providing water quality benefits to original design standards. By providing additional education to residents, small benefits to surrounding water bodies can be achieved. By regularly reviewing internal housekeeping items and by communicating about Best Management practices, additional benefit to surrounding water resources can be obtained.

STRATEGY: INTERNAL OPERATIONS		
No.	***Policy***	***Target Audience***
1	The City will sweep paved public streets within the community at least two times per year. Areas with curb and gutter and with direct discharge into lakes, wetlands and streams will be given first priority for additional sweeping. Home Owners Associations (HOA) will be required to sweep streets within their development one additional time per year. *(Existing policy)*	City Staff, HOAs, Residents
2	The City will construct a covered sand/salt storage area. *(New policy)*	City Staff
3	The City will inspect storm water treatment basins at least every 5 years and sump catch basins/manholes every year. Maintenance will be conducted as necessary. *(New policy)*	City Staff
4	The City will work with the MPCA to develop Total Maximum Daily Load (TMDL) plans for on the listed impaired waters in the City. *(New policy)*	City, MPCA
5	The City requires as-built drawings of all ponding areas and designated overflows. *(New policy)*	Developers
6	The City will develop and implement Best Management Practices (BMPs) at City public works facilities and City owned lands to retain and prevent pollutants in stormwater runoff from leaving the site. *(Existing policy)*	City Staff
7	Barriers to housekeeping activities are related to communication of City Staff and contractors. The City will endeavor to communicate effectively between departments and between staff regarding storm water management items. *(New policy)*	City Staff
8	The City will utilize the MCWD Functional Assessment of Wetlands to	City Staff

STRATEGY: INTERNAL OPERATIONS		
No.	***Policy***	***Target Audience***
	identify the location, function and value of wetlands on properties where land alteration is proposed. *(New policy)*	
9	The City will provide annual training opportunities to City Staff regarding housekeeping and construction BMPs and the NPDES permit requirements. *(New policy)*	City Staff and Council
10	The City will continue to implement a program for regular construction site inspection and enforcement to ordinance and regulatory guidelines. *(Existing policy)*	Builders, City Staff Developers,
11	The City shall develop a memorandum of understanding with the MCWD as to each partner's responsibilities and obligations. *(New policy)*	City, MCWD
12	The City acknowledges that MCWD has many capital improvement projects in the City. The City will coordinate with the MCWD to identify and evaluate these projects. *(New policy)*	City, MCWD
13	The City has developed a Wellhead Protection Plan and will continue to update the plan as required by the Minnesota Department of Health. **Appendix J** contains additional information about the plan. *(Existing policy)*	City
14	The City will coordinate efforts with the ditch authority to identify flow rate control measures upstream of the City and expected peak flow rates to be discharged into the City at the municipal boundary. The MCWD is the ditch authority within its boundaries and Hennepin County is the ditch authority in the PSCWMC boundaries. *(Existing policy)*	City Staff, MCWD, Council Hennepin County
15	The City will require proposed buildings adjacent to public ditches to meet the setback requirements of the shoreland ordinance and will require dedication of drainage and access easements for developing properties adjacent to the ditch. *(Existing policy)*	Developers, Home Builders, Residents, City Staff
16	Maintenance of private drainage systems are the responsibility of the landowner. *(New policy)*	City Staff, residents

17	The City will support the efforts of Local, State, and Federal agencies promoting public enjoyment, and the protection of fish, wildlife, and recreational resource values in the City. *(Existing policy)*	City Staff, Council, USFW
18	The City will create natural habitat buffer zones adjacent to the waterbodies, wetlands, and streams in City property and parks, where feasible. *(Existing policy)*	Developers, Residents, HOAs City Staff,
19	The City will encourage its residents to retain existing wetlands, vegetation buffers, and open spaces for the benefit of wildlife habitat. *(Existing policy)*	Developers, Residents, HOAs City Staff,
20	The City will encourage the MnDNR to continue the existing fish stocking programs in City lakes and expedite implementation of lake management plans. *(Existing policy)*	City Staff, MnDNR
21	The City will guide future land planning and community development considering agricultural preserves and existing wooded areas. *(Existing policy)*	Council, City Staff, Developers
22	The City will continue to use its Parks, Trails, and Open Space Plan to guide, plan, and implement the City's Greenway Corridor. *(Existing policy)*	City Staff, Developers
23	The City will continue to submit plats to the MCWD and PSCWMC as stated in the subdivision ordinance (Section 500.25 [Subdivision 1]. The city planner will coordinate the review of preliminary plat by all appropriate city staff persons and governmental agencies. *(Existing policy)*	City Staff, Agencies

SECTION 7-5

5. IMPLEMENTATION PRIORITIES/IMPLEMENTATION PROGRAM

Based on the information developed in **Sections 2 through 4**, the City has developed a Surface Water Management Plan that reflects the needs and concerns of the City Council, City Staff, citizens, and the funding capabilities of the City. A prioritized listing of the studies, programs and capital improvements that have been identified as necessary to respond to the water resource needs within the City is outlined on the following tables. The City anticipates implementing at least to some extent the regulatory programs, studies, or improvements identified within this plan within the next 10 years.

Table 7.1 presents Minnetrista's Implementation Program. This table shows Minnetrista's planned stormwater program from the issues identified within this LSWMP's current assessment section. More importantly, the Implementation Program aligns with Minnetrista's goals and policies as presented in Section 4. Table 7.1 presents implementation items in each of the four functional areas of Capital Improvements (CIP), NPDES MS4 (MS4), Operation and Maintenance (OM), and Official Controls (OC). The implementation program incorporates Minnetrista's Storm Water Pollution Prevention Plan (SWPPP) through direct reference of items that have a financial impact. Minnetrista will update the implementation program in conjunction with its annual NPDES MS4 public meeting. This table is for planning and budgeting purposes and project costs are considered rough estimates. It is anticipated that these cost estimates and schedules will be reviewed annually and updated as needed.

Collaboration with Watershed Entities

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

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

Minnehaha Creek Watershed Coordination Plan

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

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

- Annual meeting – Staff members will meet during the summer to review NPDES MS4

reports and activity from the previous year. Staff will also discuss draft Capital Improvement Plans for each entity for the upcoming year. It is anticipated that the City Administrator, Public Works Director and City Engineer will be the primary contacts for the annual meeting.

- Land Use Planning – City Planning staff will continue to route requests for land use approvals including, but not limited to, subdivisions and site plan reviews to MCWD staff for comment. Coordination will occur in the beginning stages of the project during the concept plan review.

- Regulatory activities – Planning staff will require documentation of appropriate MCWD construction and land alteration permits for those projects located within District boundaries as a condition to City approval. Approved MCWD permits will be stored with other project documentation for future reference. Staff will consider additional coordination for erosion control inspection and enforcement and discuss opportunities at future annual meetings.

- Wetland Conservation Act enforcement – The City is the LGU for Wetland Conservation Act (WCA) applications and will continue to involve MCWD staff on Technical Evaluation Panels. Applications are submitted to the Planning Department.

- Funding – The City seeks support from MCWD in terms of grant funding for water quality projects. The City requests that MCWD staff continue to provide information about upcoming grants and other funding opportunities.

- Data Sharing – City staff members will coordinate with MCWD staff to share any new or relevant data on an annual basis to ensure consistency. This data could be related to any newly completed studies, water quality monitoring, BMP performance monitoring, etc.

- Public Improvement Projects – City staff members will provide yearly updates on plans for public improvement projects. This will be coordinated as part of the annual meeting while discussing the draft Capital Improvement Plan. Maintenance activities for stormwater infrastructure will be provided to MCWD as part of the MS4 recording process and City inspection reports.

TABLE 7.1

SURFACE WATER MANAGEMENT IMPLEMENTATION PLAN

No.	Project Description	10 Year Total Cost Estimate [1,3]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
Capital Improvement Projects (CIP)														
1	Implement phosphorus reduction plan - Project 1: Painter Creek/Jennings Bay watershed (see **Appendix I**)	$150,000	Stormwater Utility, Grants, MCWD						$150,000					Medium Priority Project
2	Implement phosphorus reduction plan - Project 2: Dutch Lake watershed (see **Appendix I**)	$132,000	Stormwater Utility, Grants, MCWD								$132,000			Medium Priority Project
3	Implement phosphorus reduction plan - Project 3: Langdon Lake watershed (see **Appendix I**)	$100,000	Stormwater Utility, Grants, MCWD							$100,000				Medium Priority Project
4	Implement phosphorus reduction plan - Project 4: Halsted Bay watershed (see **Appendix I**)	$700,000	Stormwater Utility, Grants, MCWD		$50,000	$50,000	$300,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	Medium Priority Project
5	Implement phosphorus reduction plan - Project 5: Six Mile Marsh watershed (see **Appendix I**)	$185,000	Stormwater Utility, Grants, MCWD								$185,000			Medium Priority Project
6	Implement phosphorus reduction plan - Project 6: Mud Lake watershed (see **Appendix I**)	$185,000	Stormwater Utility, Grants, MCWD										$185,000	Medium Priority Project
7	Implement water quality projects for impaired waters based on TMDL studies.	$225,000	Stormwater Utility, Grants				$75,000		$75,000		$75,000			High Priority Project
8	Create outlet to landlocked basin near Co. Rd 151 and Apple Garden Road	$75,000	Stormwater Utility, Grants, MCWD, PSCWMC	$75,000										Medium Priority Project
9	Repair storm sewer system at Enchanted lane near Phelps Bay	$50,000	Stormwater Utility, Grants							$50,000				Medium Priority Project
10	Repairs to catchbasins and storm sewer pipes at 6380 Painters Circle	$15,000	Stormwater Utility, Grants	$15,000										High Priority Project

SECTION VII

No.	Project Description	10 Year Total Cost Estimate [1,3]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
11	Install drain tile to address current sump pump flows (5605 & 5615 Kramer Rd)	$15,000	Stormwater Utility, Grants		$15,000									High Priority Project
12	Fix large washout area and drainage to Jennings Bay (810 County Rd 110 N)	$85,000	Stormwater Utility, Grants		$85,000									High Priority Project
13	Address storm water runoff washout along horse trail. Install berm and catch basin	$50,000	Stormwater Utility, Grants	$50,000										High Priority Project
14	Replace storm sewer (1240 & 1250 Morningview Dr)	$50,000	Stormwater Utility, Grants	$50,000										High Priority Project
15	Improve and repair storm water system along Cardinal l Drive	$250,000	Stormwater Utility, Grants			$250,000								High Priority Project
16	Increase drainage capacity on St. Mary's Rd east to and along park to Tuxedo	$75,000	Stormwater Utility, Grants									$75,000		High Priority Project
17	Install new culvert beneath Dutchview Rd. (2500 Dutchview Rd.)	$6,000	Stormwater Utility, Grants	$6,000										High Priority Project
18	Replace rusted out culvert and clean out inlet and outlet areas (2105 Dutchview Rd)	$5,000	Stormwater Utility, Grants	$5,000										High Priority Project
19	Increase drainage capacity on Marywood going east to and along park to Tuxedo	$100,000	Stormwater Utility, Grants						$100,000					Medium Priority Project
20	Partner with MCWD and surrounding communities to complete fish surveys and evaluate the need for management activities	$30,000	Stormwater Utility, Grants, MCWD			$10,000			$10,000			$10,000		Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration Strategy Report
21	Partner with MCWD and surrounding communities to prepare vegetation management plans and treat for curly leaf pondweed for Dutch Lake, Halsted's Bay, Jennings Bay, and Forest Lake	$15,000	Stormwater Utility, Grants, MCWD		$5,000			$5,000			$5,000			Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration Strategy Report

No.	Project Description	10 Year Total Cost Estimate [1,3]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
22	Install raingardens and sump catch basins where feasible as part of linear reconstruction projects	$50,000	Stormwater Utility, Grants, MCWD, PSCWMC	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration Strategy Report
23	Partner with MCWD on a shoreline restoration project around Jennings Bay. Includes native plantings and buffer establishment.	$20,000	Stormwater Utility, Grants, MCWD							$10,000	$10,000			Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration Strategy Report
24	Stabilize erosion along Game Farm Road south of Kingswood Road	$8,000	Stormwater Utility, Grants, MCWD			$8,000								Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration Strategy Report
25	Partner with MCWD and surrounding communities to stabilize and restore eroded streambanks along Painter Creek and tributaries within the City.	$100,000	Stormwater Utility, Grants, MCWD						$50,000			$50,000		Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration Strategy Report
26	Drainageway stabilization and stormwater pond installation between 1350 and 1360 Monrningview Drive	$200,000	Stormwater Utility, Grants					$200,000						Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration
27	Restore drainageway near 810 County Road 110 N to reduce loading to Jennings Bay	$25,000	Stormwater Utility, Grants			$25,000								Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration
28	Partner with MCWD on a shoreline restoration project around Halsted Bay. Includes native plantings and buffer establishment.	$10,000	Stormwater Utility, Grants, MCWD										$10,000	Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration Strategy Report
29	Six Mile Marsh Improvement Project - Installation of a storm water treatment pond, infiltration and irrigation system, and stabilization of erosion problems at the downstream end of the subwatershed.	$600,000	Stormwater Utility, Grants, MCWD		$120,000		$120,000		$120,000		$120,000		$120,000	Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration Strategy Report
30	Mud Lake/Six Mile Creek Water Quality Improvements - Construction of a flocculation treatment infiltration system that will remove phosphorus from Mud Lake and Six Mile Creek prior to discharge into 6 Mile March	$540,000	Stormwater Utility, Grants, MCWD								$180,000	$180,000	$180,000	Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration Strategy Report
31	In-Channel Restorations - Channel restorations, where possible, through development of low-flow channel to decrease width and increase velocity, meandering, riffles, and aeration throughout Unnamed and Deer Creek. Goal is to complete approximately 2000 linear feet of channel restoration. Partner with PSCWMC	$120,000	Stormwater Utility, Grants, PSCWMC					$60,000				$60,000		Identified in the Pioneer-Sarah Creek Watershed WRAPS Report
32	Rural BMPs - Implmement rural/agricultrual BMPs as identified by the subwatershed assessment for North Whaletail Lake. Partner with PSCWMC and other agencies.	$15,000	Stormwater Utility, Grants, PSCWMC			$5,000			$5,000			$5,000		Identified in the Pioneer-Sarah Creek Watershed WRAPS Report

No.	Project Description	10 Year Total Cost Estimate [1,3]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
Operation and Maintenance														
33	Annual SWPPP Assessment & Annual Reporting City staff will conduct an annual SWPPP assessment in preparation of each annual report. Proposed SWPPP modifications are subject to Part II.G of the MS4 permit.	$20,000	Stormwater Utility	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	
34	Good Housekeeping/Employee Training Program - Develop written program and implement it as defined in City SWPPP to meet requirements of Part III.D.6.g. of the MS4 General Permit. Include procedures to meet permit requirements for the following items: -Park and Open Space Training Program -Fleet and Building Maintenance Training Program -Stormwater Systems Maintenance Training Program -Road Salt Materials Management Program -Annual Evaluation Inspection Frequency	$15,000	Stormwater Utility	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	
35	Annual Meeting - Hold annual public meeting combined with City Council Meeting or other public participation/involvement event to solicit public input on the SWPPP, discuss its effectiveness, or amendments. Explore new venues and enhance meeting effectiveness and participation. Effectiveness will be evaluated based upon the amount of resident feedback received.	$10,000	Stormwater Utility	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	
36	Education Activity Implementation Plan - The City will provide stormwater education and outreach programs for residents and staff within the City. This includes the development of an Education Activity Implementation Plan for each year. Partner with MCWD, PSCWMC and others.	$50,000	Stormwater Utility	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	
37	City Stormwater Management Permits - The City will continue to review land disturbance activities and collaborate with the watersheds who review and issue stormwater permits within the applicable watershed boundary through the end of the MS4 permit cycle.	$60,000	Stormwater Utility	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	
38	Storm Sewer Upgrades - Includes yearly maintenance and upgrades to the City's existing storm sewer system.	$500,000	Stormwater Utility	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	
39	Pond Surveys - The City will annually complete pond surveys to schedule and prioritize the necessary maintenance projects. This effort will be assisted by the SWAMP Application.	$90,000	Stormwater Utility		$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	

No.	Project Description	10 Year Total Cost Estimate [1,3]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
40	Annual Pond Cleanout and Maintenance - The City will perform yearly cleanout of ponds identified for maintenance with the SWAMP program.	$450,000	Stormwater Utility		$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	
41	Stormwater Asset Management Program (SWAMP) - Annual Maintenance of the City's Program	$40,000	Stormwater Utility	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	
42	Annual maintenance related to BMPs constructed as part of the Phosphorus Reduction Plans	$100,000	Stormwater Utility	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	
43	Planning and engineering review of all projects for conformance with goals, policies and management objectives of this SWMP.	$40,000	Developer's Agreement	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	
44	Maintain list of erosion control problems as the City is alerted to these issues.	$5,000	Stormwater Utility	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	
45	Continue to perform LGU responsibility for the Wetland Conservation Act.	$100,000	Developer's Agreement, General Fund	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	
46	Maintain and update existing hydrologic/hydraulic model and GIS database	$100,000	Stormwater Utility	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	
47	Update City web-site with water resource management information	$10,000	Stormwater Utility	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	
48	City will implement BMP's at public works facilities and on City-owned properties	$50,000	Stormwater Utility	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	
49	Inspect storm water treatment basins at least every five years and sump catch basins every year.	$20,000	Stormwater Utility	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	
50	Conduct erosion control inspections on construction sites (include pre-con meetings)	$100,000	Developer's Agreement	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	
51	NPDES/MS4/General Stormwater consultant services	$75,000	Stormwater Utility	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	
52	Re-ditching program	$200,000	Stormwater Utility	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	
53	Culvert replacement program	$150,000	Stormwater Utility	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	
54	Sweep the streets twice annually	$150,000	Street Maintenance Fund	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	
55	Provide education and outreach regarding pet waste management. The City will also look to increase enforcement of the pet waste ordinance.	$30,000	Stormwater Utility	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	Painter Creek E.coli TMDL

No.	Project Description	10 Year Total Cost Estimate [1,3]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
56	Chloride Management - The City will promote and adopt strategies included in the TCMA Chloride Management Plan.	$20,000	Stormwater Utility	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	
Official Controls														
57	Ordinance Updates - The City will continually review their ordinances related to stormwater, erosion and sediment control, wetlands, and floodplains for consistency with state and watershed requirements.	$10,000	Stormwater Utility, General Fund	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	
58	Policy and Procedure Review - Ongoing review of policy and procedures designed to meet wasteload allocation requirements.	$10,000	Stormwater Utility, General Fund	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	
59	Standard Operating Procedures (SOPs) - Complete an annual review of SOPs for site inspections and site plan reviews by evaluating checklists and existing guidelines to ensure they are up-to-date to reflect MPCA's current construction general permit requirements.	$8,000	Stormwater Utility, General Fund	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	
Monitor and Study														
60	Monitor development activities around Painters Creek and Lake Minnetonka to prevent further erosion issues	$50,000	Developer's Fees	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	High Priority Project
61	Complete feasibility study to address TMDL's for Jennings Bay, Halstead Bay, and Whaletail Lake.	$60,000	Stormwater Utility, General Fund, Grants, MCWD						$30,000	$30,000				Medium Priority Project
62	Complete Atlas 14 update of the City's stormwater models to identify priority areas for Best Management Practices.	$60,000	Stormwater Utility, Grants		$30,000	$30,000								Medium Priority Project
63	Evaluate feasibility of a TP load reduction project in Painter Creek near the outlet to Jenning's Bay- Jennings Bay West Detention Pond	$70,000	General Fund, MCWD				$20,000	$50,000						Medium Priority Project
64	Complete fish survey and evaluate need for management activities in Stone Lake.	$12,000	Stormwater Utility, Grants									$12,000		Low Priority Project

No.	Project Description	10 Year Total Cost Estimate [1,3]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
				2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
65	Monitor and evaluate carp movement in Halsted Bay. Partner with MCWD and surrounding communities to identify specific strategies.	$20,000	Stormwater Utility, Grants, MCWD			$10,000				$10,000				Medium Priority Project
66	Assist MCWD in evaluating the wetland system phosphorus loading to Dutch Lake and Forest Lake	$20,000	Stormwater Utility, Grants, MCWD						$10,000			$10,000		Upper Minnehaha Creek Watershed Nutrient and Bacteria TMDL Restoration Strategy Report
67	Identify priority waterbodies and complete subwatershed assessments to explore potential BMP construction and retrofits opportunities to meet TMDL requirements.	$40,000	Stormwater Utility, Grants, MCWD, PSCWMC		$10,000			$10,000			$10,000		$10,000	High Priority Project
68	Complete performance evaluation and feasibility study of iron enhanced filter benches	$10,000	Stormwater Utility, Grants							$10,000				Low Priority Project
	TOTAL	$6,941,000		$398,300	$572,300	$645,300	$772,300	$632,300	$857,300	$517,300	$1,024,300	$709,300	$812,300	

[1] Cost estimates are preliminary and subject to review and revision as engineer's reports are completed and more information becomes available. Table reflects 2017 costs and does not account for inflation. Costs generally include labor, equipment, materials, and all other costs necessary to complete each activity. Some of the costs outlined above may be included in other operational costs budgeted by the City.

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

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

SECTION 7-6

6. FINANCIAL CONSIDERATIONS

Implementation of the proposed projects, programs and studies that are identified in this plan will have a financial impact on the City. To establish how significant this impact will be, a review of the means and ability of the City to fund these controls, programs and improvements is necessary. Toward this end, please find outlined below a listing of various sources of revenue that could be available to implement the water resource management efforts outlined in this plan.

The costs to implement this Plan are outlined in **Section 5.** The City anticipates funding these projects, studies, and programs primarily through the storm water utility fund. This fund generates approximately $225,000 annually, as of 2015. The utility fund cannot cover the costs outlined in this Plan. An update to the storm water utility rates and additional funding is needed to cover these costs.

The City also anticipates pursuing grant funding from the agencies such as the Met Council, PCA, DNR, MCWD, and others. The City will continue to work with both watershed organizations to seek out partnership projects.

The City has chosen not use ad valorem or special assessments for funding water resource projects at this time. Additionally, the State's levy limits apply to the City, but no money from levies pays for storm water improvements. The City developed the Storm Water Utility to fund storm water activities.

While the City's funds do not appear to be able to fully fund these activities, the City does not wish to remove items from the Plan. The Plan acts as a placeholder and planning tool for these projects, programs, and studies. The City also knows that to be eligible for many State grants and loans, projects must be listed in the local surface water management plan. Therefore, this Plan will act as a road map and tool to complete projects, to seek out additional funding sources, and to assess updates to the Storm Water Utility.

SECTION 7-7

7. AMENDMENT PROCEDURES

It is the intention of the City to have this Surface Water Management Plan reviewed and approved by the Minnehaha Creek Watershed District and the Pioneer-Sarah Creek Watershed Management Commission. Once approved, no significant changes to this plan can be made without the approval of the proposed revisions by the Watershed Management Organization or Watershed District within the City that are affected by the change. Significant changes to the local plan shall be made known to the following parties:

1. City Administrator and City Engineer
2. Affected Watershed Management Organization and Watershed District within the City
3. Metropolitan Council
4. Public within the City through a public hearing process

Following notification of the above parties, they shall have 60 days to comment on the proposed revisions. The Metropolitan Council shall have 45 days to comment on the revisions. Failure to respond within 60 days constitutes approval. Upon receipt of approvals from the affected Watershed Management Organizations and Watershed Districts within the City, any proposed amendments will be considered approved.

Minor changes to the Plan shall be defined as changes that do not modify the goals, policies, or commitments expressly defined in this plan by the City. Adjustment to subwatershed boundaries will be considered minor changes provided that the change will have no significant impact on the rate or quality in which storm water runoff is discharged from the City boundaries. Minor changes to this plan can be made by the staff at the City without outside review. It is the intention of the City that this Plan be updated ten years after the adoption of this Plan unless significant changes to the plan are deemed necessary prior to that date.

The Minnehaha Creek Watershed District anticipates completing their plan update by December2017. The MCWD will retain most of the permitting authority within the City. Pioneer- Sarah Creek Watershed Management Commission approved their plan in 2015. The City will retain Wetland Conservation Act (WCA) permitting authority. The City will submit a Surface Water Management Plan amendment, if needed, to the MCWD, PSCWMC, and Metropolitan Council for a 60-day review and amended approval.

Existing Parks, Trails, and Open Space

Minnetrista adopted a Park, Trail, and Open Space Plan in March of 2005 with revisions in January, 2010. The City of Minnetrista has numerous designated park areas. The following table in this chapter displays the type of parks and open space currently located in Minnetrista, as well as the total acreage of those parks and recreation areas.

The aforementioned table displays Minnetrista's parks in their designated classification. Park classification helps us understand the role of each park and guide us in deciding what facilities are appropriate and where they should be located, according to the Park, Trail, and Open Space Plan.

The Plan has also differentiated the various trails into trail types, including the following:

- Type 1 – Neighborhood Trails/links
- Type 2 – Shoulder Trail Routes
- Type 3 – Separate Paved Trails along Roadways
- Type 4 – Paved trails in Corridors
- Type 5 – Unpaved Trails in Corridors
- Type 6 – Combined (Paved and Unpaved) Trails in Corridors
- Type 7 – Unpaved Trails in Sensitive Natural Corridors

Continued Parks, Trails, and Open Space Planning

The City of Minnetrista intends to continue the implementation of the existing Parks, Trails, and Open Space Plan as adopted in 2005 and revised in 2010. The City has based park needs projections with future urban areas incorporated in the 2040 Land Use Plan.

Dakota Rail Regional Trail:
This 26.5 mile regional trail follows the route of the former Dakota Rail corridor, where rail service is no longer provided. The Hennepin County Regional Rail Authority, Hennepin County Public Works, and Three Rivers Parks District worked with the City and others to develop this trail along the corridor that extends through Minnetrista. The Three Rivers Park District shall continue to be responsible for any facilities located within Minnetrista and associated with the trail.

Baker / Carver Regional Trail:
This proposed regional trail, with a study initially conducted by the City of Minnetrista followed by a draft master plan in 2014 by the Three Rivers Park District, outlines a series of north-south trails that will connect existing and proposed regional trails and parks. The Baker / Carver Regional Trail is proposed to be approximately 17 miles in length and will directly connect the Luce Line State Trail to the Dakota Rail Regional Trail and Lake Minnetonka LRT Regional Trail with direct connections to the Minnetrista regional park locations of Gale Woods Farm and the newly acquired Kingswood Park.

The Three Rivers Park District shall be responsible for any facilities within Minnetrista and associated with the trail.

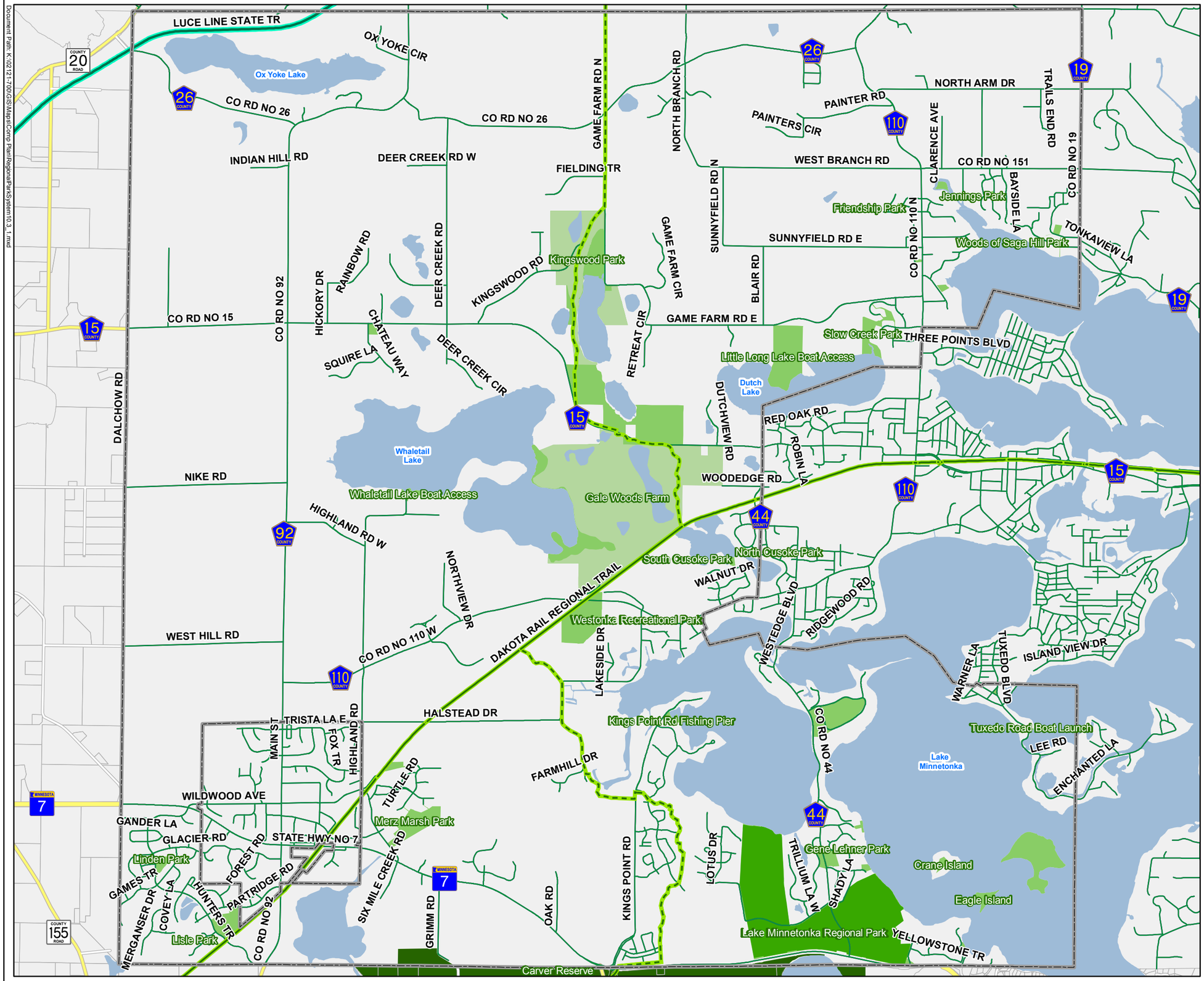
Kingswood Park:
Kingswood Park is the most recent addition to the Three Rivers Park District located in Minnetrista along the shores of Little Long Lake. The 106 acre site was previously a church camp and contains valuable natural resources, including glacial landscapes, tamarack bogs and seventy percent of the shoreline around Little Long Lake, which is a two tier fishery. The Three Rivers Park District shall be responsible for master planning and developing any facilities within the park. Kingswood Park is planned to be connected directly by the proposed Baker/Carver Regional Trail.

Minnetrista Existing and Proposed Parks, Open Space, and Trails
Source: Park, Trail, and Open Space Plan

Park Classification	Name	Total Acres	Existing Facilities
Minnetrista Parkland			
Neighborhood Mini Park	Douglas Park	0.2	Basketball, Playground
	Gene Lehner Park	1.7	Tennis, Playground
	Jennings Park	1.0	Sport Court, Playground
	Friendship Park	0.6	Playground
	Slow Creek Park	3.4	Playground, Nature Trail
	Woods of Saga Hill Park	2.0	Playground, Nature Trail
Neighborhood Parks	Linden Park	3.8	Playground
	Lisle Park	15.5	Tennis/Pickleball Courts, Trails, Parking, Ballfield
	Merz Marsh Park	25.0	Soccer, Basketball, Playground
Special Use Parks	Perennial Park	0.4	Horseshoes, Pavilion
	North & South Cusoke	2.8	Nature Trail, Pedestrian Bridge
	Adler Natureview Park	2.6	Nature Trail
	Merriman Cemetery	1.8	Historic Site
Undeveloped/Undefined	Maple Leaf Estates	0.5	
	Gillespie Park		
	Chateau Way Park	3.3	
	Painters Creek North Corridor	2.1	
	110/Dakota Rail Parcel	1.3	
	Co Rd 92/26 Parcel	0.4	
Water Access/ DNR Agreements	Halsted Bay Boat Access		
	Kings Point Park (DNR leased land)	2.5	Fishing Pier, Picnic Site
	Little Long Lake Boat access- DNR		
	Tuxedo Rd Boat Access		
	Whaletail Lake Boat Access-DNR		
Non-City Facilities			
	Westonka Recreational Assoc. Park	31.9	
Public Schools	Westonka High School		
	Hilltop Elementary		
Three Rivers Park Dist	Gale Woods Farm	410.0	
	Lake Minnetonka Regional Park	292.0	
	Wawatosa Island	44.0	

	Kingswood Park	106	
Trails	**Name**	**Total Length**	
Regional Trails	Dakota Rail Regional Trail	26.5 mi	
	Baker / Carver Regional Trail (planned)	17 mi	
State Trails	Luce Line State Trail	63 mi	

Minnetrista Comprehensive Plan
Regional Park Systems Map
Minnetrista, MN



Minnetrista Boundary

Parcel Boundary

Lakes

Regional Trails

Existing

Planned

State Trails

Existing State Trails

Other Parks and Preserves

State Park

State Wildlife Management Areas

Scientific and Natural Areas (SNA)

Regional Park Types

Regional Park

Park Reserve

Special Recreation Feature

N

0 3,500 Feet

wsb

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Capital Improvement Plan: 2020 Proposed Improvements

The Park, Trail and Open Space plan proposes preliminary yearly budgets of approximately $500,000 dedicated for parks, trails and open space improvements. This amount is subject to change according to actual CIP budgets set by the City. The City has established a budget of $432,500 for 2017 with money budgeted yearly thereafter to continued miscellaneous improvements and maintenance. Lisle Park will continue to be evaluated for ongoing development according to community needs and actual funding available. Remaining parks and trails will continue to be prioritized for ongoing replacements and improvements as needs dictate.

The staff is recommending the following improvements for 2017:

- Miscellaneous Improvements $10,000
- Lisle Park (Hunters Crest) $300,000
    - Development TBD (potential playground)
    - Replace Trails
- Douglas Park $44,550
- Linden Park (Hunters Crest) $33,000
- Slow Creek $26,000
- Friendship Park $9,000
- Capital Outlay $10,000

Total estimated cost for improvements: $432,500

IMPLEMENTATION

The City of Minnetrista intends to utilize an implementation program describing public programs, fiscal devices and other specific actions to be undertaken in stated sequence to implement the comprehensive plan and ensure conformity with metropolitan system plans.

OFFICIAL CONTROLS

Official controls include all relevant ordinances, public programs, and fiscal devices that ensure protection of the infrastructure and implementation of the Comprehensive Plan. Official controls are required to guide zoning, subdivision, water supply, and private sewer systems. To be consistent with the *Thrive MSP 2040*, Minnetrista intends to adopt official controls to:

- Accommodate levels of growth consistent with Thrive MSP 2040 forecasts;
- Provide land use and transportation connections;
- Protect natural resources; and
- Implement the Comprehensive Plan.

The City of Minnetrista will not adopt any new official controls that conflict with the Comprehensive Plan and will not permit activity that conflicts with the Metropolitan System Policy Plans.

Fiscal Devices

The City of Minnetrista has a forward-thinking fiscal management program. The City has set up water area and sewer area plans and processes to ensure the adequacy of funding for future projects. It is important to note that the City fully intends for development to pay for itself but also maintains the existing infrastructure at a high level of usability.

Ordinances

Currently, the City of Minnetrista has a progressive set of ordinances designed to implement the City's comprehensive plans and future goals. This includes Zoning and Subdivision Ordinances generally. More specifically, the City has adopted ordinances allowing for Planned Unit Developments, natural resource protection, tree preservation, shoreland protection, surface water management, and other related planning goals. The City will continue to proactively monitor their ordinances to ensure the planning goals are being adequately met.

PUD Ordinance (Flexible Development): Minnetrista has been classified partially as a Diversified Rural geographic planning area by the Metropolitan Council in the *Thrive MSP 2040*. This portion of the City also falls within the Long-Term Service Area (LTSA) for the regional wastewater treatment system. Pursuant to recent Metropolitan Council

action (Business Item 2008-124), the City's PUD (flexible development) Ordinance will need to comply with the guidelines adopted by the Metropolitan Council. This development ordinance needs to be submitted when the City submits updated/revised official controls after the Update is officially adopted. The City is aware of the need for meeting these guidelines in this ordinance.

Zoning Districts: In order to adequately implement the Comprehensive Plan, the City of Minnetrista has established the following zoning classifications, as defined in the City's Zoning Ordinance:

- **Agricultural Preserve (AP)** – This district is intended for permanent agricultural uses. Densities are allowed at 1 unit per 40 acres.

- **Agricultural (A)** – The Agricultural District allows for unsewered development at 1 unit per 10 acres.

- **Staged Development (SDD)** – The Urban Reserve and future urban areas in the City of Minnetrista are traditionally zoned as the Staged Development District. The district is similar in nature as the Agricultural District in density (1 unit per 10 acres) but is intended to preserve larger tracts of land for areas that may become urbanized in the future.

- **R-1 Residential Zoning District** – This is the traditional City of Minnetrista residential district. It allows for a density of 2 – 3 units per acre, with the City reserving the right to approve lower densities when doing so would preserve unique natural features. The minimum lot size of 14,500 square feet.

- **Douglas Beach Single Family Residence (RDB)** – Douglas Beach is a unique neighborhood within the City of Minnetrista. The City has designed a zoning district to meet this area's needs. The minimum lot size is 20,000 square feet.

- **R-2 Residential Zoning District** – This designation is intended for development at a low-medium and medium density between 2 – 3.5 units per acre with a minimum lot size of 11,000 square feet.

- **R-2 (a) Residential Zoning District –** This designation is intended for low-medium density development, and was adopted in response to the 2030 Comprehensive Plan update. Designed for 3 – 3.5 units per acre and a minimum lot size of 9,500 square feet. No additional areas should be zoned in this category.

- **R-3 Residential Zoning District** – The R-3 District allows for development at a density of 5 – 8 units per acre. This district is intended to accommodate a broader range of housing types and styles, and enhance traditional residential areas between lower and higher densities.. There is no minimum lot size.

- **R-5 Residential Zoning District** – This district is intended to create, preserve and enhance areas for multifamily use at higher densities. The minimum net density in this district is 8 units per acre, with no minimum lot size.

- **Office-limited Business (C-1)** – This district is intended to provide a district which is related to and may reasonably adjoin high density or other residential districts for the location and development of administrative office buildings and related office uses which are subject to more restrictive controls.

- **Highway Service Business (C-2)** – The C-2 District is designed to furnish areas served by other retail business districts with a wide range of services and goods which might otherwise be incompatible with the uses permitted in the retail business district.

- **Shopping Center Business (C-3)** – This district is intended to provide an area which may be applied to land in single ownership or unified control for the purpose of developing a planned business center.

- **Restricted Industrial (I)** – The Restricted Industrial District is adopted to provide for areas of general industrial employment.

- **Public (P)** – This district is intended for publicly owned uses.

City of Minnetrista 2016 Zoning Map

0 1,000 2,000 4,000 Feet

Legend

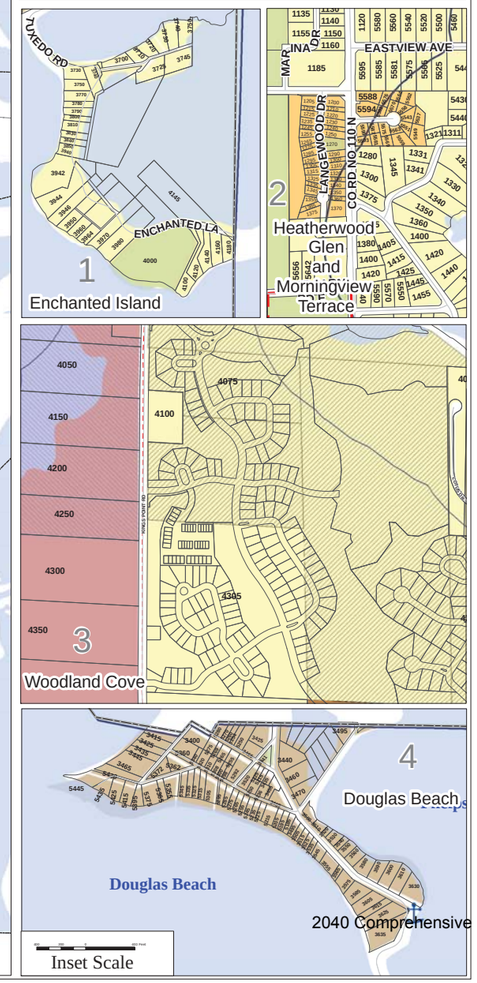
- MUSA line
- Shoreland Districts
- Six Mile Marsh protection zone
- City Boundary

Zoning Classifications

- PUD: Planned Unit Development
- AP: Agriculture Preserve
- A: Agriculture
- RDB:Douglas Beach single family residence
- R1: Low density single family residence
- R2: Low medium density single family residence
- R2(a): Low medium residential
- R3: Medium density single family residence
- R4: Medium density multiple and single family residence
- R5: High density multiple family residence
- PSB: Public/semi-public
- I: Planned Industrial
- C2: Highway service business
- SDD: Staged development district
- Problem
- A-prob
- SDD-prob
- St Boni
- none

December 6, 2010-Ordinance 369 rezoned 6701, 6750, 6710 Halstead Ave, PID 22117244304, and 4644 and 4505 Co Rd 92
May 2, 2011-Ordinance 397 rezoned 855 Red Oak Lane to R-2(a)
August 1, 2011-Ordinance 299 rezoned Woodland Cove parcels to PUD

WSB & Associates, Inc.



SCHEDULE OF IMPLEMENTATION (See Implementation Matrix)

Implementation Actions

HOUSING	Short-term	Medium-term	Long-term	Ongoing
Partner with Development Authorities to provide affordable housing options, support senior housing options, and provide housing for people during all stages of their lives.		X		
Consider pay as you go financing to provide affordable housing options, support senior housing options, and provide housing for people during all stages of their lives.		X		
Consider a tax abatement strategy to provide affordable housing options, support senior housing options, and provide housing for people during all stages of their lives.		X		
Encourage developers with qualifying housing projects to apply for Minnesota Housing RFP and funding opportunities	X	X		
Increase awareness of appropriate referrals to Hennepin County's CDBG grants programs to help people receive funding or support to maintain their properties.				X
Increase awareness of appropriate referrals to existing homebuyer assistance programs.				X
Increase awareness of appropriate referras to home repair and rehabilitation programs run through external entities or organizations to help people stay in the community by helping them to achieve safe, appropriate housing.				X
Increase awareness of appropriate referrals to foreclosure prevention programs.				X
Increase awareness of appropriate referrals to home energy assistance programs.				X
Identify housing development projects that would be good candidates for the Metropolitan Council's Livable Communities grant funding, and pursue LCDA gran funding where appropriate.	X	X	X	
Ensure that Planned Unit Development zoning ordinance allows for sufficient flexibility to allow for developments that can accommodate housing affordability.				X
Increase awareness of 4(d) tax program which encourages privately-owned housing to remain affordable to low-income households in exchange for tax credits or financial assistance.	X			
Evaluate opportunites to partner with or encourage participation in a community land trust program, in which home-ownership opportunities to low-income households are increased through permanently-affordable homes held in perpetuity by the land trust.				X

Implementation Actions	Short-term	Medium-term	Long-term	Ongoing
LAND USE	Short-term	Medium-term	Long-term	Ongoing
Consider specific zoning regulations that identify architectural styles and site planning components that support quality of commercial design.		X		
Commercial development shall be required to be designed in such a way as to minimize traffic impacts.		X		
Adopt design standards for street and building design will be implemented to enhance the physical environment in the City.		X		
New commercial development will be required to integrate architecture and site planning techniques that are reflective of the City's open space character.		X		
Site planning that minimizes the use of large, unbroken parking lots will be required. Commercial developments will be required to hide parking areas and place buildings in such a way that the buildings are emphasized to passing traffic.		X		
Building architecture should be the predominant site identifier, rather than freestanding signage. The City will value the utilization of low-profile monument signage where freestanding signs are to be considered.				X
Minnetrista residential land use districts reflect density ranges that allow for both large-lot single family home development and a range of higher-density housing options.				X
The City will evaluate its zoning code to reflect an alignment with land use policy that reduces the density of single family housing and increases the density and amenities provided with multi-family housing.	X			
New residential subdivisions, especially those utilizing a PUD design process, will be evaluated as to their variety and diversity of housing materials, colors, architectural styles and details, and other factors.				X
Multiple family developments will be evaluated for thoughtful design that incorporates these larger buildings harmoniously into the areas where they will be located.				X
Single family development proposals will be evaluated for transportation impacts beyond the provision of direct local streets. Since the majority of new growth will extend into undeveloped land, the proposed development must pay careful attention to the extension of the local street pattern.				X
Lower density single family housing zones shall be implemented adjacent to areas of significantly valuable natural resources or adjacent to properties planned for long-term rural or agricultural uses.				X
The City will discuss opportunities with the school districts particularly regarding school facility expansions and joint recreational opportunities.	X			X
Opportunities for cost efficient and timely infrastructure improvements should be explored with neighboring communities, particularly for petitioning for regional or State funding for regional or State infrastructure.	X	X		X
Minnetrista will work closely with neighboring jurisdictions and agencies to manage Highway 7 improvements. Access limitations and other considerations may require the development of a traffic study.		X		X
Develop a Highway 7 task force and strategy for desired improvements to Highway 7 in western Hennepin County.		X		
Re-design zoning districts to reflect the changes in development accommodated by the new Comprehensive Plan for future growth areas (see Chapter 5).	X			
With market study data, create a "Marketing Strategy" – how to attract commercial investment and what role the City should play.		X		
Prepare a series of architectural guidelines for commercial development.		X		
Prepare a detailed implementation program for future commercial expansion areas along Highway 7.		X		

Implementation Actions	Short-term	Medium-term	Long-term	Ongoing
PARKS	Short-term	Medium-term	Long-term	Ongoing
Lisle Park (Hunters Crest): potential playground, replace trails	X			
Douglas Park	X			
Linden Park (Hunters Crest)	X			
Slow Creek	X			
Friendship Park	X			
Capital Outlay	X			
Campus Master Plan implementation		X	X	
$500,000 annual investment in parks				X

TRANSPORTATION		Short-term	Medium-term	Long-term	Ongoing
Location	***Strategy***				
Evaluate solutions to improve safety at the roadway locations listed below:					
CSAH 92/TH 7				X	
CSAH 92/ CSAH 15				X	
CSAH 92/ CR 26				X	
CR 26 from CSAH 110 to CSAH 92				X	
CR 26/ CSAH 110				X	
CASH 151 just east of 110				X	
Additional site-specific strategies:					
CSAH 44/ Lotus Drive	Evaluate the need for turn lanes and bike trail improvements	X			
CSAH 92 near Hennepin-Carver County Line	Evaluate the need for potential turn lanes or operational improvements	X			
TH 7/Merrywood Lane	Evaluate the need for intersection control improvements	X			
CSAH 110/ Halstad Drive	Evaluate the need for potential turn lanes	X			
CSAH 44	Evaluate the need for turn lanes and bike/pedestrian improvements along the corridor from Bartlett Boulevard to TH 7				X
TH 7	Explore interest of Cities of Minnetonka, Greenwood, Excelsior, Shorewood, Victoria, Chanhassen, St. Bonifacius, Carver County and Hennepin County to establish a TH 7 Corridor Coalition		X		
Western Minnetrista	Evaluate the need for a new regional corridor, per the Hennepin County Transportation Plan			X	
CR 26 west of CSAH 110	Explore potential turnback from Hennepin County to City of Minnetrista, per Hennepin County Transportation Plan			X	
Halstead Dr from CSAH 110 to CSAH 92	This project is currently scheduled for construction				
CSAH 92 and TH 7 in St. Bonifacius	Forecasted traffic counts approaching capacity – monitor; no action required at this time, include consideration of bicycle/pedestrian crossings				
CSAH 44 from CSAH 15/ Lynwood Blvd. to CSAH 110/ Bartlett Blvd.	Consider bicycle/pedestrian improvements		X		
W Branch Road from CSAH 110/ Commerce Blvd. and CSAH 19/ North Shore Dr.	Consider bicycle/pedestrian improvements			X	
CSAH 19/North Shore Dr. (Entire Length)	Consider bicycle/pedestrian improvements			X	
Coordination with City of Orono	Work with the City of Orono regarding bicycle/pedestrian improvements along Shadywood Road and connections to Lake Independence Regional Trail			X	

TRANSPORTATION		Short-term	Medium-term	Long-term	Ongoing
Location	***Strategy***				
CIP Street Improvement Projects:					
Enchanted Lane		X			
Halstead Drive		X			
Tuxedo		X			
Blair Road			X		
North Arm Drive			X		
Sunnyfield Road East			X		
Grandview Project			X		

Implementation Actions	Short-term	Medium-term	Long-term	Ongoing
SEWER	Short-term	Medium-term	Long-term	Ongoing
The City of Minnetrista will continue to proactively identify I/I sources and take corrective actions.				X
As development continues to occur throughout Minnetrista, the City should encourage homeowners to connect to the municipal sanitary sewer system as it becomes available.				X
M426 metershed: Upsize pump at Lift Station 1 (860 gpm)	X			
M426 metershed: New lift Station 20 (160 gpm), 4-inch forcemain	X			
M426 metershed: New lift Station 21 (90 gpm), 3-inch forcemain	X			
M436 metershed: 12-inch gravity main to MCES LS24	X		X	
M436: new lift station for commercial		X		
M439 metershed: Upsize pump at Lift Station 4 (640 gpm)		X		
M439 metershed: 10-inch gravity main to LS4		X		

Implementation Actions	Short-term	Medium-term	Long-term	Ongoing
WATER SUPPLY	Short-term	Medium-term	Long-term	Ongoing
Continue to follow the goals and implemtnation measures outlined in the City's wellhead protection plan and water supply plan.				X
Install new 500,000 gallon elevated storage tank for the South System (Southwest area)	X			
Install new 500 gpm groundwater source for the North System		X		
Install new 500 gpm groundwater source for the South System		X		
Construct 1,000 GPM water treatment plant in Southwest area		X		
Expand trunk watermain service in anticipation of future developments at the intersection of West Branch Road and North Shore Drive, at Hunter's Trail and Laketown Parkway, and west of King's Point Road.		X		

Implementation Actions	Short-term	Medium-term	Long-term	Ongoing
SURFACE WATER	Short-term	Medium-term	Long-term	Ongoing
6380 Painters Cir - Inlets not open and CB's are shot. Cross pipe has heaved the road. This has back-up water into 6380 Painters Cir property. CB's need to be rebuilt and new cross pipe installed between them. Addition of Styrofoam over crossing pipe will help with frost heaves. Water flow direction - south CB to north CB to outlet. North side CB also has inlet from north side drainage flowing west. Concrete curbing to be installed around rebuilt CB's	X			
200 Ingerson Rd - Install new culvert under south side driveway to capture water flow and direct it towards the north to existing culvert under north driveway leading to crossing culvert just past the north driveway. North driveway culvert will need to be jetted clear.	X			
Crest Ridge Ct - Surface water improvements with the mill & overlay project	X			
Segment 4 of the Westwood Dr/Morningview Dr drainage reapir.	X			
CB reconstruction - Loring Drive low point	X			
2500 Dutchview Rd - Install new culvert from east side of driveway to west side of Dutchview Rd. BT will have to be removed from driveway and replaced.	X			
2105 Dutchview Rd - Replace rusted out culvert and clear trees and shrub debris from inlet and outlet areas.	X			
5605 & 5615 Kramer Rd - Water from sump pumps flows down curb line and causes green algae/slime to form causing safety concern. Also causes large ice dams to form in winter. Install drain tile behind curb from west property line of 5615 to CB to intersection of Kramer Rd & Cty Rd 110 N. CB & crosser pipe at 5625 Kramer is heaved and needs to be replaced.	X			
810 Cty Rd 110 N - Storm water runoff has caused a large washout area along property line from culvert outlet by 151 to lake. Redo drainage to lake.	X			
Game Farm Rd at Cty Rd 26 - Storm water runoff washs out horse trail on east side of road. Install asphalt trail at this location (would have to add white fog line stripe along trail if paved for safety). Increased runoff with large pole barn that was built.	X			
1240/1250 Morningview Drive - Storm sewer has collapsed and needs to be replaced. This pipe runs from Morningview Dr to the lake along the property line between these two homes.	X			
Create outlet to landlocked basin near Co. Rd 151 and Apple Garden Road	X			
Improve and repair storm water system along Cardinal Cove	X			
Repair storm sewer system at Enchanted Lane near Phelps Bay	X			
Implement phosphorus reduction plan - Project 1: Painter Creek/Jennings Bay watershed		X		
Complete water quality protection project at Little Long Lake		X		
Implement phosphorus reduction plan - Project 2: Dutch Lake watershed		X		
Increase drainage capacity on St. Marys Rd going east to and along park to Tuxedo		X		
Implement phosphorus reduction plan - Project 3: Sauders Lake watershed		X		
Implement phosphorus reduction plan - Project 5: Six Mile Marsh watershed			X	
Implement phosphorus reduction plan - Project 6: Mud Lake watershed	X			

Appendix A: Minnetrista CIP reports

Streets

Sewer

Water Supply

Surface Water

City of Minnetrista
Street Improvement Plan

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Expenses											
Game Farm Road Total											
Enchanted Lane**				365,000							
Halstead Drive**				3,712,800							
Tuxedo				475,000							
Kings Point Road (Development related)											
Highland Road		-									
Blair Road		-							576,000		
North Arm Drive							1,563,750				
Sunnyfield Road East						-					1563750
Sunnyfield Road North						-					
Grandview Project				150,000							
Debt Payments - (new)	-	-	-	-	218,948	218,948	218,948	308,948	-	-	
Total Expenses	**-**	**-**	**-**	**4,702,800**	**218,948**	**218,948**	**1,782,698**	**308,948**			
Revenues											
Bond Proceeds				3,365,000	-	-	1,563,750	-			
Special Assessments * see below				35,000							
Game Farm Road Total	-	-	-	-	-	-	-	-			
North Arm Drive	-	-	-		-	-	-	25,000			
Halstead Drive**	-	-	-		56,180	56,180	56,180	56,180	56,180	56,180	56,180
Enchanted**	-	-	-		14,152	14,152	14,152	14,152	14,152	14,152	14,152
Tuxedo		-			18,416	18,416	18,416	18,416	18,416	18,416	18,416
Kings Point Road (Development related)											
Highland Road				-	-	-	-	-			
Blair Road				-	-	-	-	-			
North Arm Drive					-	-	-	-			
Sunnyfield Road East							-	-			
Sunnyfield Road North							-	-			
Grandview Project											
MSA (account drawdown)				1,302,800							
Annual MSA Used for Debt Payments	-	-	-	-	-	-	-	-			
Assessable to developer											
Current Year Levy	-	-	-	-	-	-	-	-	-	-	
Total Revenues/Other Financing Sources	**-**	**-**	**-**	**4,702,800**	**88,748**	**88,748**	**1,652,498**	**113,748**			

City of Minnetrista, MN

CIP - Operating Fund 602

Project	2015	2016	2017	2018	2019	2020	2021
Replace 2002 Ford F-450 w/utility box & crane (Truck #1)		$92,000					
Replace 2005 Tandem Axle Dump Truck (Truck #13) **(⅓ each - Street / Sewer / Water CIP)**					$66,000		
Generator (1 of 2 - water fund other one)	$37,500						
Replace 1997 Tractor Backhoe **(⅓ each - Storm water / Sewer / Water CIP)**		$32,000					
IPad & software for locates and SCADA system			$2,500				
Repalce 2000 Katolight 50 KW Generator						$50,000	
50% I & I Repair	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Lift Station Repairs/Upgrades (install transducers)	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
Total	$ 107,500	$ 194,000	$ 72,500	$ 70,000	$ 136,000	$ 120,000	$ 70,000

CIP - Sewer Improvement Fund 492

Project	2015	2016	2017	2018	2019	2020	2021
Sewer Improvements - Forcemain Project			$100,000		$100,000		
50% I & I Repair	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Full Scada Updgrades							
Total	$50,000	$50,000	$150,000	$50,000	$150,000	$50,000	$50,000

City of Minnetrista
Water Improvement Fund
Capital Improvement Program

0

CIP Dated December 5, 2016

Projects	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
PROJECTS																
SCADA																
Interconnect Central and Southwest Systems																
Engineering, etc.																
Decentralized Water Treatment Plants:																
Water Treatment Plants/Facilities (PFA)		$8,900,000														
Watermain		$2,800,000														
Water Tower Hunters Crest			$2,400,000													
Wells 6 & 7		$600,000														
Replace Water Department service truck								$126,000								
Estimated Future																
Actual CIP (2016 Dollars)	**$0**	**$12,300,000**	**$2,400,000**	**$0**	**$0**	**$0**	**$0**	**$126,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

City of Minnetrista
Water Operating Fund
Capital Improvement Program

Projects	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
CAPITAL EQUIPMENT																
Line/Pipe Tracer (Reciever & Transmitter Kit)		$2,689														
Kerf Cutter (Gate valve replacement tool)		$3,650														
Replace 2005 Tandem Axle Dump Truck (Truck #13) (1/3 of)					$66,000											
Hydrant Wrench																
Itron Ert Reader (Hardware & software - meters)				$18,000		$30,000										
Replace 2008 Ford 550 w/utility box & crane (Truck #7)			$102,000													
Other																
Replace 2008 f550								$126,000								
Generator (New)	$37,500															
Replace 2000 Katolight 200 KW Generator						$60,000										
Replace 1997 Ford/New Holland 675E Tractor Backhoe **(⅓ each - Storm water / Sewer / Water CIP)**		$32,000														
Estimated Future								$75,000		$75,000		$100,000		$100,000		$100,000
Actual CIP (2016 Dollars)	**$37,500**	**$38,339**	**$102,000**	**$18,000**	**$66,000**	**$90,000**	**$0**	**$201,000**	**$0**	**$75,000**	**$0**	**$100,000**	**$0**	**$100,000**	**$0**	**$100,000**

Surface Water CIP - Operating Fund xxx

Project	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
NPDES/MS4/General Stormwater Consultant Services	$7,500	$17,200	$7,500	$7,500	$7,500	$17,500	$7,500	$7,500	$7,500	$7,500	$17,500	$7,500	$7,500	$7,500	$7,500
Halstead Bay / 6 mile Marsh surface water treatment plant	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Re-ditching program				$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Culvert replacement program	$10,000	$10,000	$15,000	$15,000	$15,000	$15,000	$15,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Street Sweeping Program (50% of total budget is allocated to the Street Maintenance Budget)	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$20,000	$20,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Storm Water Pond Maintenance Program	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
Replace 2007 Skid Steer Loader					$75,000										
Replace 1997 Ford/New Holland 675E Tractor Backhoe (⅓ each - Storm water / Sewer / Water CIP)			$32,000												
Total Cash	$42,500	$52,200	$79,500	$67,500	$142,500	$77,500	$67,500	$82,500	$82,500	$92,500	$102,500	$92,500	$92,500	$92,500	$92,500
Total Inflated CIP Expense															
Inflation Rate															

Surface Water CIP - Surface Water Improvement Fund xxx

Project	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
6380 Painters Cir - Inlets not open and CB's are shot. Cross pipe has heaved the road. This has back-up water into 6380 Painters Cir property. CB's need to be rebuilt and new cross pipe installed between them. Addition of Styrofoam over crossing pipe will help with frost heaves. Water flow direction - south CB to north CB to outlet. North side CB also has inlet from north side drainage flowing west. Concrete curbing to be installed around rebuilt CB's				$15,000											
200 Ingerson Rd - Install new culvert under south side driveway to capture water flow and direct it towards the north to existing culvert under north driveway leading to crossing culvert just past the north driveway. North driveway culvert will need to be jetted clear.				$7,000											
1350 & 1360 Morningview Dr - Storm water runoff has caused a large washout area along property line from Morningview Dr to lake. Reconstruct drainage way. (Hoffman)		$100,000													
Segment 4 of the Westwood Dr/Morningview Dr drainage reapir. (Maslowski)			$25,000	$75,000											
Crest Ridge Ct - Surface water improvements with the mill & overlay project			$37,220												
CB reconstruction - Loring Drive low point					$10,000										
2500 Dutchview Rd - Install new culvert from east side of driveway to west side of Dutchview Rd. BT will have to be removed from driveway and replaced.				$6,000											
2105 Dutchview Rd - Replace rusted out culvert and clear trees and shrub debris from inlet and outlet areas.				$5,000											
Project	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
5605 & 5615 Kramer Rd - Water from sump pumps flows down curb line and causes green algae/slime to form causing safety concern. Also causes large ice dams to form in winter. Install drain tile behind curb from west property line of 5615 to CB to intersection of Kramer Rd & Cty Rd 110 N. CB & crosser pipe at 5625 Kramer is heaved and needs to be replaced.				$25,000											
810 Cty Rd 110 N - Storm water runoff has caused a large washout area along property line from culvert outlet by 151 to lake. Redo drainage to lake.					$25,000										
Game Farm Rd at Cty Rd 26 - Storm water runoff washs out horse trail on east side of road. Install asphalt trail at this location (would have to add white fog line stripe along trail if paved for safety). Increased runoff with large pole barn that was built.				$50,000											
1240/1250 Morningview Drive - Storm sewer has collapsed and needs to be replaced. This pipe runs from Morningview Dr to the lake along the property line between these two homes.							$50,000								
Project	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Repair storm sewer system at Enchanted Lane near Phelps Bay							$50,000								
Implement phosphorus reduction plan - Project 1: Painter Creek/Jennings Bay watershed									$150,000						
Complete water quality protection project at Little Long Lake									$100,000						

Implement phosphorus reduction plan - Project 2: Dutch Lake watershed											$132,000				
Increase drainage capacity on Marywood going east to and along park to Tuxedo												$75,000			
Implement phosphorus reduction plan - Project 3: Sauders Lake watershed													$100,000		
Implement phosphorus reduction plan - Project 5: Six Mile Marsh watershed															$185,000
Raise Enchanted Lane at 3850 (Groat) - $100,000 should be part of road improvement project															
Implement phosphorus reduction plan - Project 6: Mud Lake watershed															
TOTALS	$4,028	$104,030	$66,252	$183,000	$35,000	$0	$100,000	$0	$250,000	$0	$132,000	$75,000	$100,000	$0	$185,000