



WATER COMPREHENSIVE PLAN

December, 2025

Prepared for:
City of Dayton, Minnesota

Prepared by:
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Project Number:
193806077

Water Comprehensive Plan

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
A	Draft	Camila Bejarano	8/6/25	Louis Sigtermans	8/29/25		
B	Final	Camila Bejarano	12/19/25	Louis Sigtermans	12/19/25	Nastassja Abercrombie	11/5/25

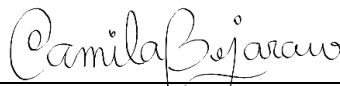


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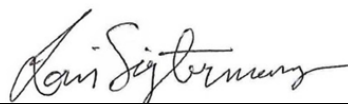
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Executive Summary

The City of Dayton, Minnesota is positioned along the I-94 corridor and bordered by the Mississippi River. With a population now exceeding 12,000—an increase of more than 6,000 residents since 2007—the City is experiencing robust residential, commercial, and industrial development. This Water Supply and Distribution Plan has been prepared to guide municipal decision-making and infrastructure investment through 2050, ensuring that Dayton’s water system remains resilient, reliable, and capable of supporting anticipated growth.

The City’s water supply is currently sourced from four wells (with a fifth constructed and anticipated to be online in 2026) and supplemented by interconnections with the neighboring cities of Maple Grove, Champlin, and Rogers. The distribution network comprises three distinct, non-interconnected service areas: Historic Village, Northeast, and Southwest. Each area is supplied by its own dedicated wells. Historical data from 2017 to 2024 indicate that water use in the Historic Village has remained stable, while water use in the Northeast and Southwest service areas has increased, reflecting growth in those areas. Tables document well output and billing records, providing a baseline for future planning.

A comprehensive analysis of population growth, water usage trends, and seasonal variations suggests continued acceleration in both residential and employment sectors. Projections indicate the need for ongoing monitoring and periodic evaluation of water demands in each service area, particularly as development patterns shift and as service areas are eventually interconnected.

Hydraulic modeling of the distribution system was conducted to identify existing operational constraints and to develop a strategic framework for future expansion. The planned interconnection of the three service areas at the system’s ultimate build-out will create two primary pressure zones: a Low Pressure Zone serving the North Dayton District (encompassing the Historic Village and Northeast) and a High Pressure Zone serving the South Dayton District. This approach will optimize service pressures, improve fire flow capability, and enhance service reliability citywide.

Based on forecasted population and development, the plan outlines the timing and estimated costs for critical infrastructure improvements. These include additional wells to expand supply capacity, upgrades to water treatment, expansion of treated water storage, and new trunk mains to complete the interconnected distribution grid. The Capital Improvements Plan (Appendix B) provides a prioritized schedule to align investment with growth so that service reliability and public safety standards are maintained.



1 Introduction

The City of Dayton, Minnesota, located along the I-94 corridor and bordered by the Mississippi River to the north, is a growing community with a population of approximately 12,000 people. Since 2007, when the previous Water Supply and Distribution Plan was prepared, Dayton's population has grown by over 6,000 residents. Recent developments in the City of Dayton have fostered accelerated population and job growth. Continuation of this trend is anticipated for both housing and commercial/industrial developments.

The City of Dayton is in the process of revising its future land use plan, which will help define growth patterns in the City for the next ten years and beyond. Because of projected growth, the City continues to monitor and plan for improvements in water system infrastructure that must be made to keep up with this growth.

The City presently obtains its water supply from four wells and existing interconnections with the City of Maple Grove, City of Champlin, and City of Rogers. Dayton's water distribution system currently consists of three separate service areas that are not interconnected – the Historic Village, Northeast, and Southwest Service Areas. Figures A-1 through A-3 show the existing water distribution system for each service area. The service areas are planned to be interconnected at future "build-out" of the water system, with a Low Pressure Zone in the North Dayton District (encompassing the current Historic Village and Northeast areas) and a High Pressure Zone in the South Dayton District. Figure A-4 shows the proposed ultimate build-out trunk water distribution system map.

This report evaluates the current water system, including water supply wells, water treatment, treated water storage, and the distribution system. Future needs are evaluated for the ultimate build-out of the system and forecasted for the next 25 years (to 2050), including the timing and estimated costs for additional infrastructure.



2 Water Demands

Historical water use, current water use trends, seasonal water demand variations, and population growth projections were all evaluated to determine existing and future water demands for evaluation of the water system. Because the water service areas are not currently interconnected and obtain water supply from different sources, water demands for the Historic Village and Northeast service areas were evaluated separately from the Southwest service area.

2.1 Existing Demands

The Historic Village and Northeast Service Areas are currently supplied by two municipal wells each. Annual well pumping volumes and residential and non-residential water billing data from 2017 to 2024 for these service areas were evaluated. Summaries for each service area are shown in Table 2-1 and Table 2-2. The Northeast Service Area has one emergency interconnect to the City of Champlin but this is normally closed and did not supply water during the period of record.

For the Historic Village Service Area, the water pumped and delivered has remained relatively flat over the period of record. This is expected based on the relatively limited growth and development in observed this area from 2017 to 2024.

Table 2-1. Historical Water Demands for Historic Village Service Area

Year	Residential Water Use (MG)	Irrigation Water Use ¹ (MG)	Total Water Delivered (MG)	Total Water Pumped (MG)	UFW (%)	Avg Day Demand (MGD)	Max Day Demand (MGD)	Max/Avg Ratio
2017	6.62	0.0	6.62	7.73	14.4%	0.021	0.046	2.17
2018	7.16	0.0	7.16	8.04	10.9%	0.022	0.045	2.04
2019	6.67	0.59	7.27	8.22	11.6%	0.023	0.042	1.87
2020	7.23	1.22	8.45	9.42	10.2%	0.026	0.056	2.17
2021	6.50	1.01	7.51	8.97	16.3%	0.025	0.055	2.24
2022	6.56	1.15	7.72	9.58	19.4%	0.026	0.069	2.63
2023²	6.56	1.34	7.90	9.47	16.6%	0.026	0.067	2.58
2024	7.08	0.53	7.61	7.43	-2.5%	0.020	0.061	3.00
Avg	6.80	0.97	7.53	8.61	12%	0.024	0.055	2.34
Max	7.23	1.34	8.45	9.58	19%	0.026	0.069	3.00

1. Irrigation data for McNeil Ballfield.

2. Well No. 1 pumpage for 2023 was corrected to exclude volumes bled to sanitary sewer during pressure tank repairs. Estimated bled volume was 4,400,000 gallons (Oct 28 – Nov 17).

For the Northeast Service Area, an increase in total water pumped and delivered has accompanied increases in population served over the past eight years. The highest total water delivered was in 2023 at



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202.7 million gallons (MG) and the highest total raw water pumped was also in 2023 at 215.7 MG. The largest maximum day was also in 2023, with 1.61 MGD pumped on June 21, 2023. Timely rainfall during the summer of 2024 may have contributed to reduced lawn watering demands, compared to 2023 which had a relatively drier summer.

Since 2021, non-revenue water (NRW) or unaccounted for water (UFW), i.e. water lost, has averaged approximately 13 percent in the Northeast Service Area, after two years where UFW exceeded 25 percent. The years with high (and negative) UFW are believed to be caused by inaccuracies with the City's billing and reporting systems. In the Historic Village Service Area, UFW has averaged 12 percent, mostly due to the small size of the service area and the disproportionate impact caused by annual hydrant flushing activities which are not metered or tracked. As an industry standard, it is recommended that the percentage of non-revenue water should be maintained below 10 percent. Improvements to the City's electronic water billing and reporting systems, as well as improved tracking of hydrant flushing volumes, are expected to reduce the City's non-revenue and unaccounted for water in the future.

Table 2-2. Historical Water Demands for Northeast Service Area

Year	Residential Water Use (MG)	Irrigation Water Use ¹ (MG)	Total Water Delivered (MG)	Total Water Pumped (MG)	UFW (%)	Avg Day Demand (MGD)	Max Day Demand (MGD)	Max/Avg Ratio
2017	53.8	0.0	53.8	49.7	-8.2%	0.14	0.42	3.10
2018	61.4	0.0	61.4	66.7	8.0%	0.18	0.62	3.39
2019	59.0	1.2	60.2	81.7	26.3%	0.22	0.57	2.54
2020	58.3	1.2	59.5	128.1	53.5%	0.35	1.00	2.85
2021	108.9	1.3	110.2	119.4	7.7%	0.33	0.98	2.99
2022	155.0	1.5	156.5	166.0	5.7%	0.45	1.32	2.90
2023	200.2	2.5	202.7	215.7	6.0%	0.59	1.61	2.72
2024	174.2	1.0	175.2	188.5	7.1%	0.52	1.25	2.42
Avg	108.8	1.5	109.9	127.0	13%	0.35	0.97	2.86
Max	200.2	2.5	202.7	215.7	54%	0.59	1.61	3.39

1. Irrigation data for City Hall and Rivers Bend Park.

The Southwest Service Area is primarily supplied through two interconnects with the City of Maple Grove, and one with the City of Rogers that supplies a limited number of industrial users on the west side of French Lake. A second interconnect with Rogers is normally closed and did not supply water during the period of record. The interconnects are not metered. In lieu of this, individual customer meter billing data for the Southwest Service Area was reviewed for the past eight years, summarized in Table 2-3.

Similar to the Historic Village and Northeast Service Areas, the highest annual water sales for the Southwest was in 2023 at 180.5 MG. In general, an increase in total water sales has accompanied increased population and industrial/commercial users in the service area. Note that because the interconnects with Maple Grove and Rogers are not metered, maximum day demand is not recorded and a maximum to average day ratio cannot be calculated, nor is it possible to calculate water losses (NRW or UFW) for the Southwest Service Area.



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Table 2-3. Historical Water Demands for Southwest Service Area

Year	Residential Water Use (MG)	Ind/Comm Water Use (MG)	Irrigation Water Use (MG)	Total Wholesale Purchases (MG)	Avg Day Demand (MGD)
2017	13.4	30.9	0.0	44.4	0.12
2018	20.5	33.3	0.5	54.3	0.15
2019	22.5	33.5	0.6	56.6	0.16
2020	39.1	45.9	3.5	88.5	0.24
2021	60.5	38.3	3.8	102.7	0.28
2022	73.2	37.1	3.6	113.8	0.31
2023	100.4	70.3	9.7	180.5	0.49
2024	89.7	51.2	11.2	152.1	0.42
Avg	-	-	-	99.1	0.3
Max	-	-	-	180.5	0.5

For Dayton, the served population is different from the total population. Many existing residents are on private wells, and some are connected to the City of Champlin's water system. Table 2-4 summarizes the City's total population, estimates of population served by the municipal water system, and city-wide annual water demands for 2017-2024. Note that the served population was calculated assuming that the unserved population has remained steady since 2016 at 3,289 persons.

Table 2-4. City-Wide Historical Population and Water Demands

Year	Total Population	Population Served	Annual Residential Water Use (MG)	Annual Water Demand ¹ (MG)	Avg Day Demand (MGD)	Residential per Capita Demand (gpcd)	Total per Capita Demand (gpcd)
2017	5,481	2,192	73.9	101.8	0.28	92.3	127.3
2018	6,072	2,783	89.1	129.1	0.35	87.7	127.1
2019	6,374	3,085	88.2	146.5	0.41	78.3	130.1
2020	7,262	3,973	104.6	225.9	0.62	72.1	155.8
2021	8,021	4,732	175.9	231.0	0.63	101.8	133.7
2022	9,281	5,992	234.7	289.3	0.79	107.3	132.3
2023	10,086	6,797	307.2	410.4	1.12	123.8	165.4
2024	11,065	7,776	271.0	350.5	0.96	95.5	123.5
Avg	-	-	168.1	235.6	0.65	94.9	136.9
Max	-	-	307.2	410.4	1.12	123.8	165.4

1. Sum of annual wholesale purchases and well pumpage.

As with the individual service areas, Table 2-4 shows that an increase in city-wide annual residential and total water demand has accompanied increased residential and industrial/commercial growth over the past eight years.



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The residential per capita demand was calculated by dividing the city-wide annual residential water delivered by population served. The total per capita demand for each year was calculated by dividing the sum of wholesale purchases and raw water pumping volumes and dividing by population served. The calculated per capita demands for the years 2017-2024 in gallons per capita per day (gpcd) are shown in Figure 2-1.

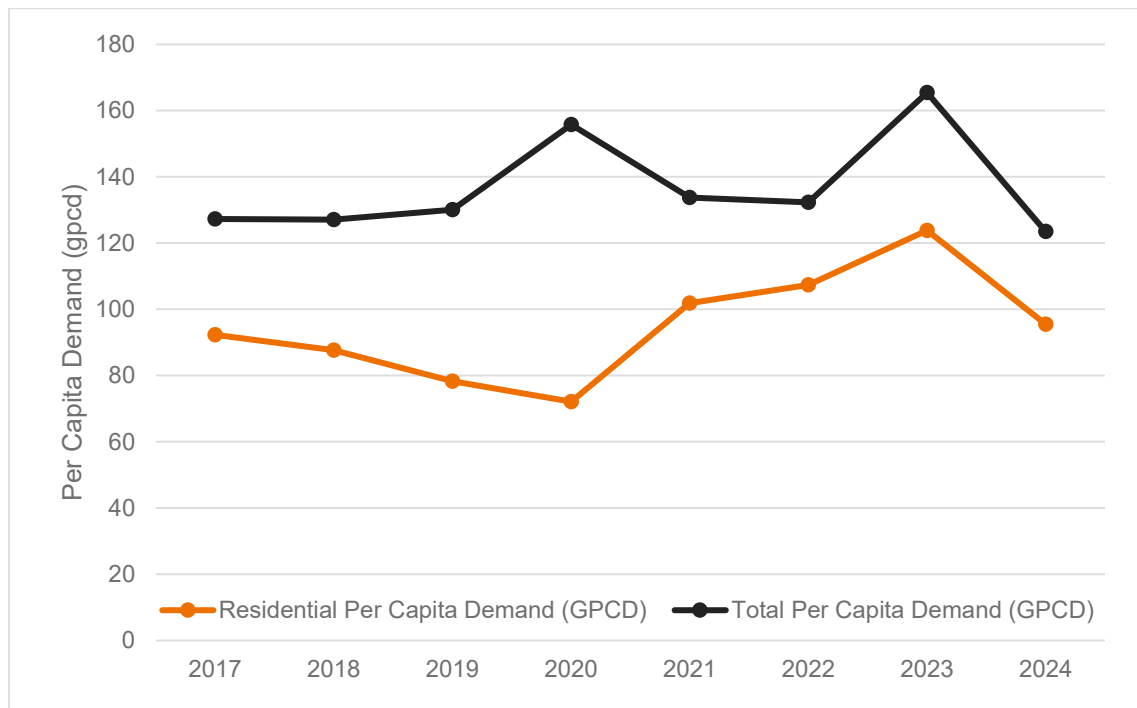


Figure 2-1. Annual Per Capita Demand

In general, residential per capita demand has increased over the past eight years. Notable exceptions include 2019 and 2020 when unaccounted for water in the Historic Village and Northeast Service Areas was 25% and 51%, respectively; and 2024, when timely rainfall during the summer may have reduced lawn watering demands. In 2023, the per capita demand peaked, having a per capita residential demand of 123.8 gpcd and a per capita total demand of 165.4 gpcd. The observed increases in per capita demand may be attributed to hotter and drier weather patterns from 2021 to 2023, leading to increased lawn irrigation demand in summer. Another factor may be increased lawn watering demands from new single-family homes constructed within Dayton over those time periods.

2.2 Demand Design Criteria

For establishing design criteria for existing and projected demands, the following peaking factor and per capita demands were selected:

- City-Wide 2.8 Maximum Day to Average Day Peaking Factor based on the average observed peaking factor from 2017-2024. Although higher peaking factors were observed in the Northeast



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Service Area in 2018 and prior years, it is noted that the recorded maximum days typically occurred during days in which the City flushed hydrants. As the service areas have grown, the impact of hydrant flushing has been minimized, and maximum days are now typically driven by lawn watering in summer. It is assumed that the Southwest Service Area will exhibit a similar peaking factor as the Northeast Service Area.

- Per capita residential demand of 95 gal/cap/day, the average observed from 2017-2024. This was further broken down based on residential densities as follows:
 - 100 gal/cap/day for low density
 - 90 gal/cap/day for medium density (including master planned developments)
 - 80 gal/cap/day for high density (including mixed use)
- Per capita total demand of 140 gal/cap/day, the average observed from 2017-2024, rounded up.
 - Per capita total demand is inclusive of residential, commercial/industrial, and institutional consumption, as well as unaccounted-for water (UFW). Total demands are applied to population-based forecasts and assume that the relative demand between use types will remain consistent.

The peak hour demand is the maximum hour of water demand which occurs on the maximum day. Peak hour demands typically occur in the morning or evening when residential and irrigation water use increase. Peak hour ratios typically range from 1.4 to 2.0 times maximum day demand. A higher percentage of industrial or commercial water use decreases the peak, since industrial usage does not fluctuate significantly from hour to hour. An industry standard time of day demand curve from the American Water Works Association (AWWA) is illustrated in Figure 2-2.

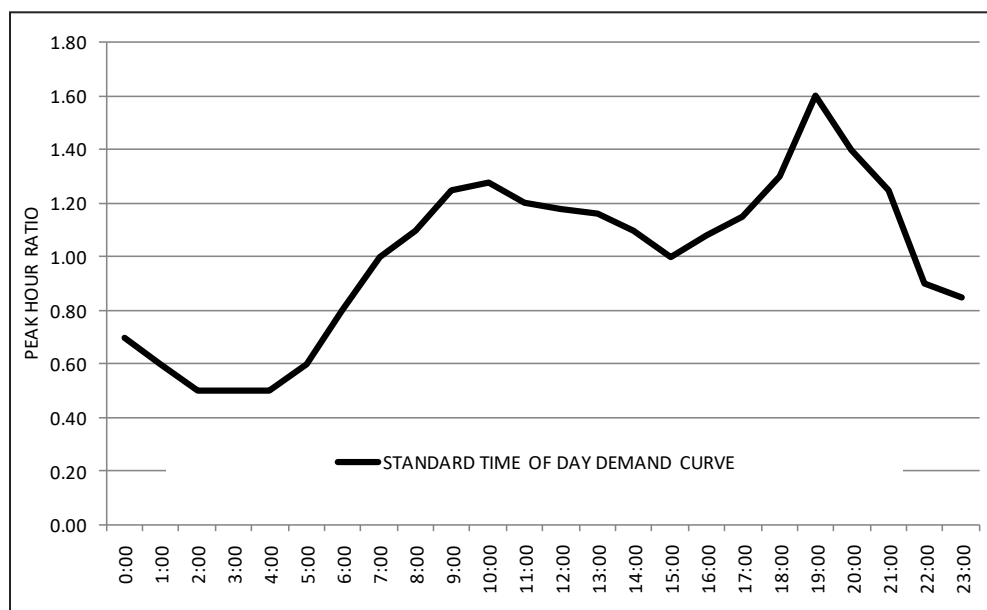


Figure 2-2. AWWA Standard Time of Day Demand Curve



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In lieu of basing the peak hour ratio on hourly pumping and water storage data recorded during a maximum day, it is recommended that a design peak hour ratio of 1.6 be used based on the AWWA standard time of day demand curve.

The design existing water demands for this study are summarized in Table 2-5. The average day demands were based on the maximum observed average day demands over the past eight years. As discussed, the maximum day and peak hour ratios were determined based on Dayton water demand trends and typical industry standards.

Table 2-5. Design Existing Water Demands

Service Area	Average Day Demand	Maximum Day Demand ¹	Peak Hour Demand ²
Historic Village	0.026 MGD	0.073 MGD	0.12 MGD (82 gpm)
Northeast	0.59 MGD	1.65 MGD	2.65 MGD 1,839 gpm
Southwest	0.49 MGD	1.37 MGD	2.20 MGD 1,524 gpm
Total City	1.12 MGD	3.14 MGD	4.97 MGD (3,445 gpm)
¹ Maximum day demand design factor equal to 2.8.			
² Peak hour demand design factor equal to 1.6.			

2.3 Population Growth Projections

2.3.1 TOTAL POPULATION

Establishing water demand projections requires the development of population growth projections throughout the planning period. For the purposes of this study, a design year of 2050 is used.

Population is a very dynamic parameter – difficult to estimate with a high level of accuracy. An added complication is that water studies are focused primarily on the population served, or will be served, by the City's water system. This can be different than a City's total population, as it is for Dayton. Water use is affected by many factors such as land use, water rates, climate, soil conditions, and socioeconomic trends. It is, however, associated with population more than any other parameter. The prior section of this Plan established the estimated per capita water consumption rates for Dayton based on historical data. Once population growth forecasts are determined for a community, future water demands can be projected.

Two approaches were used to project Dayton's population growth through 2050:

1. Metropolitan Council Forecasts (Imagine 2025)



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Forecasts from the Met Council were only available for the Hennepin County portion of the City. Historically, the Wright County segment has comprised less than 1% of the City's population, and any expected growth from this area was considered negligible.

2. City Staff Growth Estimates

Based on discussions with City planning staff, an alternative growth model of 500 residents per year was used for projections beyond the year 2025. A total city population of 12,000 was projected for 2025.

Figure 2-3 shows the historical population of Dayton from 2009 to 2024 along with the two approaches for population projections.

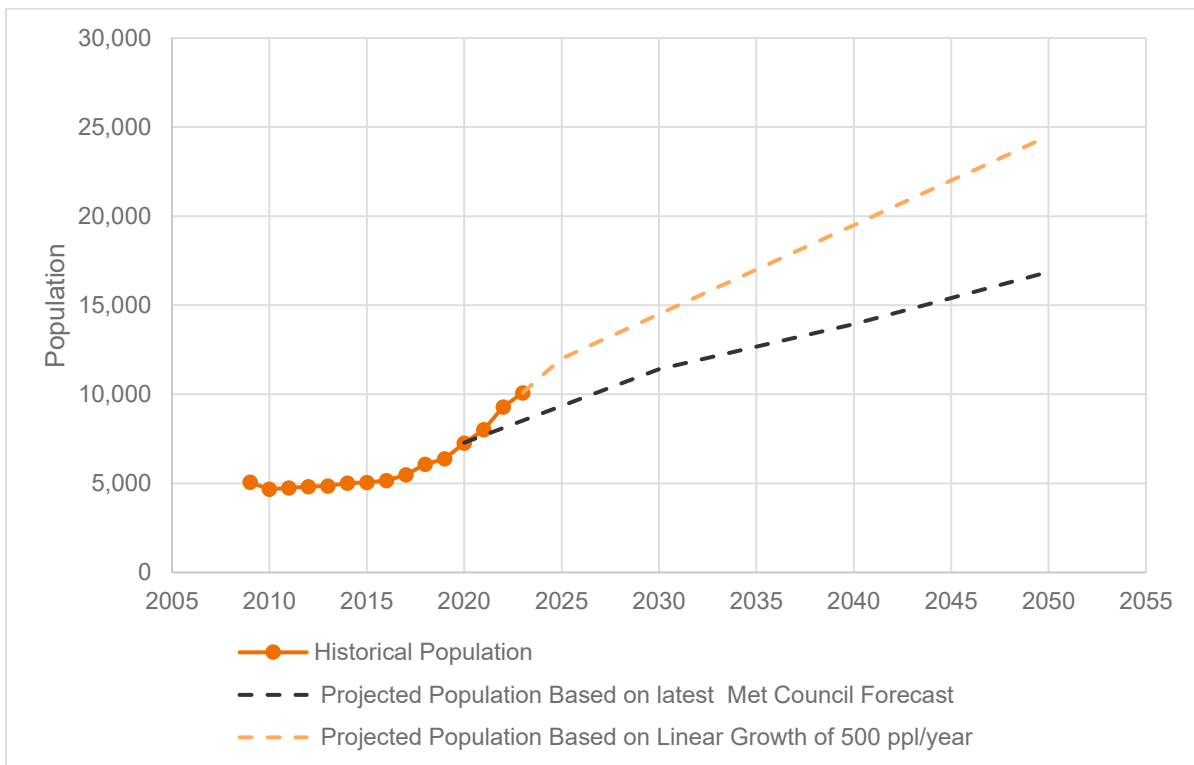


Figure 2-3. Historical and Projected Population for Dayton

In consideration of the above growth projections, the growth rate based on linear growth of 500 people per year was selected as the planning basis for this study. The growth rate used in this planning document is intended to be somewhat conservative to avoid underestimating infrastructure needs. At this growth rate, Dayton's population would reach 24,500 in the year 2050.

2.3.2 SERVED POPULATION

As noted previously, not all residents are connected to the municipal water system. A portion of the population is served by private wells, and some are served by the Champlin water distribution system.



These unserved residents are not anticipated to connect to the municipal water system within the 2050 horizon considered in this Plan. Table 2-6 presents projections for both the total population and population served by the Dayton municipal water system. Estimated served population was calculated by determining the difference between the projected total population and the currently unserved population.

Table 2-6. Projected Served Population for City of Dayton

Year	Total Population	Population Served
2025	12,000	8,711
2030	14,500	11,211
2035	17,000	13,711
2040	19,500	16,211
2045	22,000	18,711
2050	24,500	21,211

As shown in the table above, Dayton's served population is projected to reach 21,211 by the year 2050.

2.4 Future Land Use

An alternative to projecting water demands using projected population at specified intervals of time is to project water demands based on future land use. Water demands projected this way are often referred to as ultimate or full "build-out" demands. Ultimate demands are useful for long-term planning and layout of water system facilities such as storage and trunk water mains; however, the timeframes (or lack thereof) associated with full build out scenarios make it difficult to estimate precisely when ultimate facilities will be needed.

The City of Dayton is currently in the process of revising its land use plan, which will help to define growth patterns in the City for the next ten years and beyond. The latest version of Dayton's land use plan was used to develop Figure A-5. At full build-out, the current Historic Village and Northeast Service Areas will combine into the Low Pressure Zone in the North Dayton District and the current Southwest Service Area will be encompassed by the High Pressure Zone in the South Dayton District.

Table 2-7. Adjusted Developable Acres by Table 2-7 and Figure A-5 show the developable acres by ultimate service area. Developable acres are exclusive of areas such as open water, right-of-way (ROW), National Wetlands Inventory (NWI), 100-year floodplain, environmentally sensitive areas, and steep slopes. Parcels with existing water meters have also been removed. Note that the total developable acres in Table 2-7 additionally account for reductions due to future right-of-way and green spaces.

The precise timing, locations, and densities that develop in the future are unknown but expected to be guided by the land use plan.



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Table 2-7. Adjusted Developable Acres by Ultimate Service Area

Future Land Use	North Dayton¹	South Dayton¹
Low Density Residential (LDR)	1,732.4	1,350.9
Medium Density Residential (MDR)	0.0	418.9
High Density Residential (HDR)	0.0	177.3
Master Planned Development	348.1	0.0
Mixed Use	36.2	159.6
Sewered LDR	186.4	0.0
Mobile Home Parks	0.0	14.6
Unsewered LDR	556.5	0.0
Commercial	0.0	75.0
Industrial	0.0	336.4
Public/Institutional	17.1	16.3
Agricultural Preserve	73.4	122.8
Business Park	0.0	50.5
Golf Course	0.1	37.6
Neighborhood Commercial	5.7	20.7
Open Water	0.0	0.5
Park/Open Space ²	356.8	358.2
Right of Way (ROW)	309.5	373.2
Rural Estate	234.7	0.0
Total	3,857.0	3,513.0

1. Acres are adjusted assuming that 10% of all developable acres will become right-of-way and 10% of residential developable acres become green space.
2. Excluding Elm Creek Park Reserve areas.

The assumed residential unit densities per acre, household sizes, and average water demand rates by future land use type are shown in Table 2-8. The average per capita daily water demands used were 100 gallons per capita for Low-Density Residential (LDR), 90 gallons per capita for Medium-Density Residential (MDR), and 80 gallons per capita for High-Density Residential (HDR). To determine the average per capita daily water demand, other residential land uses were classified as LDR, MDR, or HDR based on their unit density.



Table 2-8. Population Densities and Water Demand Rates by Future Land Use Type

Future Land Use	Unit Density ¹	Household Size	Per Capita Avg Day Demand	Acreage Avg Day Demands
	Units/Acre	Cap/Unit	gal/cap/day	gal/acre/day
LDR (1-3)	2.5	3.0	100	750
MDR (6-8)	6	2.5	90	1,350
HDR (15-20)	15	2.0	80	2,400
Master Planned Development (4.5-8)	6	2.5	90	1,350
Mixed Use (12-20)	15	2.0	80	2,400
Sewered LDR (1.18)	1.18	3.0	100	360
Mobile Home Parks (8-10)	8	2.5	90	1,800
Unsewered LDR (0.2-0.5)	0.35	3.0	100	110
Commercial	-	-	-	1,500
Industrial	-	-	-	1,500
Public/Institutional	-	-	-	1,000
Agricultural Preserve (assume will be LDR)	2.5	3.0	100	750
Business Park	-	-	-	1,500
Golf Course	-	-	-	1,000
Neighborhood Commercial	-	-	-	1,500
Park/Open Space	-	-	-	1,000
Rural Estate (0.1-0.5)	0.1	3.0	100	30

1. Values selected from ranges provided in land use definitions in the City of Dayton 2040 Comprehensive Plan. Ranges are noted in parentheses in the future land use description column.

Note that this analysis assumed the residential areas to be developed within the middle to lower ranges of their respective land use descriptions. Non-residential water demands are dependent on the nature of the users and tend to have a higher base demand variance than residential demands. For example, a warehouse user may demand less than 1,500 gal/day on average while a water-intensive manufacturer may demand much more water on average. Therefore, it is critical to remember that these are planning assumptions only and that actual water usage should be verified as industrial and commercial areas develop.

2.5 Projected Demands

Table 2-9 presents the projected average day water demands based on the population projections outlined in Section 2.3 and an initial total water consumption factor of 140 gpcd. This factor accounts for all water use, including residential, industrial, commercial, and institutional consumption, as well as unaccounted-for water (UFW). While 140 gpcd serves as a starting point, it is assumed that residential growth will outpace industrial and commercial growth over time, leading to a gradual reduction in per



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2 Water Demands

capita water demand. As a result, total per capita demand is projected to decline from 140 gpcd to 130 gpcd by 2050. The projected maximum day demands are calculated using the design average-to-maximum day demand ratio of 2.8.

Table 2-9. Projected Population and Demands by Year

Year	Pop. Served	Total per Capita Demand (gpcd)	Average Day Demand (MGD)	Maximum Day Demand (MGD)
2025	8,711	140	1.2	3.4
2030	11,211	140	1.6	4.4
2035	13,711	135	1.9	5.2
2040	16,211	135	2.2	6.1
2045	18,711	130	2.4	6.8
2050	21,211	130	2.8	7.7

The ultimate average and maximum day demands based on future land use for full build out are shown in Table 2-10. The projected ultimate population for Dayton, assuming full build out at the guided densities, is 59,895. The projected ultimate average day demand is 7.19 MGD and projected ultimate maximum day demand is 20.1 MGD.

Table 2-10. Projected Population and Demands at Full Build Out

Stage	Total City			North Dayton		South Dayton	
	Population Served	Average Daily Demand (MGD)	Max. Daily Demand (MGD)	Average Daily Demand (MGD)	Max. Daily Demand (MGD)	Average Daily Demand (MGD)	Max. Daily Demand (MGD)
Current	11,065	1.12	3.14	0.63	1.76	0.49	1.38
Ultimate	59,895	7.2	20.1	3.1	8.6	4.1	11.6

2.6 Fire Demand

Water usage for fire demand is also a vital consideration in the design of a water supply and distribution system. Fire demand varies greatly from normal usage in that an extremely large quantity of water is required from a single demand point in a very short time. The annual quantity of water used for fires is almost negligible when compared to other usage categories, but because of the extreme rate of usage during an emergency, fire demands frequently govern design of the distribution system.

The Insurance Services Office (ISO) recommends that a system the size of Dayton's be capable of delivering a fire demand of 1,000 gpm to 3,500 gpm for varying durations depending on the occupancy use type and building construction. Recommended fire flows used in the evaluation and design of the



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2 Water Demands

Dayton water system were assigned based on water demand projections using land use and are illustrated in Figure A-2. Typical recommended fire flows by land use are listed below:

- Park and Open Space – 500 gpm
- Low Density Residential – 1,000 gpm
- Historic Village Mixed Use – 1,500 gpm
- Medium Density Residential, Business Park, and Commercial – 2,500 gpm
- Other Mixed Use, High Density Residential, Industrial, and Public/Institutional – 3,500 gpm

Fire flow needs derived from land use classifications may lack the precision necessary for building-specific and site-specific evaluations; therefore, fire flow requirements should be reviewed with Fire Officials based on occupancy use and building construction. For example, a large commercial facility may be better classified as industrial or institutional for firefighting purposes. A large commercial facility may require a higher fire flow than the commercial land use dictates, due to the size, construction, and use of the facility. Industrial or institutional buildings may be assigned a fire flow as high as 3,500 gpm, but the facility may contain fire sprinklers, in which case fire flow requirements may be as low as 1,500 gpm.



3 Water Supply

3.1 Supply from Neighboring Cities

The City of Dayton has agreements with the Cities of Maple Grove, Champlin and Rogers to serve water to Dayton. Copies of the water service agreements are included in Appendix A.

The Southwest service area is served by two existing connections to the Maple Grove water system. Maple Grove has agreed to provide Dayton with water in sufficient quantity to meet an average day demand not to exceed 2.8 MGD and a maximum day demand of 5.0 MGD at a minimum pressure of 1,066 ft elevation.

The Southwest service area also has two interconnections to the City of Rogers water system. The connection along Rogers Drive is currently used to serve a limited number of industrial users on the west side of French Lake. In the near term, this industrial park area will be connected to the remainder of the Southwest service area and supplied by Maple Grove. This interconnection would then be closed but still available for use as an emergency connection. The second interconnection in the southwest is used as an emergency connection along Brockton Lane North. There is no formal agreement in place for emergency interconnect operations.

The Northeast service area has one interconnection to the City of Champlin, which was established by Joint Powers Agreement. The interconnection is located along French Lake Road and is used only during an emergency.

Additionally, an isolated residential neighborhood within Southeast Dayton, located east of Elm Creek Park Reserve and south of Elm Creek Road, is served by the City of Champlin's water and sewer systems and is not connected with the rest of the Dayton's system.

3.2 Existing Wells

The water systems in North Dayton presently obtain raw water supply from four wells, two located in Northwest Dayton that serve the Historic Village service area (Well Nos. 1 and 3), and the other two in Northeast Dayton (Well Nos. 2 and 4) that serve the Northeast service area. All wells obtain water from the Tunnel City-Wonewoc Aquifer. The existing well locations are shown on the water system map illustrated on Figures A-1 and A-2, and on the wells and raw water piping map illustrated on Figure A-7.

These wells range from 384 feet to 505 feet deep and have operational capacities ranging from 150 gpm to 800 gpm, depending on the size of the well and the structure of the geologic formation. Table 3-1 provides a summary of each well.



Table 3-1. Existing Groundwater Supply Wells

Source	Unique ID	Aquifer	Service Area	Year Const.	Pump Type	Well Depth (ft)	Casing Depth (ft)	Casing Dia. (in)	Operational Capacity (gpm)
Well 1	611054	Tunnel City-Wonewoc	Historic Village	2001	Submersible	390	190	16	150 ¹
Well 2	752128	Tunnel City-Wonewoc	Northeast	2007	Submersible w/ pitless adapter	404	220	18	800
Well 3	843384	Tunnel City-Wonewoc	Historic Village	2019	Line shaft vertical turbine	384	205	12	150 ¹
Well 4	854381	Tunnel City-Wonewoc	Northeast	2021	Line shaft vertical turbine	505	332	18	800 ²

1. List capacities for Well Nos. 1 and 3 are based on current flow setpoints for pumping to the hydropneumatic tank; rated capacities of installed pumps are higher at 300 and 600 gpm, respectively. Both wells are on variable frequency drives (VFDs).
2. Due to issues with pumping sand, Well No. 4 has been de-rated to 800 gpm. Original pump design was 1,200 gpm.

Because the Historic Village and Northeast service areas are not currently connected to each other, firm capacity is considered separate for each. The firm capacity is 150 gpm (0.22 MGD) in the Historic Village and 800 gpm (1.15 MGD) in the Northeast. Firm capacity is defined as the amount supplied with the largest well out of service.

3.2.1 WELL NO.5

To continue accommodating rising water demand, Well No. 5 will be added to the City's distribution system in the Northeast service area. Drilling and installation of this well began in 2023 and was completed construction in January 2024. Construction of Wellhouse No.5 is complete but the wellhead treatment facility for Well No. 5 is expected to be completed in 2026.

Well No. 5 consists of an 18-inch steel-cased, 435-foot-deep production well finished in the Tunnel City-Wonewoc aquifer. The well is expected to provide a capacity of 1,200 gpm and will be pumped to a wellhead treatment plant located next to Well No. 4 for further treatment. This system is expected to start up in 2026.

With three wells, the total supply capacity (operational) for the Northeast service area will increase to 2,800 gpm (4.1 MGD), and the firm capacity will increase to 1,600 gpm (2.3 MGD).

3.3 Existing Raw Water Piping

The City's wells have piping in place to deliver raw water from the wellhead to treatment before the water is conveyed to the distribution system. The existing raw water piping is illustrated on Figure A-7.



- Approximately 1,900 feet of 8-inch polyvinyl chloride (PVC) raw water pipe connects Well No. 3 to Wellhouse No. 1, where the raw water is treated by chemical dosing.
- Approximately 3,100 feet of 12-inch PVC raw water pipe runs from Wellhouse No. 4 to Wellhouse No. 5. A new treatment facility for Well Nos. 4 and 5 is currently under construction at the Wellhouse No. 4 site.

3.4 Well Capacity versus Demand

Water supply and storage volume capacities are interrelated. Tanks act as additional supply sources during peak periods when the primary supply sources (e.g. wells alone) are unable to meet the demand. Thus, storage serves to stabilize supply during peaks in water demand and allows the system to produce water at a lower, more uniform, and typically less expensive rates.

There are an infinite number of combinations of supply and storage that can be used to meet peak water demands. An efficient, economical system can be determined through a detailed analysis of supply and storage costs. For the vast majority of communities, the ideal combination of supply and storage is found when the supply equals 100% of the maximum day demand. This is consistent with the recommendations in both *Recommended Standards for Water Works* by Great Lakes Upper Mississippi River Board (*Ten States Standards*), and American Water Works Association (AWWA) *Manual of Practice M32 - Distribution Network Analysis for Water Utilities*. Providing a firm capacity equal to the maximum day demand will result in improved system reliability by enhancing performance during the tank-filling periods, and particularly in the event of an emergency such as a fire.

For maximum system reliability and efficiency, supply and storage should be considered separately where there are multiple service areas. Two service areas are planned for the Dayton system, a High Pressure Zone in South Dayton and a Low Pressure Zone in North Dayton. It is inefficient to pump water to a high elevation and let the water flow down to lower pressure zones through pressure reducing valves. The cost to pump is high and the cost of pressure reducing systems is high. Also, pressure reducing valves are high maintenance items and subject to failure. Therefore, it is generally not desirable to rely on a pressure reducing valve system as a major component of a supply source for an area. For these reasons, supply and storage requirements for each zone are evaluated independently.

The resulting supply recommendations for each existing service area are based on the maximum day demands and are shown in Table 3-2. As shown in the table, once Well No. 5 is commissioned, each existing service area meets the supply recommendations.



Table 3-2. Existing Water Supply Recommendations

Service Area	Existing Maximum Day Demand	Recommended Supply Capacity	Existing Firm Capacity	Additional Supply Needed
Historic Village	0.073 MGD	50 gpm	150 gpm	None
Northeast	1.65 MGD	1,150 gpm	1,600 gpm ¹	None
Southwest	1.37 MGD	960 gpm	3,472 gpm ²	None

1. Firm capacity after Well No. 5 is commissioned.
2. Based on Maple Grove agreement to provide up to maximum day demand of 5.0 MGD.

Supply recommendations for the two proposed ultimate service areas are based on projected ultimate water demands and are shown in Table 3-3. Existing firm capacities are based solely on existing wells within the City of Dayton; for the purposes of this report, it is assumed that water supply from Maple Grove to the South Dayton system will ultimately be terminated.

Table 3-3. Ultimate Water Supply Recommendations

Service Area	Ultimate Maximum Day Demand	Recommended Supply Capacity	Existing Firm Capacity	Additional Supply Needed
North Dayton	8.6 MGD	5,950 gpm	2,500 gpm ¹	3,450 gpm
South Dayton	11.6 MGD	8,050 gpm	0 gpm ²	8,050 gpm

1. Firm capacity after Well No. 5 is commissioned, and assuming Well Nos. 1 and 3 capacities are increased to their rated capacities of 300 and 600 gpm, respectively.
2. Assumes that supply from Maple Grove water system will ultimately be terminated.

The following section discusses planning considerations for future wells to meet the ultimate supply recommendations.

3.5 Future Well Planning

The Tunnel City-Wonewoc is the most available bedrock aquifer across the City, and for the purposes of this report, it is assumed to be the main source water for future municipal wells for Dayton. Typical yields from a Tunnel City-Wonewoc well in this part of the Metro are in the range of 800 to 1,200 gpm.

The Minnesota Department of Natural Resources (MnDNR) generally does not allow new wells to be drilled into the deeper bedrock aquifer (Mt. Simon) unless it is the aquifer of last resort. Shallower bedrock aquifers (chiefly the Jordan aquifer) are either too spotty across the City, too thin, or are missing altogether, so they aren't a reliable source of water for multiple municipal wells. However, there may be locations where a Jordan aquifer well might be an option, as water quality may be better overall than



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3 Water Supply

Tunnel City-Wonewoc water. The Jordan tends to have less iron and manganese and often does not require treatment in many of the Metro Area communities where it is used.

The City may also investigate the possibilities of using the drift (non-bedrock) aquifer that lies closer to the land surface, which is another aquifer that tends to have less iron and manganese. Recently, an irrigation well drilled to the drift aquifer in Northwest Dayton was noted to be highly productive with good water quality. If areas like these can be located and used for municipal wells, it can help reduce the reliance on the Tunnel City-Wonewoc aquifer. The largest issues with the drift aquifer are that it can be highly variable – changing in thickness, composition, and yield over short distances – and that it is often more vulnerable to contamination. So, while it is unlikely that all or most future municipal wells could be drilled into the drift aquifer, there may be the possibility of drilling some wells there.

Well spacing for the Tunnel City-Wonewoc aquifer needs to take well interference into consideration. Wells Nos. 4 and 5 are 2,050 feet apart. Some interference has been observed between these two wells, but it is not significant enough to cause a problem. Therefore, a spacing of 2,000 feet is recommended for planning purposes. Spacing may be able to be reduced to 1,500 feet in areas where available land is limited. But any less than 1,500 feet is not recommended, especially if multiple wells have been drilled in the area competing for water.

One benefit of finding wells in the shallower drift aquifer or the Jordan aquifer is that those aquifers generally aren't hydraulically connected to the Tunnel City-Wonewoc. This means that the shallower well could potentially be placed on or near the same site as a Tunnel City-Wonewoc well. This could reduce the number of well sites ultimately needed. However, this would depend on where the drift or Jordan aquifers are present and whether they are ideally situated to be used.

Test drilling would be needed to confirm aquifer availability, depth, and thickness. For each prospective well site, the City should plan to drill a Tunnel City-Wonewoc test well, which would pass through any layers of drift and Jordan on the way down. If those layers show some promise, a test well could be completed in those layers for further testing. Otherwise, the test well would be completed in the Tunnel City-Wonewoc for water quality testing and confirmation of aquifer performance.

As identified in Table 3-3, a total firm production capacity of 8.6 MGD (5,950 gpm) in North Dayton, and 11.6 MGD (8,050 gpm) in the South Dayton, is required to meet the ultimate projected demand conditions in Dayton at Ultimate build-out. This represents 100% of the ultimate system's maximum day demand. Firm well capacity is defined as the pumping capacity available with the largest well out of service. For added reliability in large systems, firm capacity is further defined by reserving one out of every ten wells as a standby well. Because Dayton has two systems, a minimum of one well is recommended for each system.

Due to existing challenges with drawing sand from Well No. 2, at some point in the future the City may decide to de-rate Well No. 2 to 600 gpm. In that case, the firm capacity of Dayton's existing five wells is 2,300 gpm, with Well No. 5 as standby.



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3 Water Supply

The calculated number of additional wells for each system is shown below. Note that the listed future well capacities are the average yields necessary to meet recommended firm capacities. Actual well yields will vary but are expected to be in the range of 800 to 1,200 gpm.

North Dayton

Recommended Firm Capacity	5,950 gpm
Existing Firm Capacity (Well No. 2 reduced to 600 gpm)	2,300 gpm
Required Additional Capacity	3,650 gpm
At 915 gpm Average Yield	4 additional wells
	8 total duty wells + 1 standby

South Dayton

Recommended Firm Capacity	8,050 gpm
Existing Firm Capacity	0 gpm
Required Additional Capacity	8,050 gpm
At 1,010 gpm Average Yield	9 additional wells
	8 duty wells + 1 standby

Two well fields are planned for the ultimate service areas. The well fields, along with conceptual sizing and routing of raw water mains, are shown in Figure A-10.

The North Well Field will supply North Dayton and consists of the existing Well Nos. 2, 4, and 5, along with four future wells located along the north side of Diamond Lake Rd S. Raw water mains will be required to convey water from wells to the proposed wellhead treatment sites, which are each expected to be sized to treat up to two wells. North Dayton will additionally be supplied by existing Well Nos. 1 and 3 located near the Historic Village.

The South Well Field is comprised of nine future wells located to the north and east of the proposed South WTP located along 117th Ave N, south of Dubay Lake. Raw water mains will be required to convey water from the wells to the proposed South WTP.



4 Water Treatment

4.1 Existing Facilities

Raw water treatment occurs at Wellhouse Nos. 1, 2 and 4 consisting of chemical feed equipment for chlorination, fluoridation, and polyphosphate addition. The water quality at the wells and in the distribution system is tested periodically to ensure that water quality is within Primary Standards.

Dayton's raw water is treated with chlorine for disinfection and to provide a chlorine residual for preventing bacterial regrowth within the distribution and storage systems. Fluoride is dosed for dental protection. Polyphosphates are added to the water to sequester dissolved iron and manganese and prevent their oxidation. Polyphosphates do not remove the iron and manganese from the water, but instead bind them in a temporary, non-reactive condition, helping them to pass through the system without causing deleterious effects on the water system.

Well No.3 pumps raw water directly to Wellhouse No. 1 for treatment. Table 4-1 shows the current capacity and treatment processes for each well.

Table 4-1. Capacity and Treatment Processes at Dayton's Wellhouses

Well	Capacity (gpm)	Treatment Processes
Well No. 1	150 ¹	Wellhouse No. 1: Chlorination, Fluoridation, Polyphosphate Addition
Well No. 2	800	Wellhouse No. 2: Chlorination, Fluoridation, Polyphosphate Addition
Well No. 3	150 ¹	Treatment at Wellhouse No. 1
Well No. 4	800 ²	Wellhouse No. 4: Chlorination, Fluoridation, Polyphosphate Addition

1. List capacities for Well Nos. 1 and 3 are based on current flow setpoints for pumping to the hydropneumatic tank; rated capacities of installed pumps and chemical feed equipment are higher at 300 and 600 gpm, respectively.
2. Due issues with pumping sand, Well No. 4 is anticipated to be de-rated to pump 800 gpm. Original pump design was for 1,200 gpm.

4.2 Water Quality Evaluation

The U.S. Environmental Protection Agency (EPA) has established national drinking water standards. These standards contain federally enforceable maximum contaminant level (MCL) standards for substances known to be hazardous to public health.

Water quality parameters are defined and regulated by two sets of standards – Primary and Secondary. Primary Standards are set for those substances known to be a hazard to public health. Secondary Standards are set for those substances that, although not hazardous to public health, frequently cause drinking water to have objectionable aesthetic qualities, such as taste and odor.



Water quality test results on Dayton's existing wells indicate that the raw water historically exceeds the secondary (aesthetic) standards for iron and manganese. While existing levels of iron and manganese do not pose a health problem, they can present problems with aesthetics (appearance and taste) and system maintenance, cause staining of laundry and fixtures, clogging of meters and services, as well as other deleterious effects. If public complaints and/or high maintenance costs warrant, iron and manganese treatment may become necessary.

While the timing of adding treatment for Dayton is generally population or demand driven, future treatment regulations could also drive future treatment decisions. Health advisories for certain per- and polyfluoroalkyl substances (PFAS) issued in January 2024 by Minnesota Department of Health (MDH) are lower than standards proposed by the United States Environmental Protection Agency (EPA).

Current understanding of PFAS concentrations in Dayton's water supply suggest that PFAS is not present in the groundwater supply. As long as PFAS remains "non detect", the current treatment processes will continue to provide compliant drinking water and should not be impacted. Removal of iron and manganese will continue to be desired for achieving Secondary drinking water standards.

It should be noted that the recently announced MDH health advisories established criteria for PFAS exposure from drinking water including short-term, chronic, sub chronic and cancer which are at or below reliable detection capabilities for analytical laboratories. These criteria warrant close attention by Dayton to monitor water quality and enforcement of health advisories to provide appropriate time for planning and implementation of potential future treatment. MDH is continuously reviewing the growing list of emerging contaminants and the respective effect on human health. Toxicological study could result in changes to drinking water regulation involving the need for additional treatment for certain contaminants, or treatment for contaminants that have not been regulated in the past.

Considerations for advanced treatment to address potential emerging contaminants may require continuing evaluation as criteria and enforcement are established and finalized by EPA and MDH.

Although a detailed analysis of treatment alternatives is beyond the scope of this report, the following section describes planned and proposed future treatment facilities assuming iron and manganese removal.

4.3 Future Facilities

In North Dayton, iron and manganese removal is proposed to be accomplished by "wellhead treatment" plants, or small-scale pressure filtration plants than are designed to treat water from up to two wells. The City has already begun construction of a wellhead treatment facility adjacent to Well No. 4, consisting of pressure filtration for iron and manganese removal, to treat water from Wells 4 and 5 prior to distribution. Wellhead treatment for Well Nos. 1 and 3 is planned to be constructed adjacent to the existing Wellhouse No. 1, and Well No. 2 may eventually be paired with a future well for wellhead treatment. Additional future wells are expected to include wellhead treatment for every two wells as necessary to provide similar treatment for iron and manganese removal.



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4 Water Treatment

In South Dayton, iron and manganese removal could be accomplished at a central water treatment plant (South WTP) located near the proposed South Well Field. It is anticipated that this treatment facility would be constructed after the well field has begun development. This report assumes that water supply from Maple Grove would ultimately be terminated; therefore, the ultimate capacity of the South WTP would match the ultimate maximum day demand of South Dayton (11.6 MGD).

A conceptual map of future water treatment facilities, including wells and raw water main, is illustrated on Figure A-10.



5 Treated Water Storage

5.1 Existing Facilities

Peak hour demands are supplied through a combination of water from the wells and water drawn from treated water storage. Although the rate of consumption is high during periods of peak hourly demand, the duration of the extreme rate is relatively short. Therefore, a moderate quantity of water withdrawn from storage reservoirs strategically located on the system assures satisfactory service, minimizes the total maximum hour pumping and transmission main capacity required, and permits more uniform and economical operation of the system and pumping facilities.

Water storage in the system is also an important factor in ensuring reliability of service during emergencies resulting from loss of power, temporary outages of water supply facilities, and from sudden demands for firefighting. Water storage allows these fluctuations in water demands to be met without having additional supply pumping capacity, which would typically be held in reserve.

A 3,750-gallon hydropneumatic tank serves the Historic Village and a 0.5 MG water tower serves the Northeast. A summary of the existing facilities is presented in Table 5-1.

Table 5-1. Existing Water Storage

Water Storage	Service Area	Type of Storage	Effective Capacity (MG)	High Water Level (ft)	Year Constructed
Hydropneumatic Tank	Historic Village	Pressurized	0	1,057 ¹	2000
Northeast Tower (Pineview)	Northeast	Elevated	0.5	1,060	2006

1. The effective high water level of the hydropneumatic tank was calculated based on an operating pressure range of 50 psi to 70 psi and tank elevation of 895 ft.

Because the water tower is elevated, the full storage capacity is considered effective storage. Effective storage is defined as the storage available while still maintaining a sufficient residual pressure in the distribution system (generally within 30 to 40 feet of the high-water level). The hydropneumatic tank is too small to provide effective capacity for firefighting and only serves to maintain system pressures and to provide a buffer between well pump start/stop points and to provide for smoother pumping operation.

The existing Southwest Service Area does not have storage located within the City of Dayton. Instead, the system relies on existing elevated storage within the Maple Grove and Rogers water systems. Both peak hour and fire demands are supplied through the existing interconnects.

5.2 Storage Capacity versus Demand

The amount of storage required in the distribution system can be determined by multiple approaches, summarized below.



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5 Treated Water Storage

1. Using an analysis of peak hour demands, fire flow requirements, and operational needs, required storage can be determined by adding together three types of storage: fire/emergency storage, operating storage, and equalizing (peak hour) storage.
2. Using maximum day demands, up to 20 percent of the total maximum day demand accounts for hourly demand fluctuations. In addition, approximately 10 percent of the total maximum day demand is allocated to account for fire flow needs, unusual demands on the system, and operational parameters. The minimum recommended storage volume can therefore be approximated as 30 percent of maximum day demand. Note that this method is not recommended for smaller service areas unless fire protection is not required.
3. *Recommended Standards for Water Works* recommends a minimum storage equal to the average day demand, plus a consideration of storage required for fire protection.

Based on the methods described above, water storage recommendations for Dayton's existing system are detailed in Table 5-2. As discussed in the chapter on water supply, for maximum system reliability and efficiency, supply and storage are both considered independently for each service area. Because each service area is unique in terms of relative size and types of water customers, the basis for the recommended storage capacities differs as noted in the table. For example, the Historic Village service area is relatively small and therefore storage is driven by fire flow and operational needs. Because the Southwest service area does not have effective means to meter daily flows, maximum day demand cannot be monitored. Thus, the storage recommendation is based on annual average day demands.

Table 5-2. Existing Water Storage Recommendations

Service Area	Basis of Recommendation	Recommended Storage Capacity	Existing Storage Capacity	Additional Storage Needed
Historic Village	Sum of fire/emergency, operating, and equalizing storage	0.25 MG	0 MG	0.25 MG
Northeast	Average Day Demand	0.59 MG	0.5 MG	0.09 MG
Southwest	Average Day Demand	0.5 MG	N/A ¹	None

1. Storage facilities currently provided by Maple Grove.

Storage recommendations for the two proposed ultimate service areas (North and South Dayton) are based on projected ultimate water demands and are shown in Table 5-3. For the purposes of this report, it is assumed that water supply from Maple Grove to the South Dayton system will ultimately be terminated; therefore, South Dayton will not be able to rely on Maple Grove's water storage facilities in the future.



Table 5-3. Ultimate Water Storage Recommendations

Service Area	Basis of Recommendation	Recommended Storage Capacity	Existing Storage Capacity	Additional Storage Needed
North Dayton	Between 30% of Maximum Day and Average Day Demand	3.0 MG	0.5 MG	2.5 MG
South Dayton		4.0 MG	0 MG	4.0 MG

The following section discusses planning considerations for future water storage facilities to meet the ultimate storage recommendations.

5.3 Future Facilities

As shown in Table 5-2, the existing water storage facilities in the Historic Village do not meet recommendations. Additionally, Northeast Dayton is a rapidly developing area with growing water demands and is thus anticipated to soon require additional water storage.

In the immediate term, two potential water storage facilities are under consideration, to be constructed within the next 2-5 years:

- A 0.25 MG elevated water storage tank located in the Historic Village
- A 1.0 MG elevated water storage tank located in the Northeast Service Area, tentatively assumed to be located along N Diamond Lake Rd, east of Zanzibar Ln

Discussions with landowners in these areas are underway to determine land availability, site acquisition costs, and other site considerations. Upon selecting the preferred sites, geotechnical evaluations should be conducted to determine the structural suitability of soils and to begin preliminary engineering and design of the facilities.

To address longer term water storage needs, additional proposed storage sites for the Dayton water distribution system are shown on Figure A-10 and summarized in Table 5-4. A total of 7.0 MG of storage at six sites (North and South Dayton) is planned for the ultimate system, assuming Dayton develops in accordance with its Comprehensive Plan. The amount of storage required may be increased or reduced depending on population, water usage patterns, and conservation measures.



Table 5-4. Ultimate System Water Storage

Service Area	Site	Type of Storage	Capacity (MG)	High Water Level (ft)
North Dayton	Pineview	Elevated	0.5	1,060
	Historic Village	Elevated	0.25	1,060
	Northeast	Elevated	1.0	1,060
	Northwest	Elevated	1.25	1,060
	Total		3.0	
South Dayton	Wicht	Elevated	2.0	1,110
	Dubay	Elevated	2.0	1,110
	Total		4.0	

In general, there are two options for types of storage facilities – elevated storage and ground storage. The differences between each are described below.

- **Ground Storage Tanks** – These are ground supported, flat bottom tanks generally with a wall height less than or equal to the tank diameter or plan dimensions, and usually constructed of steel or concrete. They can sit on existing grades or be fully or partially buried, depending on topography, water tables, and soil conditions. They can also be installed at water treatment facilities as clearwells, to serve multiple purposes including serving as a supply of backwash or other process water in addition to providing equalizing storage for distribution. Because ground storage often sits at elevations below the hydraulic grade of the distribution system, they may require direct pumping systems to pump water out of the tank to distribution system pressures.
- **Elevated Storage Tanks** – These consist of a steel tank which holds the water and a supporting structure or tower which supports the tank above the ground elevation. There are several common styles of elevated tanks including spheroid, fluted steel column, and composite. Many tanks are constructed of welded steel; composite tanks utilize a steel tank atop a concrete support. Composite tanks require less long-term maintenance costs as the concrete does not require recoating. Elevated tanks utilize an indirect pumping system where water is pumped into the tank at system pressures. The water level “floats” on the system and during high demands water will flow by gravity out of the tank to the points of service.

In general, elevated storage has several advantages over ground storage in a water distribution system, especially when there is only one storage facility in a given service area. Some advantages of elevated storage are listed below.

- Lowers the peak pumping rates required to maintain constant, reliable water supply and pressures.
- Stabilizes pressure variations as demands fluctuate.
- Balances and levels pump operations.
- Reduces the need for a wide range of pump sizes.



Water Comprehensive Plan

5 Treated Water Storage

- Decreases power consumption costs, especially for time-of-day electricity pricing.
- Dampens extreme low- and high-pressure surges.
- Enhances emergency response during fire demands, water main breaks, or power failure.

These advantages become less pronounced with multiple storage facilities, and often a mix of storage types can provide flexibility, especially in the case of clearwell storage at a treatment facility. For South Dayton, the potential exists for locating some amount of ground storage at the South WTP site; however, elevated storage facilities are assumed for the purposes of this plan.



6 Distribution System

6.1 Existing Distribution System

The distribution system consists of trunk water mains (primarily 10 inches in diameter and larger), local water mains (primarily 8 inches and smaller), service lines, valves, hydrants, and all appurtenances to convey water from the treated supply sources (wellhouses and interconnects), water tower and hydropneumatic tank, and ultimately to the points of demand.

The modeled water distribution system contains approximately 55 miles of total water main ranging in diameter from 6 inches to 24 inches. Water mains are primarily polyvinyl chloride (PVC). Characteristics of the water distribution system pipes are illustrated in Figure 6-1 and Figure 6-2. The fully modeled distribution system, including local water mains down to 6 inches in diameter, is illustrated in Figures A-1 through A-3.

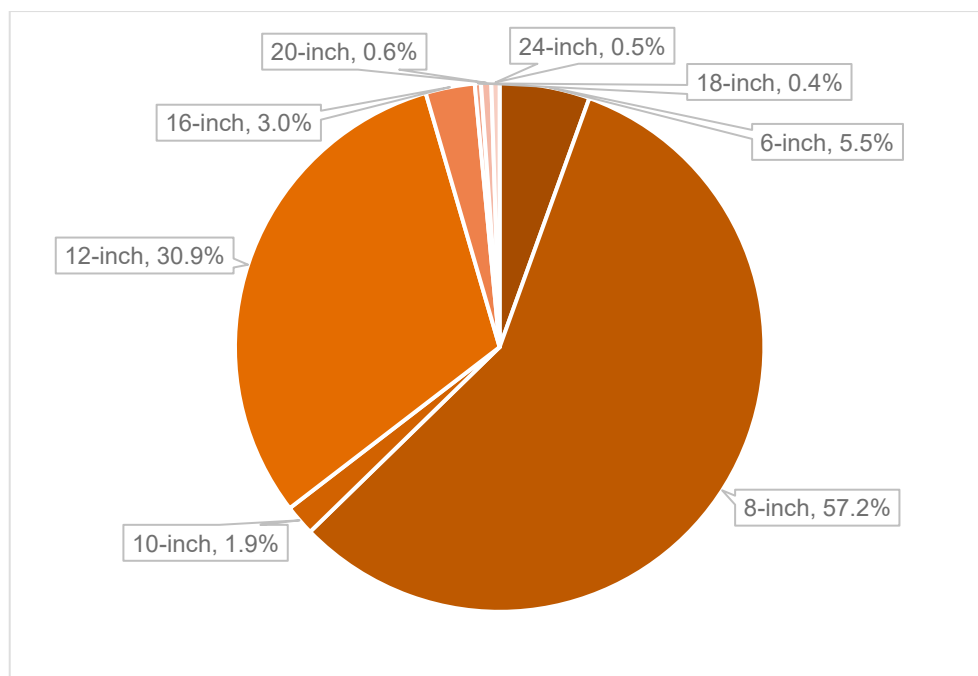


Figure 6-1. Distribution System Pipe Diameters

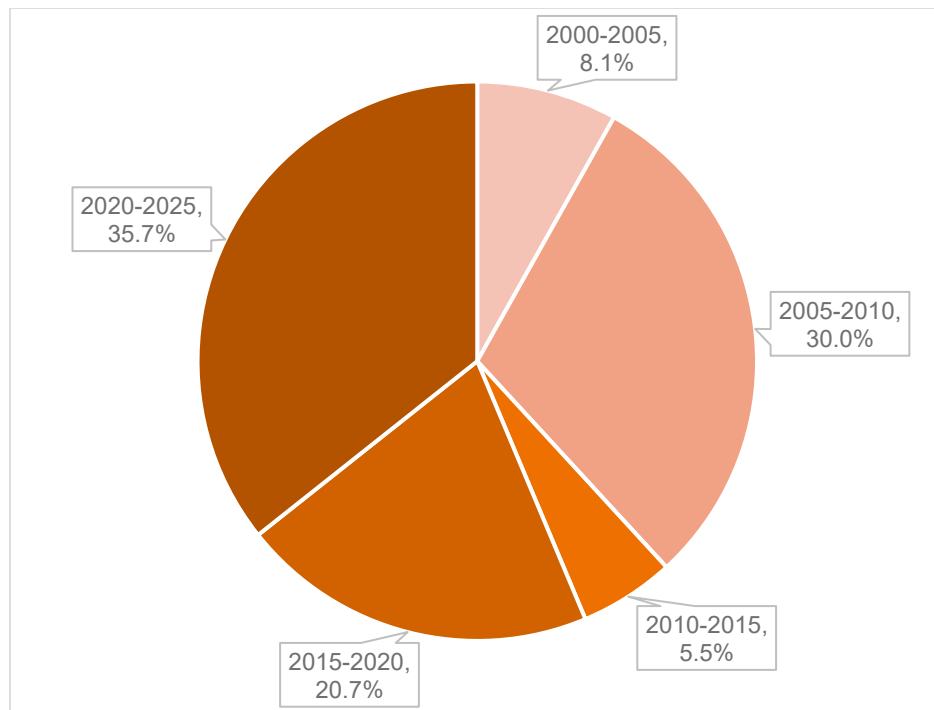


Figure 6-2. Distribution System Dates of Installation

The water distribution system is currently operated as three separate service areas. Each service area will ultimately become part of two water system pressure zones as summarized in Table 6-1.

Table 6-1. Service Areas and Pressure Zones in Dayton

Current Service Area	Future Service Area	Pressure Zone	Currently Supplied by
Historic Village	North Dayton	Low Zone	Well No. 1 and Well No. 3
Northeast	North Dayton	Low Zone	Well No. 2 and Well No. 4
Southwest	South Dayton	High Zone	City of Maple Grove and Rogers

6.2 Hydraulic Model

6.2.1 DEVELOPMENT, ASSUMPTIONS, AND VALIDATION

As part of this study, hydraulic analyses were performed using WaterCAD Connect Edition Update 3 software from Bentley Systems, Inc. The hydraulic model performs hydraulic analysis based on the Hazen-Williams energy loss formula and the Hardy Cross procedure. The Hardy Cross procedure is an iterative process in which both flows and energy losses are balanced throughout the entire system. The hydraulic model includes well supply, treatment system head losses, water mains, and elevated water storage.



Water Comprehensive Plan 6 Distribution System

The hydraulic model is used for deficiency analysis, operation reviews, emergency planning, and long-term planning. The hydraulic model was developed to represent the existing water system with existing water demands and the proposed future water system with future water demands. Hydraulic model validation was completed during this project, using previously collected field data provided by the City, to confirm that the model was adequate for the analyses performed for this study.

Water mains were reviewed and included from the most up to date mapping and record plans available. Water system facilities were reviewed and modeled to provide water supply and water storage in the hydraulic model. Actual metered water usage for the Northeast, Historic Village, and Southwest service areas was reviewed. Using billing meter addresses and water usage for each account, the actual metered water use was geolocated and accurately applied to the hydraulic model. Then, unaccounted for water (UFW) was applied uniformly across the model.

6.2.2 LEVEL OF SERVICE CRITERIA

Table 6-2 summarizes the criteria used for all modeling evaluations.

Table 6-2. Level of Service Criteria

Parameter	Value	Demand Condition
Minimum Pressure (psi)	35 / 20	PHD / MDD + FF
Maximum Pressure (psi)	80	Static
Maximum Velocity (ft/s)	5 / 12	PHD / MDD + FF
Maximum Headloss Gradient		
Pipe Diameter ≤ 8-inch	10 ft / 1,000 ft	PHD
Pipe Diameter 8 < D < 16-inch	5 ft / 1,000 ft	PHD
Pipe Diameter ≥ 16-inch	3 ft / 1,000 ft	PHD

Note: PHD = Peak hour demand; MDD = Maximum day demand; FF = Fire flow.

6.2.3 ADEQUACY OF EXISTING SYSTEM

6.2.3.1 Distribution System Service Pressure

Municipal water distribution systems are typically designed with a minimum pressure of 35 psi at all locations in the service area under normal operating conditions during peak hour demands. Minnesota Administrative Rules require minimum pressures be available to plumbing fixtures within buildings. When water distribution system pressures exceed 80 psi, the Minnesota Plumbing Code requires installation of a pressure reducing valve on the water service. Water systems are also required to be designed and operated to maintain 20 psi residual pressure throughout the water system during emergency operation (e.g. firefighting conditions).

A hydraulic analysis of the existing Dayton water supply and distribution system was conducted using the hydraulic model. The existing average day water system pressures were calculated with a total distribution system demand of 1.12 MGD applied to the model nodes, Well Nos. 2 and 3 operating, the



Water Comprehensive Plan 6 Distribution System

Northeast (Pineview) Tower water level at 5 ft below high-water elevation, and the Historic Village pressure tank set to 10 psi below the 70 psi pump shutoff setting. The modeled hydraulic grades at Maple Grove Interconnections 1 and 2, and Rogers interconnect, were 1,101 ft, 1,102 ft, and 1,100 ft, respectively.

The average day water system pressures are illustrated in Figure A-8. Water distribution system pressures on an average day range between 40 and 85 psi for nearly all customers. Modeling results identified localized areas within the Historic Village Zone, particularly near County Street and Columbus Street, where pressures fall below 50 psi. These lower pressures are attributed to higher ground elevations at specific points within the zone, which reduce the available system pressure.

Water pressures were also reviewed under peak hour water demands, using the same boundary conditions as for the maximum day scenario (described below). In the Northeast and Southwest service areas, pressures during peak hour demand were observed to be approximately 4-5 psi lower than during average day conditions, and roughly unchanged in the Historic Village. No area within the City falls below 35 psi during any demand conditions.

6.2.3.2 Distribution System Fire Flow Availability

The updated hydraulic model was used to determine the approximate available fire flow while maintaining 20 psi residual pressure within the distribution system. For the purpose of this evaluation, needed fire flows at each location were assumed based on the land use type as outlined in Chapter 2 of this report, and are illustrated in Figure A-6. It is recommended that fire flow requirements be reviewed with City staff and Fire Officials.

The available fire flow results while maintaining 20 psi residual pressure throughout the distribution system are illustrated in Figure A-9. Fire flow evaluations were conducted under existing maximum day demand conditions with a design demand of 3.14 MGD, Well Nos. 2 and 3 operating, and the Northeast (Pineview) Tower water level 8 ft below high-water level. The modeled hydraulic grades at Maple Grove Interconnections 1 and 2, and Rogers interconnect, were 1,100 ft, 1,104 ft, and 1,100 ft, respectively.

Fire flow availability within the Southwest and Northeast Service Areas ranges from approximately 850 gpm to well over 3,500 gpm. The lowest available fire flows exist at the small diameter water main dead end that serves the mobile home community southwest of French Lake. Available fire flows greater than 2,500 gpm are available on nearly every large diameter water main which make up the trunk water system.

Fire flow availability within the Historic Village is limited to 300 gpm (or less if one well is offline) primarily because of a lack of water storage. The existing hydropneumatic tank is too small to provide effective capacity for firefighting, and Well Nos. 1 and 3 are not sufficiently sized to supply firefighting demands. To improve fire flow availability in the Historic Village, the service area will need to be connected to additional water storage as discussed in Section 5.

Table 6-3 summarizes the existing fire flow availability results for each service area along with remarks and recommendations to improve fire flow in deficient areas.



Table 6-3. Fire Flow Availability Results

Service Area	Fire Flow Required (gpm)	Total Nodes	Nodes Meeting Requirements	Remarks
Historic Village	1,500	47	0	Entire service area does not meet recommendations. Existing hydropneumatic tank is too small to provide effective capacity for firefighting.
Northeast	500	3	3	All nodes meet or exceed recommendations.
	1,000	323	323	All nodes meet or exceed recommendations.
	3,500	19	8	Apartments and townhomes east of Balsam Lane N do not meet recommendations. Recommend looping existing 8-inch dead ends.
Southwest	500	3	3	All nodes meet or exceed recommendations.
	1,000	186	186	All nodes meet or exceed recommendations.
	2,500	30	19	Dead ends at townhomes south of Territorial Road fall shy of recommendations, however hydrants on main loop through development are within recommendations. 8-inch dead end near mobile home community is shy of recommendations but would be improved by completing loop to the north to connect to 12-inch at 121 st Ave N.
	3,500	81	51	Industrial areas generally southwest of French Lake are slightly below recommendations. Improvements are likely to be realized only by increasing service pressures – either with booster pumps at interconnects or by constructing the ultimate storage and WTP infrastructure.

6.2.3.3 Distribution System Headloss and Velocity

High velocity or headloss in water mains are indicators of potential capacity problems. Velocities greater than 5 feet per second (ft/s) and headlosses of 3-10 ft per 1,000 ft or greater during peak demands (acceptable headloss gradient depending on pipe diameter as indicated in Table 6-2) may contribute to low pressures and reduced fire flows. No water mains in the distribution system were identified to exceed the recommended level of service criteria for velocity or headloss gradient during peak hour demand conditions.

6.2.4 FUTURE DISTRIBUTION SYSTEM

The future distribution system trunk network sizing was performed with the concept that there will ultimately be wellhead treatment provided for every two wells in North Dayton and a centralized WTP for South Dayton, and the recommended future elevated storage facilities will be constructed. Conceptual locations for future supply, treatment, and storage infrastructure are shown on Figures A-4 and A-10. A backbone network of trunk water mains will extend in every direction from these sites. Major water mains



Water Comprehensive Plan

6 Distribution System

connect the storage tanks and will be looped throughout the system, providing reliable service, both in terms of pressure and available fire flows.

Two pressure zones are recommended because there is significant topographic relief within the City. Additionally, the system in South Dayton will operate at the same high-water level as the Maple Grove system. At some point in the future, it is assumed that Maple Grove will no longer be a full-time supplier to the South Dayton system, but there are benefits to matching the Maple Grove high-water level, such as maintaining consistent service pressures under emergency or temporary interconnect situations.

In general, it is desirable to provide a static pressure range of between 50 psi and 80 psi. Homes with a static pressure of greater than 80 psi should be required to install individual pressure reducing valves. Homes with a static water pressure less than 50 psi may desire in-home booster stations. Without a booster pump, a minimum static pressure of 40 psi is necessary for the operation of automatic sprinkler systems. As discussed previously, municipal water distribution systems are typically designed with a minimum pressure of 35 psi under peak hour demands, and under emergency (firefighting) conditions, pressures must be maintained above 20 psi.

The desired static service pressures determine the design high-water level for storage based on the predominant ground elevations. The high-water levels for the two service areas are as follows:

High Zone (South Dayton): 1,110 ft Mean Sea Level (MSL)

Low Zone (North Dayton): 1,060 ft MSL

Pressure reducing valves (PRVs) are proposed between the pressure zones for redundancy and to provide supplementary fire flows to the lower zone. All PRVs should be set so they do not open under normal pressure fluctuations.

Hydraulic analysis of the future ultimate supply and distribution system, illustrated on Figure A-4, was conducted using the hydraulic model. Steady state computations were conducted under average day, maximum day, and peak hour demand conditions. Future trunk water main diameters and locations were iteratively adjusted until the following parameters were satisfied:

1. Tank Operation: Attempts were made, as best as possible, to equalize filling and emptying rates of water towers within each pressure zone. Tank operations are also impacted by the relative locations between supply and storage, as well as proximity to points of demand.
2. High Pressure Nodes: High pressure nodes during low demand (tank-filling) periods were evaluated. The lowest-lying northeast areas of South Dayton exceeded 80 psi during low demand (tank-filling) periods; however, no nodes in the system exceeded 100 psi static pressure.
3. Low Pressure Nodes: Low pressure nodes during high demand periods were evaluated. No nodes in the system fell below 35 psi during any demand conditions.
4. High Velocities/Head Losses: Pipes were evaluated to ensure that no velocities exceeded 5 fps or head losses exceeded 10 ft per 1,000 ft under normal demand conditions.



Water Comprehensive Plan
6 Distribution System

5. Available Fire Flows: All nodes along future trunk water mains were evaluated under maximum day demand conditions to provide a minimum available fire flow of 3,500 gpm, while maintaining a minimum residual pressure of 20 psi.



7 Capital Improvement Plan

The installation of Dayton's trunk water system has proceeded steadily during past years, and a significant portion of the City is presently served with water. It is anticipated that growth of the water system will continue at a steady rate. A Capital Improvement Plan (CIP) consisting of additional water system infrastructure required to meet existing and future water demands and growth is presented in this section and included in Appendix B.

7.1 Water System Phasing

The projected population served by the Dayton water system by 2050 is 21,211. Based on the projected growth in population and water demands, additional needed supply, treatment, and storage facilities for the next 25 years are presented in Table 7-1.

These additions will keep pace with the increasing needs of the community and at the same time maintain a desirable balance between storage and supply for economy and reliability. If growth rates deviate significantly from the City's forecasts, if a major water consumer is added to the system, or if conservation measures produce an outcome different than anticipated, the phasing schedule should be revised in accordance with the latest available data.

Another factor in the phasing of water supply, treatment, and storage treatment facilities in South Dayton is whether, and within what timeframe, water service from Maple Grove is terminated. For the purposes of this plan, it is assumed that South Dayton will be independent from the Maple Grove water system by the year that the current agreement expires in 2036. The CIP plans for construction of supply and treatment facilities in South Dayton before this date to allow ample time to plan, design, and construction the facilities prior to expiration of the agreement.



Table 7-1. Summary of Capital Improvement Projects for Water System Through 2050

Description	Service Area	Improvement Type	Project Need or Trigger
Water Main Connection/Loop from Brayburn Trails West to East French Lake Rd	South	Distribution	Create trunk watermain loop to new developments and serve growing demand. Improve system redundancy and reliability.
Wellhead Treatment at Well No. 1 (also treating Well No. 3)	Historic Village	Treatment	Improve water quality for Historic Village Service Area by removing iron and manganese.
Historic Village/Northwest Water Tower (0.25 MG)	Historic Village	Storage	Provide storage for fire protection in Historic Village Service Area.
Northeast Dayton Water Tower (1.0 MG)	Northeast	Storage	Additional storage needed for Northeast Service Area based on current and projected demands.
117th Ave Watermain Connection/Loop (Dayton Parkway to Brayburn Trails)	South	Distribution	Create trunk watermain loop to new developments and serve growing demand. Improve system redundancy and reliability.
I-94 Crossing (Water Loop to Territorial Road)	South	Distribution	Create trunk watermain loop to new developments and serve growing demand. Improve system redundancy and reliability.
South Dayton Water Tower (Wicht) (2.0 MG)	South	Storage	Timing dependent on growth of water system in South Dayton, and provisions for adequate fire flow as system develops away from Maple Grove supply connections.
Northeast Well (Well No. 6)	Northeast	Supply	Timing dependent on growth of maximum day water demand approaching existing well firm capacity (2.3 MGD).
Wellhead Treatment at Well Nos. 2 and 6 (Including Raw Watermain)	Northeast	Treatment	Improve water quality for Northeast Service Area by removing iron and manganese. Would occur concurrent with drilling of Well No. 6.
South Dayton Water Treatment Plant (3.9 MGD, expandable to 11.6 MGD, Including Raw Watermain)	South	Treatment	Size and timing TBD by water demand growth in South Dayton, and potential disconnection from Maple Grove.
South Dayton Wells	South	Supply	Number and timing TBD by water demand growth in South Dayton, and potential disconnection from Maple Grove.

7.2 Cost Estimates

One of the basic objectives of this report was to determine the cost of capital improvements to Dayton's water supply and distribution system through the year 2050.

Cost estimates for completing the proposed future improvements are presented in Appendix B. The table includes a description of the treatment, storage, supply, and distribution facilities that will be added, the anticipated timeframe or trigger, and the total expenditure for the time period. Contingency, administration, legal, and engineering costs are included in the total cost opinions; however, land acquisition costs and roadway reconstruction are not included.



The cost estimates presented in Appendix B are based on current construction costs and can be related to the value of the ENR (Engineering News Record) Index for Construction Costs of approximately 14,118 (December 2025). Future changes in this index are expected to reflect cost changes in the proposed facilities. During interim periods, between full evaluation of projected costs, capital recovery procedures can be related to this index.

7.3 Water System Charges

It is common practice in the Metro Area to establish a policy of paying for capital improvements with a combination of area and/or connection charges. Implementing an area charge allows the City to assess property to be developed and developing property a portion of the trunk facility costs, allowing the City to construct and pay for infrastructure improvements before the demand is actually experienced. The remainder of the cost is then assessed as connection charges, to be collected when the units actually connect to the system. The “area charge” is based on gross benefited area, and can be assessed at the time of developer plat approval. Connection charges can be assessed at the time of hook-up and can be used to finance the remaining capital cost, as well as the meter cost. These charges should be reviewed and adjusted annually, applying the ENR construction cost index or another recognized cost index.

7.4 Lateral Benefit/Trunk Oversize

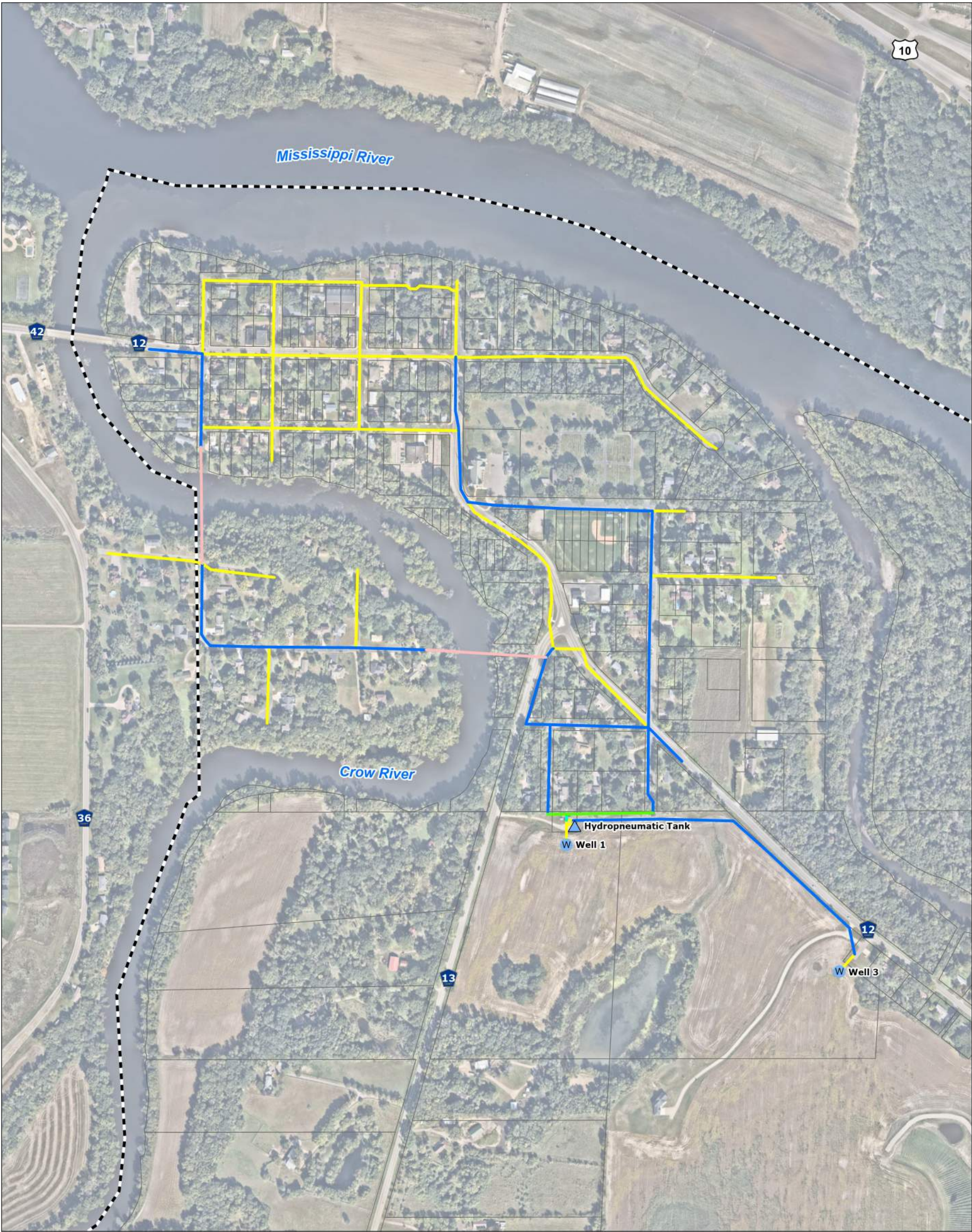
Lateral benefit is the portion of the cost of a trunk water main that would normally be paid for by the developer. It is proposed that any development in Dayton should pay for an 8-inch water main to serve low and medium density residential development, and a 12-inch main to serve commercial, industrial, and high density residential development. If any of these mains are designated for oversizing by the Ultimate Trunk Water System Map (Figure A-4), incremental costs may be credited against appropriate area charges.

For watermain that is not installed by a developer, it is assumed that the adjacent/benefited properties be assessed for lateral size (8-inch for residential; 12-inch for commercial/industrial) based on a front foot rate. The City's responsibility would then be the project cost minus the assessment.



FIGURES





Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Hennepin County
3. Background: Nearmap 2024 Imagery

- Legend**
- City Boundary
 - Parcels
 - Water System Facility**
 - Supply Well
 - Pressure Tank
 - Water Main Diameter**
 - 6 Inch
 - 8 Inch
 - 8.7 Inch (HDPE)
 - 10 Inch
 - 12 Inch

0 200 500 Feet
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Project Location
Dayton, Hennepin Co., MN

Prepared by BS on 2025-12-19

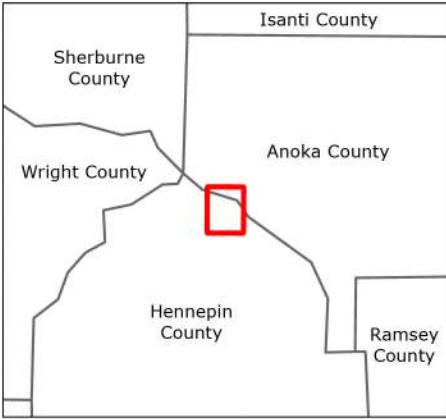
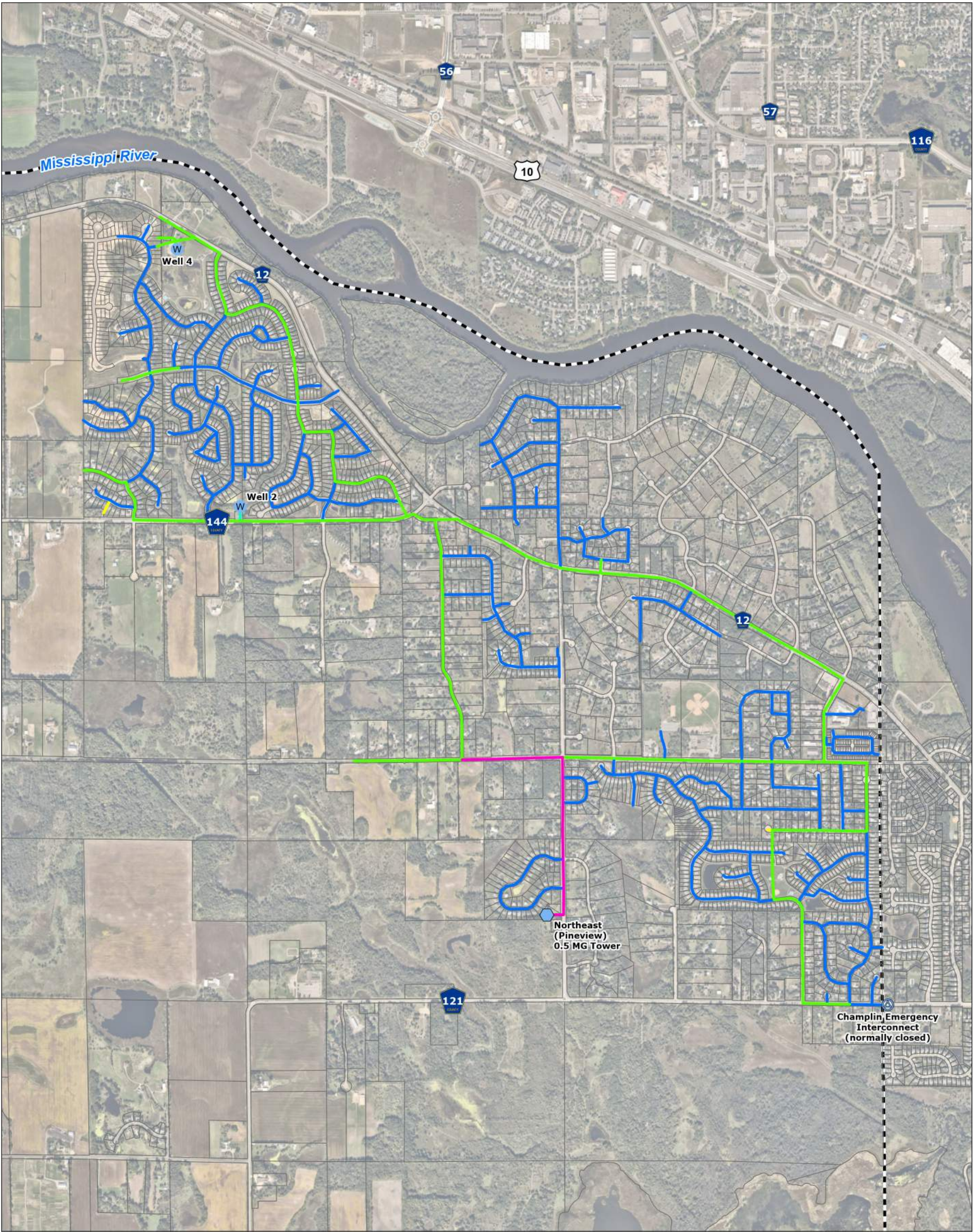
Client/Project
City of Dayton
Water Comprehensive Plan

193806077

Figure No.

A-1

**Existing Water Distribution System-
Historic Village**



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Hennepin County
3. Background: Nearmap 2024 Imagery

- Legend**
- City Boundary
 - Parcels
 - Water System Facility**
 - Supply Well
 - Interconnect
 - Tower
 - Water Main Diameter**
 - 6 Inch
 - 8 Inch
 - 10 Inch
 - 12 Inch
 - 16 Inch

0 800 2,000 Feet
(At original document size of 11x17)
1:20,000



Project Location
Dayton, Hennepin Co., MN

Prepared by BS on 2025-12-19

Client/Project
City of Dayton
Water Comprehensive Plan

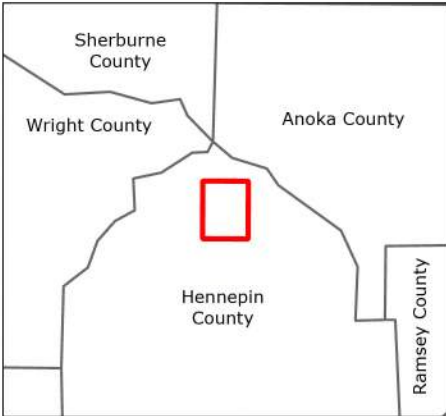
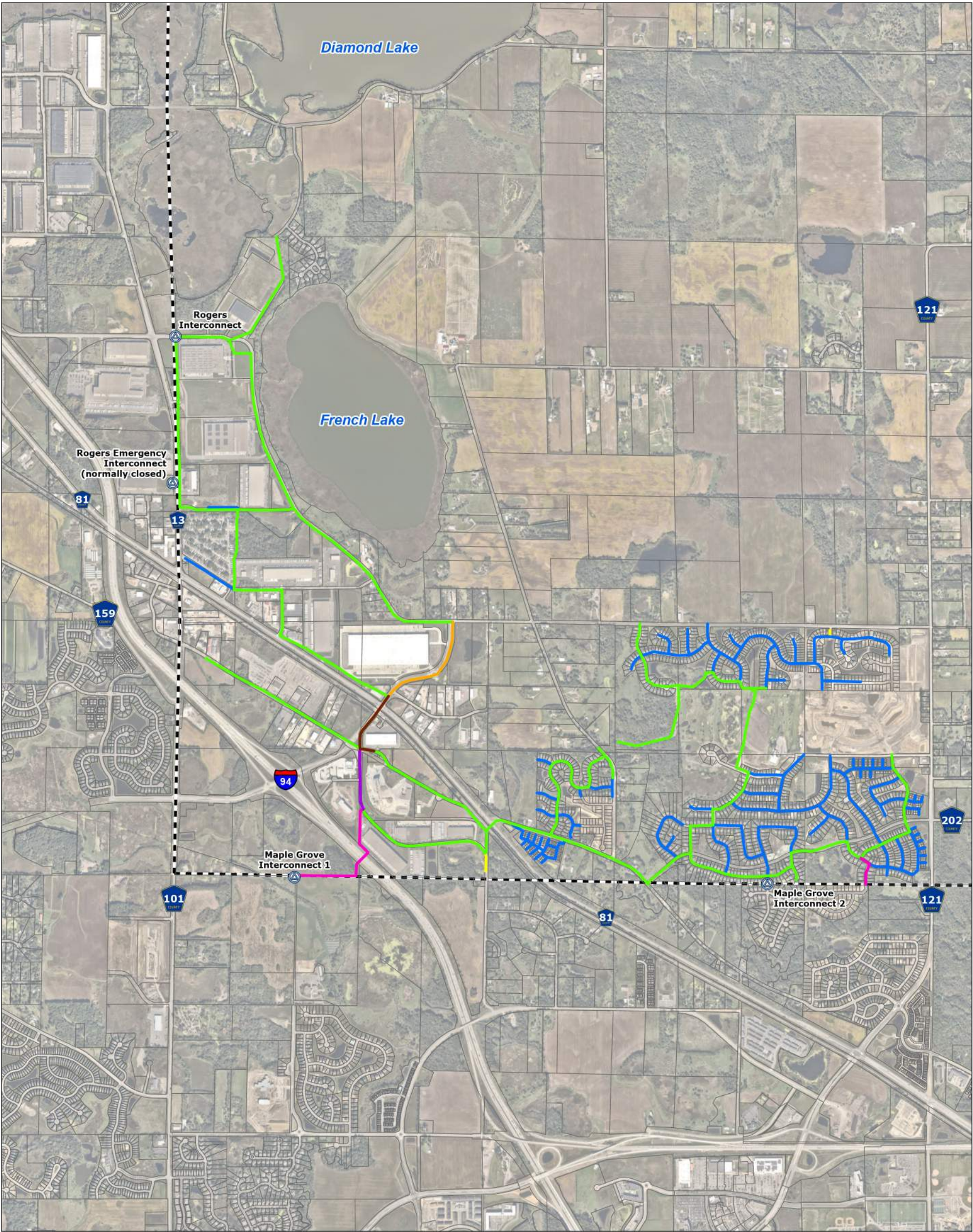
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Figure No.

A-2

Title

**Existing Water Distribution System-
Northeast Dayton**



Notes
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2. Data Sources: Hennepin County
3. Background: Nearmap 2024 Imagery

- Legend**
- City Boundary
 - Parcels
 - Water System Facility**
 - Interconnect
 - Water Main Diameter**
 - 6 Inch
 - 8 Inch
 - 12 Inch
 - 16 Inch
 - 18 Inch
 - 20 Inch
 - 24 Inch

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Project Location
Dayton, Hennepin Co., MN

Prepared by BS on 2025-12-19

Client/Project
City of Dayton
Water Comprehensive Plan

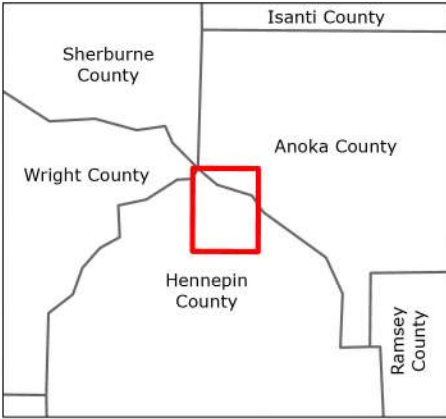
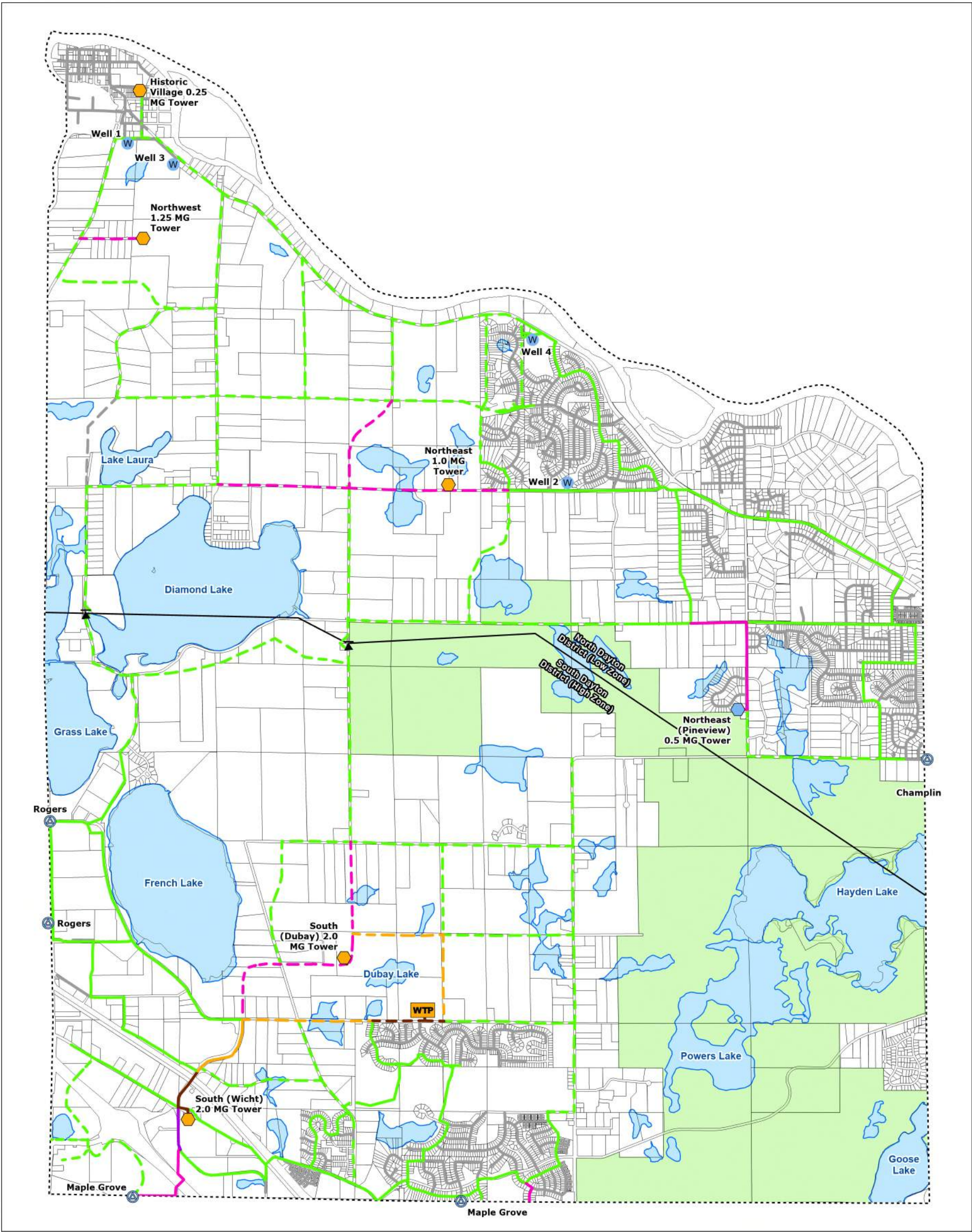
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Figure No.

A-3

Title

**Existing Water Distribution System-
Southwest Dayton**



- Legend**
- City Boundary
 - Pressure Zone
 - DNR Public Water Basin
 - Elm Creek Regional Park
 - Existing Water System Facility**
 - Supply Well
 - Interconnect
 - Tower
 - Existing Water Main Diameter**
 - <10 Inch
 - 10 Inch
 - 12 Inch
 - 16 Inch
 - 18 Inch
 - 20 Inch
 - 24 Inch

- Future Water System Facility**
- Future PRVs
 - Future Tanks
 - Future Water Treatment Plant
 - Future Water Main Diameter**
 - <10 Inch
 - 12 Inch
 - 16 Inch
 - 18 Inch
 - 20 Inch
 - 24 Inch

0 2,000 3,000 Feet
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Project Location
Dayton, Hennepin Co., MN

Prepared by BS on 2025-12-19

Client/Project
City of Dayton
Water Comprehensive Plan

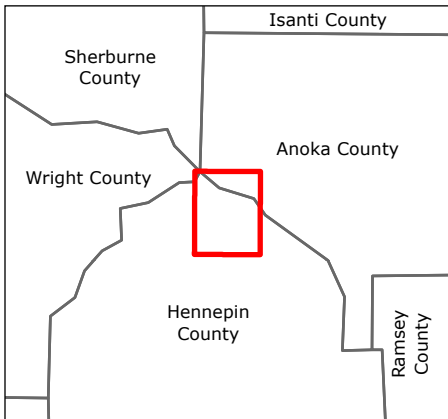
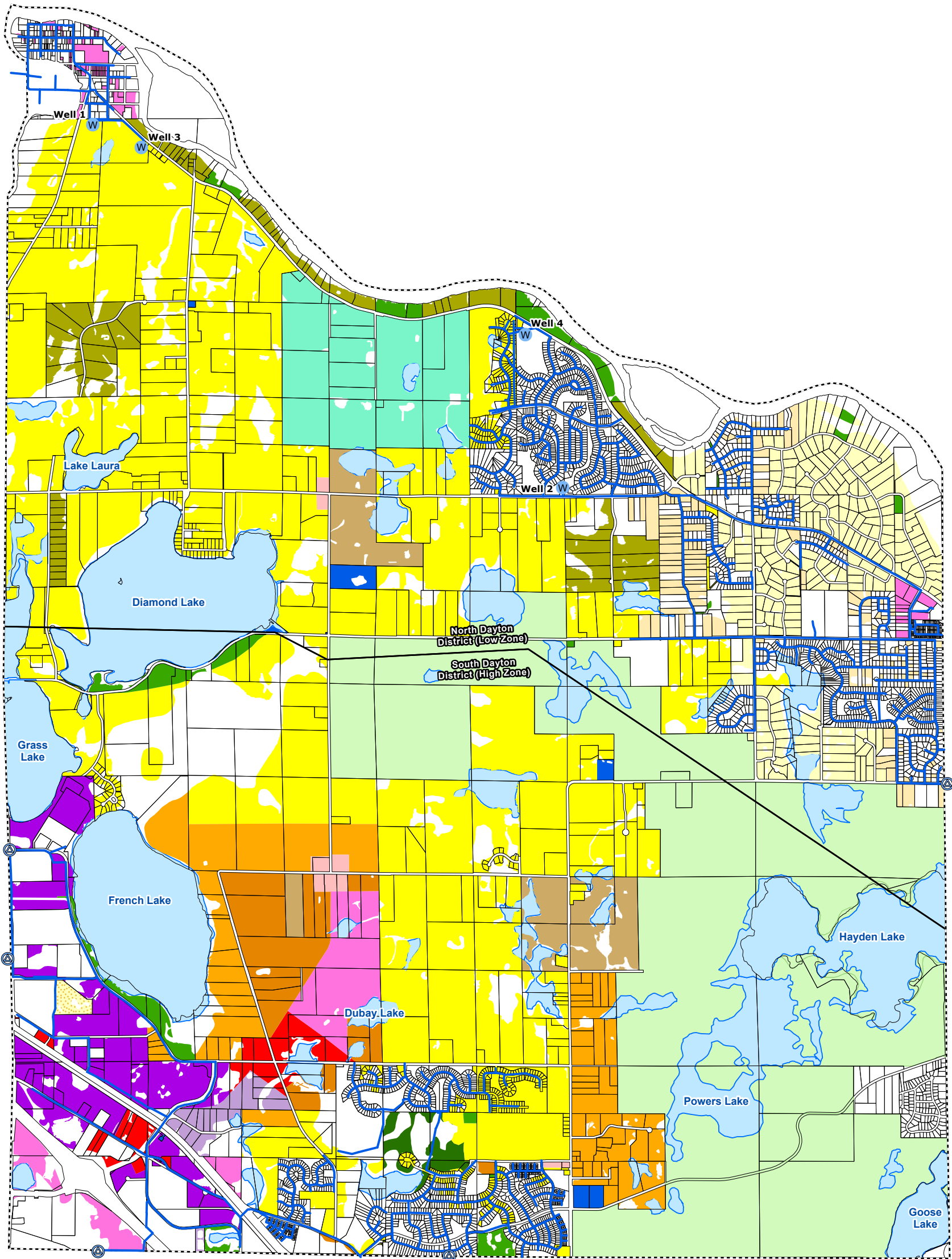
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Figure No.

A-4

Ultimate Trunk Water Distribution System

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- Legend
- City Boundary
 - Pressure Zone
 - DNR Public Water Basin
 - Elm Creek Regional Park
 - Water System Facility**
 - Supply Well
 - Interconnect
 - Tower
 - Water Main
 - Land Use**
 - Agricultural Preserve
 - Business Park
 - Commercial
 - Existing Mobile Home Park

- Existing Sewered Low Density Residential
- Existing Unsewered Low Density Residential
- Golf Course
- High Density Residential
- Industrial
- Low Density Residential
- Master Planned Development
- Medium Density Residential
- Mixed Use
- Neighborhood Commercial
- Park & Open Space
- Public/Institutional
- Rural Estate

0 2,000 3,000 Feet
(At original document size of 11x17)
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Project Location
Dayton, Hennepin Co., MN

Prepared by BS on 2025-08-05

Client/Project
City of Dayton
Water Comprehensive Plan

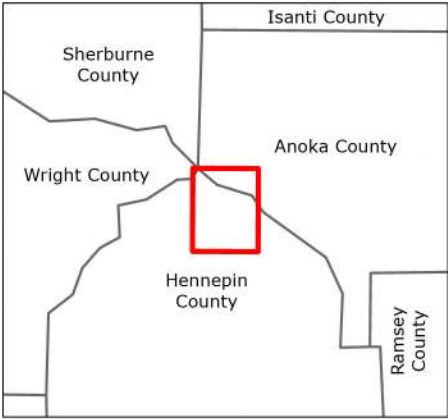
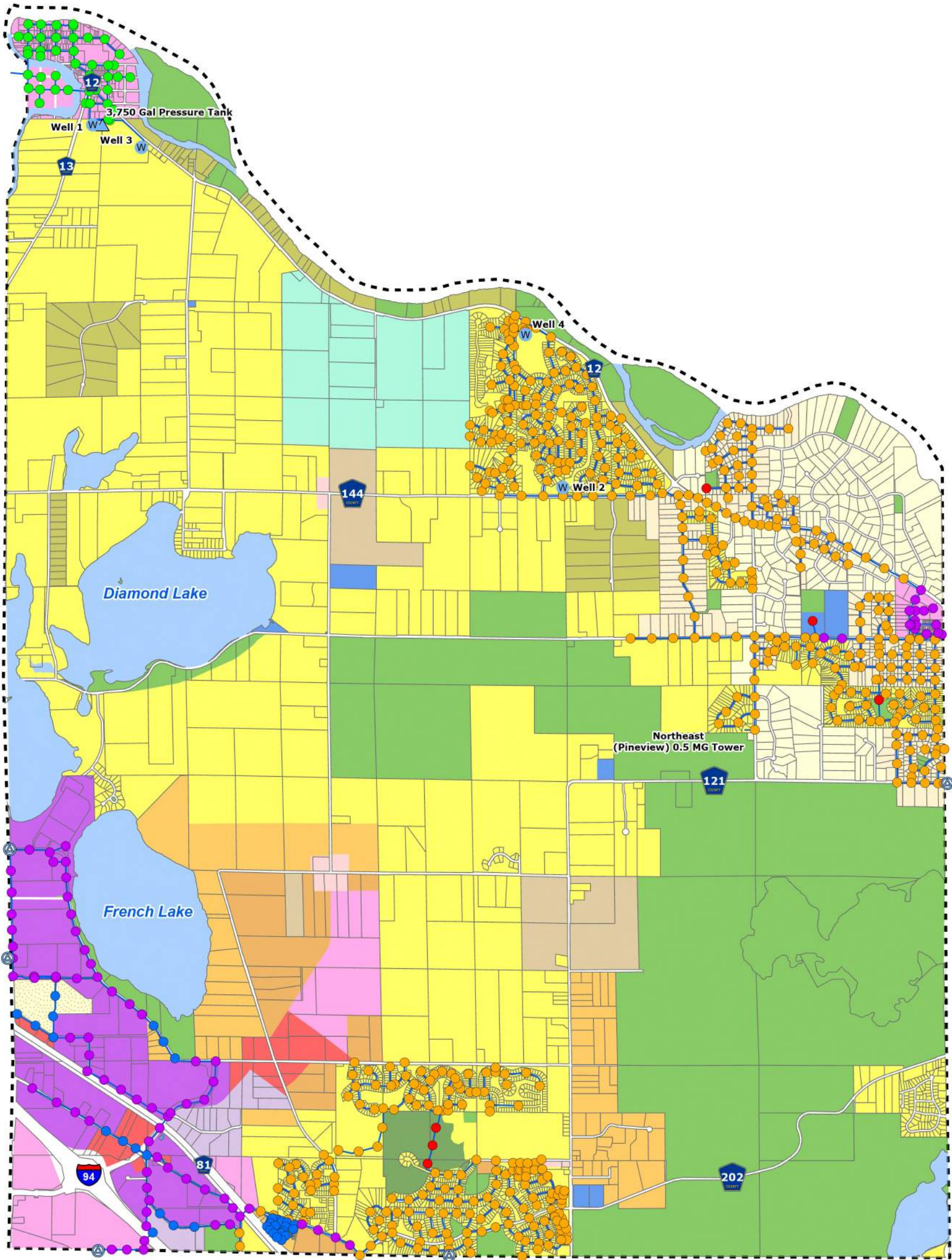
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Figure No.

A-5

Title

Future Growth Areas by Future Land Use



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Hennepin County

Legend

- City Boundary
- Parcels
- Water System Facility**
 - Supply Well
 - Interconnect
 - Storage Tank
 - Water Main

Recommended Fire Flow

- 500 GPM
- 1,000 GPM
- 1,500 GPM
- 2,500 GPM
- 3,500 GPM

2040 Land Use

- Agricultural Preserve
- Business Park
- Commercial
- Existing Mobile Home Park
- Existing Sewered Low Density Residential
- Existing Unsewered Low Density Residential
- Golf Course
- High Density Residential
- Industrial
- Low Density Residential
- Master Planned Development
- Medium Density Residential
- Mixed Use
- Neighborhood Commercial
- Open Water
- Park & Open Space
- Public/Institutional
- Rural Estate

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(At original document size of 11x17)
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Project Location
Dayton, Hennepin Co., MN

Prepared by BS on 2025-11-20

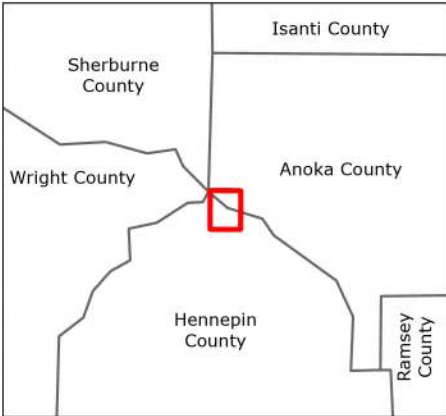
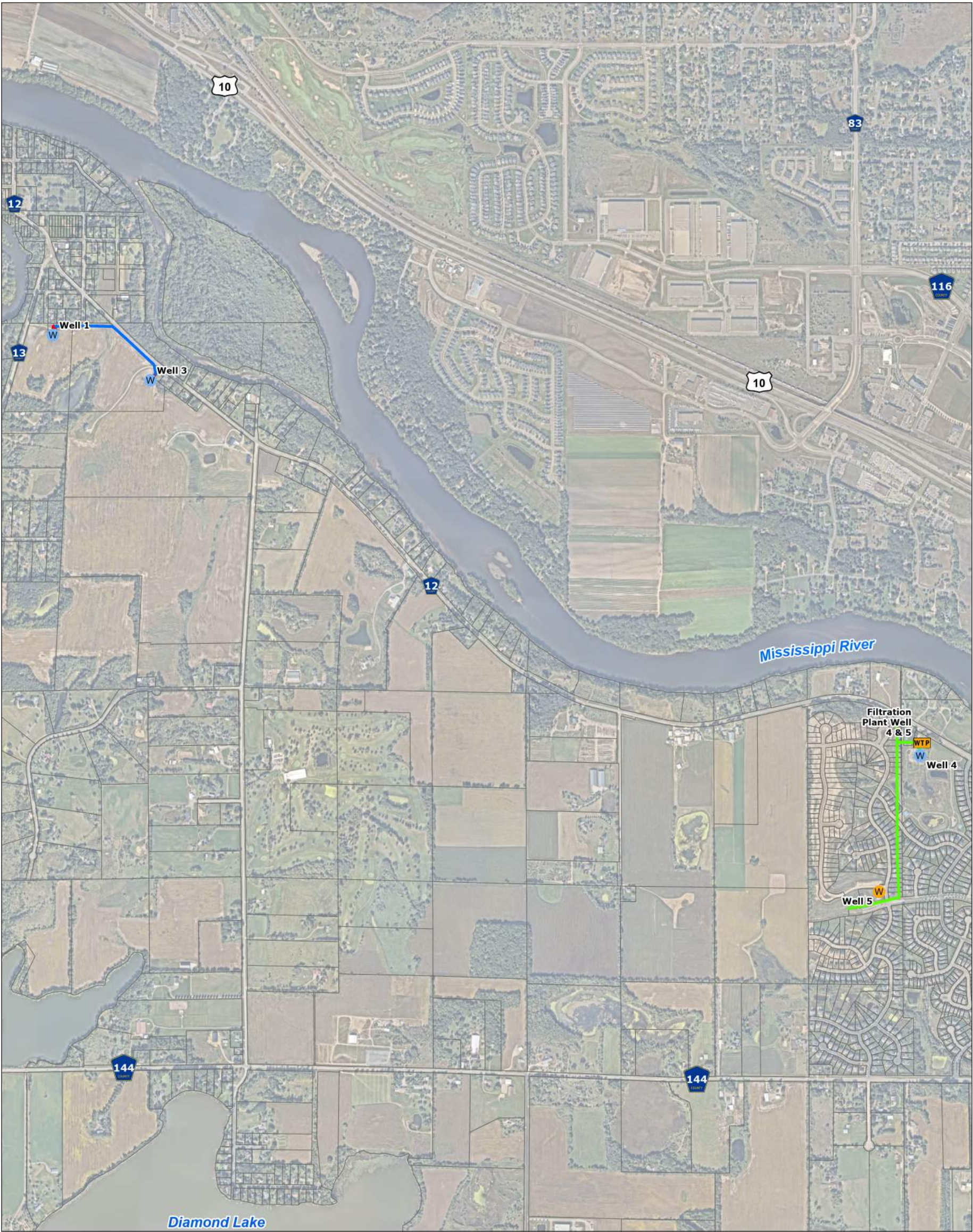
Client/Project
City of Dayton
Water Comprehensive Plan

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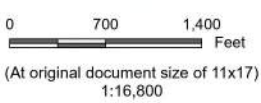
A-6

Recommended Fire Flow by Future Land Use



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Hennepin County
3. Background: Nearmap 2024 Imagery
4. Well 5 and WTP are under construction

- Legend**
- City Boundary
 - Parcels
 - Existing Facility**
 - Supply Well
 - WTP
 - Facility Under Construction**
 - Supply Well
 - WTP
 - Raw Water Pipe**
 - 6
 - 8
 - 10
 - 12



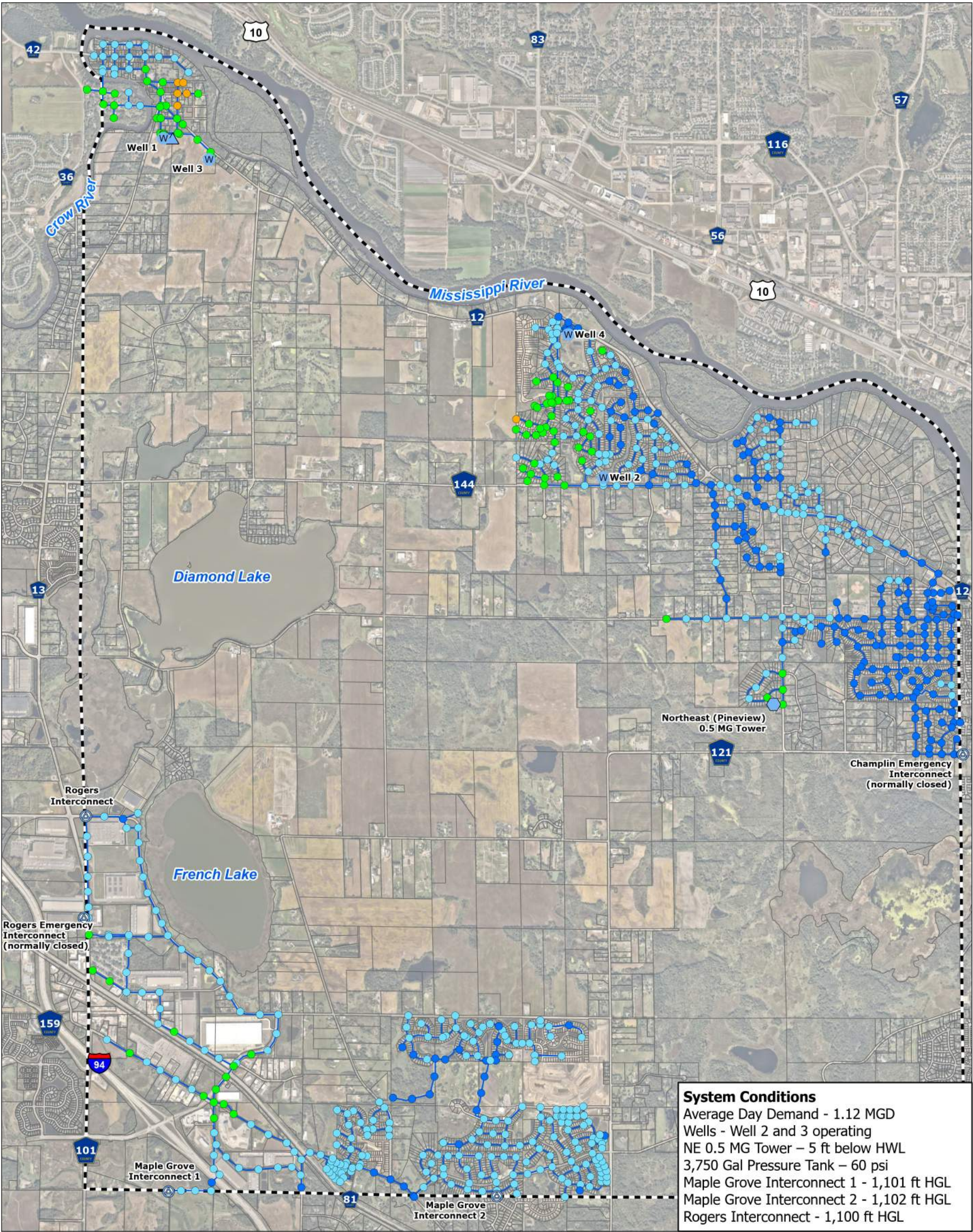
Project Location
Dayton, Hennepin Co., MN

Prepared by BS on 2025-11-20

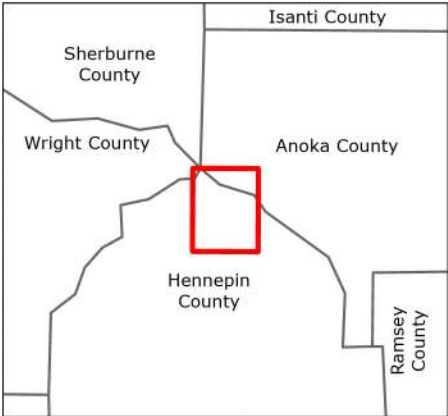
Client/Project
City of Dayton
Water Comprehensive Plan

193806077

Figure No.
A-7
Title
Existing Wells and Raw Water Piping

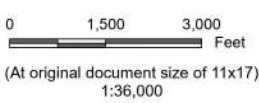


System Conditions
Average Day Demand - 1.12 MGD
Wells - Well 2 and 3 operating
NE 0.5 MG Tower – 5 ft below HWL
3,750 Gal Pressure Tank – 60 psi
Maple Grove Interconnect 1 - 1,101 ft HGL
Maple Grove Interconnect 2 - 1,102 ft HGL
Rogers Interconnect - 1,100 ft HGL



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Hennepin County
3. Background: Nearmap 2025 Imagery

- Legend**
- City Boundary
 - Parcels
 - Water System Facility**
 - Supply Well
 - Interconnect
 - Pressure Tank
 - Tower
 - Water Main
 - Pressure**
 - < 35 PSI
 - 35-50 PSI
 - 50-65 PSI
 - 65-80 PSI
 - 80-95 PSI
 - > 95 PSI



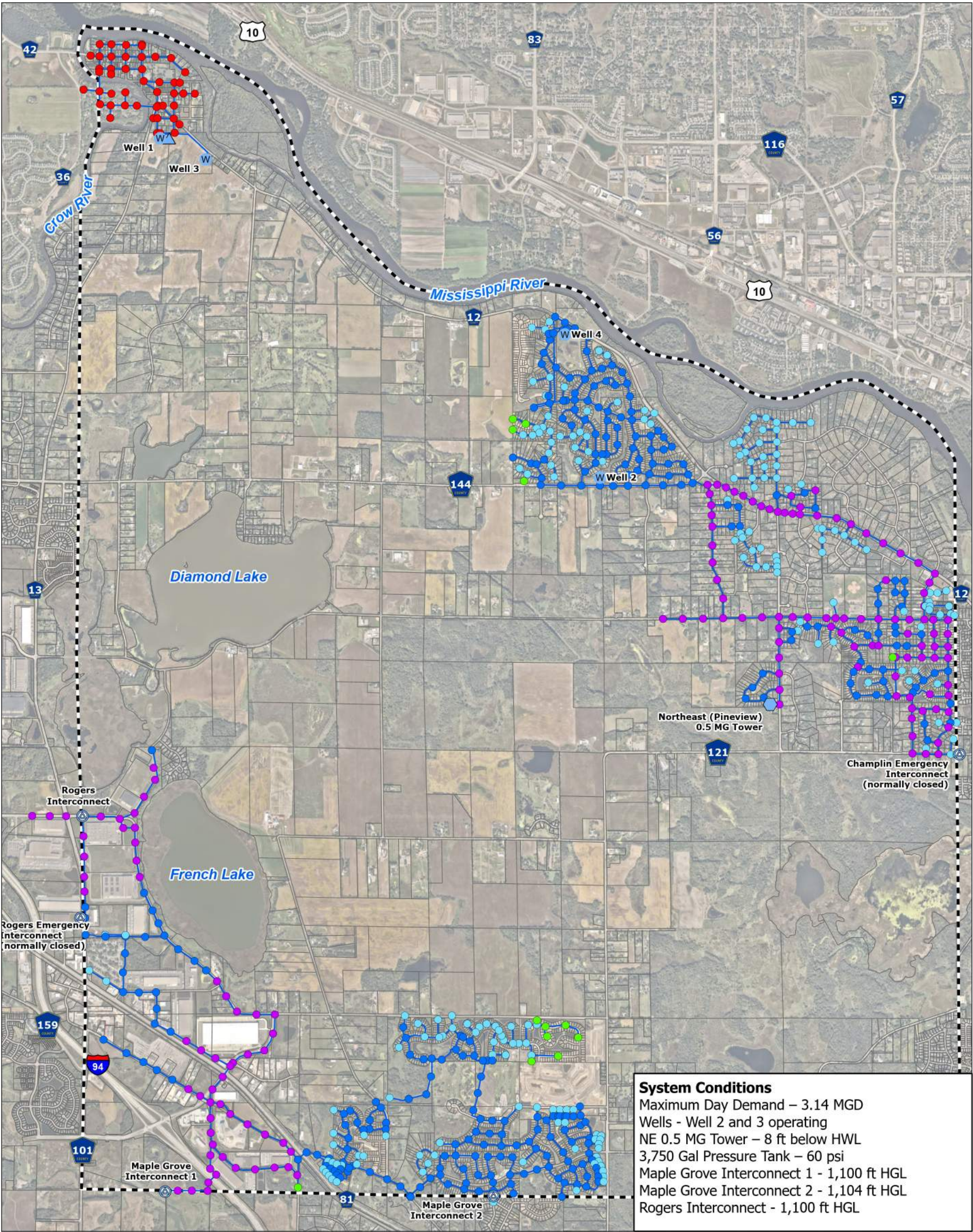
Project Location
Dayton, Hennepin Co., MN

Prepared by BS on 2025-11-20

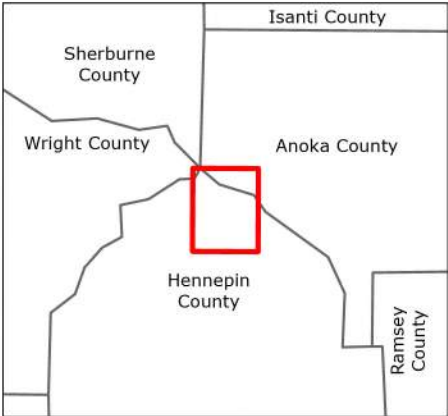
Client/Project
City of Dayton
Water Comprehensive Plan

193806077

Figure No.
A-8
Title
Existing Average Day Pressure

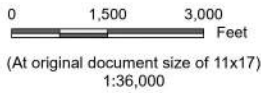


System Conditions
Maximum Day Demand – 3.14 MGD
Wells - Well 2 and 3 operating
NE 0.5 MG Tower – 8 ft below HWL
3,750 Gal Pressure Tank – 60 psi
Maple Grove Interconnect 1 - 1,100 ft HGL
Maple Grove Interconnect 2 - 1,104 ft HGL
Rogers Interconnect - 1,100 ft HGL



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Hennepin County
3. Background: Nearmap 2024 Imagery
4. Available fire flow for the historic village (combined flow rates of Well 1 and 3) are 300 gpm

- Legend**
- City Boundary
 - Parcels
 - Water System Facility**
 - Supply Well
 - Interconnect
 - Pressure Tank
 - Tower
 - Water Main
 - Available Fire Flow**
 - <500 GPM
 - 500 - 1,000 GPM
 - 1,000 - 1,500 GPM
 - 1,500 - 2,500 GPM
 - 2,500 - 3,500 GPM
 - >3,500 GPM



Project Location
Dayton, Hennepin Co., MN

Prepared by BS on 2025-12-19

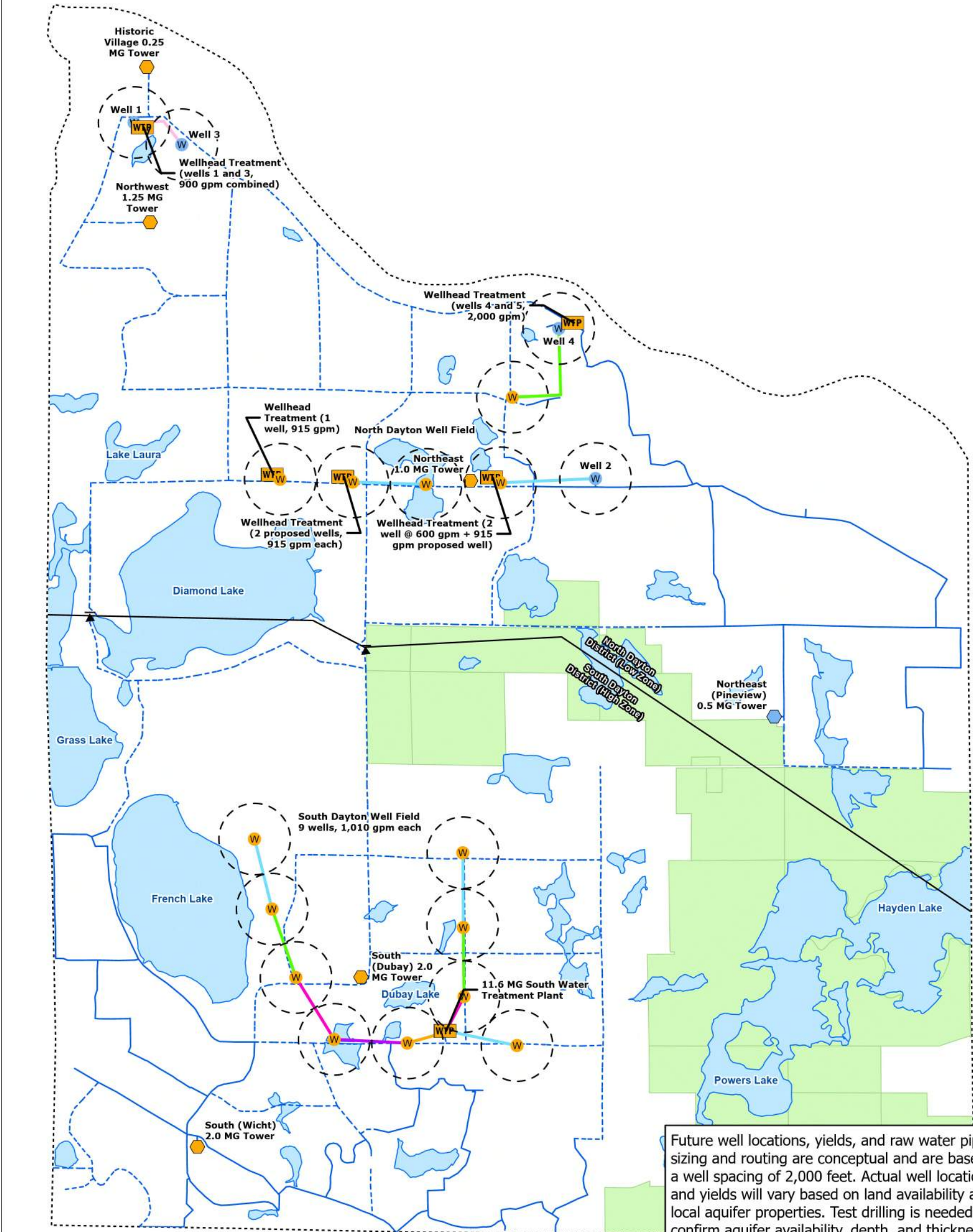
Client/Project
City of Dayton
Water Comprehensive Plan

193806077

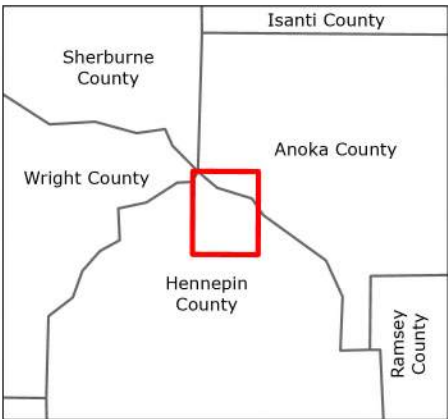
Figure No.

A-9

Existing Maximum Day Fire Flow Availability



Future well locations, yields, and raw water pipe sizing and routing are conceptual and are based on a well spacing of 2,000 feet. Actual well locations and yields will vary based on land availability and local aquifer properties. Test drilling is needed to confirm aquifer availability, depth, and thickness at each location.



- Legend**
- City Boundary
 - Pressure Zone
 - DNR Public Water Basin
 - Elm Creek Regional Park
 - 2,000 ft Buffer from Future Wells
 - Existing Water System Facility**
 - Supply Well
 - Tower
 - Distribution Water Main**
 - Existing Trunk Water Main
 - Future Trunk Water Main

- Future Water System Facility**
- Future PRVs
 - Future Tanks
 - Future Supply Well
 - Future Water Treatment Plant
- Future Raw Water Diameter**
- 8 Inch
 - 10 Inch
 - 12 Inch
 - 16 Inch
 - 18 Inch
 - 20 Inch

0 2,000 3,000 Feet
(At original document size of 11x17)
1:36,000



Project Location
Dayton, Hennepin Co., MN

Prepared by BS on 2025-11-20

Client/Project
City of Dayton
Water Comprehensive Plan

193806077

Figure No.

A-10

Ultimate Concept Well Locations and Raw Water Piping

APPENDICES



Appendix A Water Service Agreements



**CONTRACT FOR WATER SERVICE BETWEEN
THE CITY OF MAPLE GROVE MINNESOTA AND THE CITY OF DAYTON MINNESOTA**

This contract made and entered in this 8th day of August 2006 by and between the City of Maple Grove, a Municipal Corporation located in Hennepin County, Minnesota hereafter called "Maple Grove" and the City of Dayton, a Municipal Corporation located in Hennepin County, Minnesota hereafter called "Dayton".

Witness:

That the said parties, in consideration of the mutual covenants and agreements herein after set forth, have agreed to and with each other as follows:

1. Term of Contract

This contract shall be for the term of thirty (30) years from the date of execution hereof unless terminated earlier as hereinafter provided. The contract may be cancelled pursuant to notice provided in Section 10 or may be cancelled by either party if laws are enacted by the State of Minnesota or the United States of America which substantially and adversely affect rights, duties, or obligations of either party under this contract. In the event the City of Dayton wants to terminate this contract, the contract shall be terminated provided Dayton reimburses costs incurred by Maple Grove to serve Dayton. It is expressly understood that this contract may be extended by the written consent of both parties.

2. Water Service

- A. Maple Grove agrees to furnish and deliver water from the Maple Grove water works system to the southwest portion of Dayton as shown on Exhibit "A" in sufficient quantity to meet an average day demand not to exceed 2.8 Million Gallons per Day (MGD) and a maximum day demand of 5.0 MGD.
- B. Maple Grove will furnish water to the City of Dayton at mutually agreed Connection Points (hereinafter Connection Points) at a minimum pressure as determined by elevation 1066 National Geodetic Vertical Datum of 1929.
- C. The water furnished by Maple Grove shall be the same treated water supplied by Maple Grove to Maple Grove residents.
- D. Dayton agrees that the use of water from the supply furnished by Maple Grove shall be at all times be governed by the applicable rules, regulations and conditions Maple Grove has now in effect or hereafter adopts for the preservation, regulation and protection of its water supply, and Dayton agrees to adopt the rules, regulations or requirements of Maple Grove now or hereafter adopted in connection with use of water in Maple Grove and to enact and enforce such rules, regulations and requirements as Dayton ordinances within one hundred and eighty (180) days after the execution of this contract and to enact any amendments to the regulations hereafter adopted by the City of Maple Grove within sixty (60) days after being notified of such adoption and to adopt the same penalties as those of Maple Grove for the violation thereof and to strictly enforce such rules, regulations and requirements. This section shall be, however, limited to water usage and related matter and does not give Maple Grove the right to prescribe rules for administration and billing for the Dayton water system.

3. Water System Facilities

- A. Maple Grove shall own and operate all facilities necessary to the supply, production, storage and transmission of water to the Connection Points, [but not including the master meter or master meters and backflow devices.]
- B. Dayton shall own and operate all facilities necessary for the metering, transmission, and distribution of water from the Connection Points to the points of delivery of water in Dayton. All such facilities shall conform to the Minnesota State Health Department requirements. Dayton shall maintain at no expense to Maple Grove its entire Dayton water system from point or points of delivery.
- C. Dayton shall keep accurate records of watermain construction and number of connections by category and such records shall be subject to inspection and auditing by Maple Grove.
- D. The Connection Points on Maple Grove's facilities shall be made by Maple Grove, but all expense shall be paid by Dayton within thirty (30) days of billing by Maple Grove. The water consumed by Dayton shall be measured by a master meter or meters furnished and maintained by Dayton at its own cost and expense at such reasonable locations to be designated by Maple Grove. Such meters shall be of a make and setting, and shall be installed and housed in a manner approved by Maple Grove. Such meters shall be subject to testing by Maple Grove at any reasonable time.
- E. Backflow prevention devices shall be installed at the Connection Points to assure no backflow or flow through of water through the Dayton system into the Maple Grove system. Dayton shall install and maintain at no expense to Maple Grove said backflow devices.

4. Connection Charge

The City of Dayton shall pay a connection charge based on the current charge then in effect at time of payment to Maple Grove properties for each connection made to the system served with water from Maple Grove based on the following residential connection charges for various types of property

<u>Land Use Type</u>	<u>Residential Equivalent Unit</u>	<u>2006 Rate</u>
Low Density	1.0/unit	\$1,700/unit
Medium and High Density with laundry facilities in each unit.		
Medium and High Density without Plumbing included for laundry facilities in each unit	.8/unit	\$1,360/unit
Commercial	4.0/acre	\$6,800/ac
Industrial	4.0/acre	\$6,800/ac
Mixed	4.0/acre	\$6,800/ac
Parks	0.5acre	\$850/ac
Institutional	4.0/acre	\$6,800/ac

connect to Maple Grove's water supply is shown in the following table:

	<u>Number of Acres</u>	<u>Number of R.E.U.'s</u>
Residential (Low, Medium, High)	2800	8800
Commercial/Industrial	800	3200
Institutional	N/A	N/A
Parks	400	200
Mixed Use	-	-
Total	4,000	12,200

The City of Dayton agrees to pay Maple Grove three hundred fifty thousand dollars (\$350,000) within sixty (60) days of execution of this agreement, and \$350,000 when Dayton connects to Maple Grove's water supply, which amount will allow 102.94 acres, or 411.76 R.E.U.'s to connect to Maple Grove's system provided said payments are received by end of 2006. Thereafter Dayton shall pay Maple Grove for each R.E.U. or acre that connects to the system served from Maple Grove at the then current connection charge rate for Maple Grove properties and transmit payment to Maple Grove within 45 days of permit for connection.

5. **Connections Beyond Corporate Limits of Dayton**

Water extensions beyond the Corporate Dayton limits of the City of Dayton and shall be made only with the permission of Maple Grove.

6. **Rates**

Initial water rate for water sold by Maple Grove to Dayton under this agreement shall be \$1.30 per 1000 gallons. In the future, the water rate shall be increased by the same percentage of increase for water to Maple Grove residents. Maple Grove's current water rates to Maple Grove residents is \$.90 per 1000 gallons and \$13.20 annually resulting in a current effective water rate of approximately \$1.04 per 1000 gallons based on 100,000 gallons per Residential Equivalent Unit (REU) per year.

7. **Meter Reading and Billing**

Monthly readings of the master meter or meters at the Connection Points of delivery to Dayton shall be made by Maple Grove. Billings by Maple Grove shall be mailed to Dayton and payment on such bills shall be made by Dayton to Maple Grove within 30 days.

8. **Department of Health Connection Fee**

The City of Dayton shall be responsible for collecting and transmitting the state mandated water connection fee (current rate is \$5.21/year) to the Minnesota Department of Health for connections made to the Dayton Water Distribution System.

9. **Liability of Maple Grove -**

Maple Grove shall not be liable for interruptions in service; provided, however, that Maple Grove shall not discriminate against Dayton water users in the event of such interruption, and shall reasonably attempt to provide uniform service to all water system users, to the extent possible in the event of such interruption.

10. **Default**

Either party shall have the right to terminate this agreement and the water service provided herein in the event that the other party fails to comply with any of the terms and conditions of this agreement. Any termination shall not take effect unless written notice of termination is provided containing a description the default. The defaulting party shall have thirty (30) days to cure the default. If the default is cured, this agreement shall be reinstated. If it is not cured within the time provided for cure, this agreement and the obligations here under shall terminate. However, such service may be

terminated only after reasonable notice to Dayton, and Dayton shall have a reasonable opportunity to correct any condition which is cited by Maple Grove as a cause for termination of water service.

11. Indemnification

Dayton agrees to indemnify and save Maple Grove harmless in accordance with acceptable standards from any and all claims or demands for damages rising out of or which may result from the water supplied pursuant to this agreement and from the use, installation, and maintenance and repair of its facilities as set forth in the contract.

12. Non-Waiver

The non-enforcement by either party hereunder of a right provided by this Agreement shall not constitute a waiver of that party's rights to enforce the term or provision of the Contract at a later date.

13. Effective Date of Agreement

Effective date of this agreement shall be the date of execution thereof of both parties.

Date

October 3, 2006
Date

CITY OF MAPLE GROVE

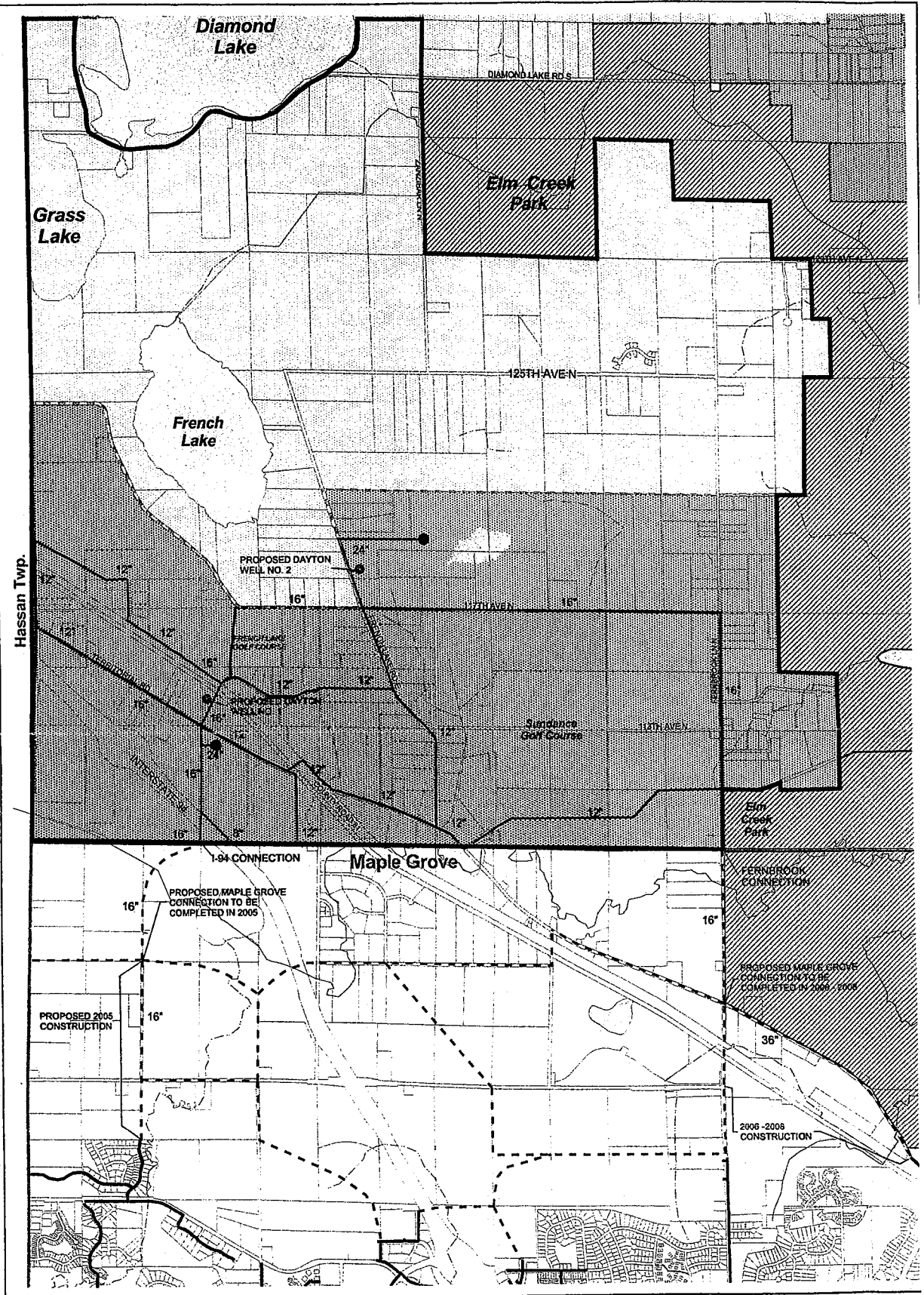
Mayor

City Clerk

CITY OF DAYTON

Mayor

City Clerk



- Proposed Well
 - Proposed Storage Tank
 - Trunk Water Meins
 - Proposed SW Dayton
 - - - Proposed Maple Grove
 - Maple Grove Trunk
 - City Boundary
- | | |
|-----------------|--------------------|
| 2001 Phasing | 2000 - 2010 |
| | 2010 - 2020 |
| | 2020+ |
| - - - 2020 MUSA | Water Service Area |

**SW Dayton Trunk Water/
Maple Grove Connection
Distribution Plan**

Water Supply Investigation

1000 0 1000
Feet



May 2005

**Bonestroo
Rosene
Anderlik &
Associates**
Engineers & Architects

E:\174117405121\cad\gilespj\MO_connect...

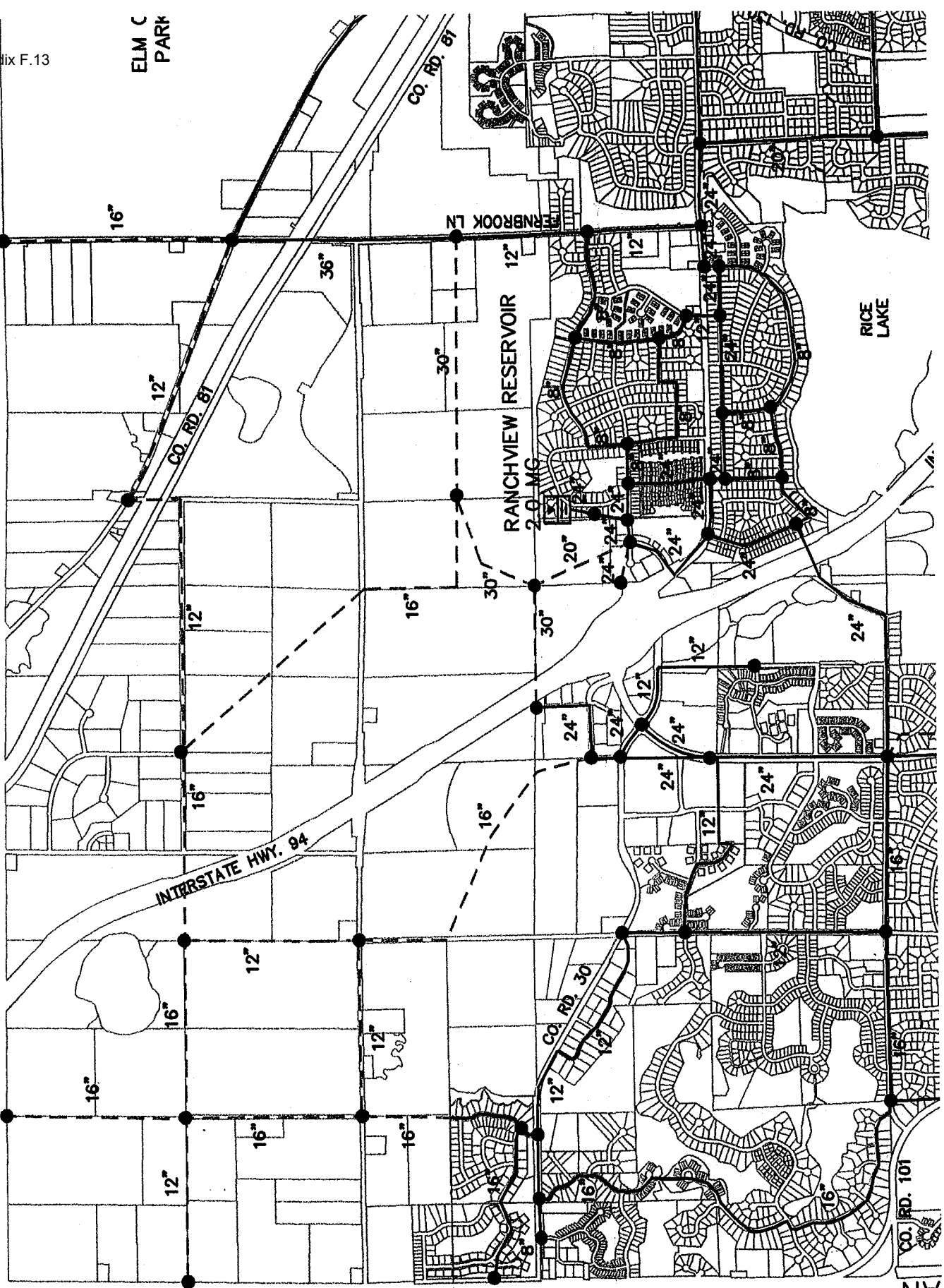
POTENTIAL
DAYTON
CONNECTION

DAYTON

POTENTIAL
DAYTON
CONNECTION

POTENTIAL
CORCORAN
CONNECTION

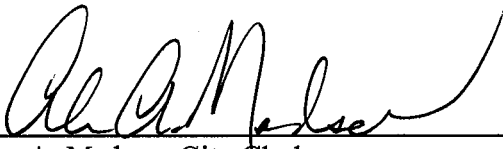
POTENTIAL
CORCORAN
CONNECTION



STATE OF MINNESOTA)
COUNTY OF HENNEPIN) SS.
CITY OF MAPLE GROVE

I, the undersigned, being the duly qualified City Clerk of the City of Maple Grove, Hennepin County, Minnesota, hereby certify that I have carefully compared the attached Resolution with the original thereof on file and of record in my office, and the same is a full, true and correct copy of City Council Resolution No. 06-096 as adopted on the 15th day of May, 2006.

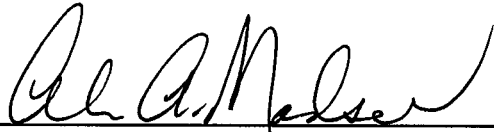
WITNESS, my hand and seal this 16th day of May, 2006.



Alan A. Madsen, City Clerk

STATE OF MINNESOTA)
COUNTY OF HENNEPIN) SS.
CITY OF MAPLE GROVE)

I, the undersigned, being the duly qualified and acting Clerk of the City of Maple Grove, Hennepin County, Minnesota, a Minnesota municipal corporation, hereby certify that the above and foregoing Resolution No. 06-096 is a true and correct copy of the Resolution as adopted by the City Council on the 15th day of May, 2006.



Alan A. Madsen, City Clerk

RESOLUTION NO. 06-096

RESOLUTION APPROVING CONTRACT FOR WATER SERVICE BETWEEN THE CITY
OF MAPLE GROVE, MINNESOTA AND THE CITY OF DAYTON, MINNESOTA

WHEREAS, a request has been submitted to have the City of Maple Grove supply the City of Dayton with water for both domestic and fire flow purposes; and

WHEREAS, Maple Grove's water system is designed to accommodate the requested amount of water needed by the City of Dayton; and

WHEREAS, a contract has been drafted for approval and execution by Dayton and Maple Grove City officials, which sets forth provisions of the sale of water to the City of Dayton; and

WHEREAS, the Maple Grove City Council concurs with the provisions of said contract.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Maple Grove, Minnesota:

1. The contract for water service between the City of Maple Grove, Minnesota and the City of Dayton, Minnesota is hereby approved.
2. The Mayor and City Clerk are hereby authorized to execute said contract.

Adopted by the City Council on this 15th day of May, 2006.

The motion for the adoption of the foregoing resolution was made by Councilmember Jaeger, seconded by Councilmember Sargent, and upon vote being duly taken thereon, the following voted in favor thereof: Mayor Steffenson, Councilmembers Campbell, Jaeger, Koski and Sargent

and the following voted against the same: None.

and the following were absent: None.

whereupon said resolution was declared duly passed and adopted.



8899 Nashua Avenue N.E.
Elk River, MN 55330

(612) 441-4414
Fax: (612) 441-8823

April 27, 1999

Sandra Borders, City Clerk
City of Dayton
12260 South Diamond Lake Road
Dayton, Minnesota, 55327

**RE: SIGNED SEWER USE AGREEMENT
CITY OF OTSEGO AND CITY OF DAYTON**

Dear Sandy:

Enclosed is a signed original of the above agreement for your file. Thank you for your help with this agreement and we at Otsego look forward to continued joint endeavors with the City of Dayton.

Sincerely,

CITY OF OTSEGO

Elaine Beatty,
City Clerk/Zoning Administrator

eb

enclosure (1)

AGREEMENT

CITY OF DAYTON AND CITY OF CHAMPLIN

THIS AGREEMENT is made and entered into between the City of Dayton, a Minnesota municipal corporation (hereinafter referred to as "Dayton") and the City of Champlin, a Minnesota municipal corporation (hereinafter referred to as "Champlin")

RECITALS:

WHEREAS, Champlin owns and operates a municipal water system in the northwest corner of Champlin adjacent to the northeast corner of Dayton; and

WHEREAS, Dayton owns and operates a municipal water system in the northeast corner of Dayton adjacent to the northwest corner of Champlin; and

WHEREAS; an inter-community water main connection exist along French Lake Road at the border of the two communities; and

WHEREAS, the Dayton water system has approximately 66 connections in the northeastern portion of the City; and

WHEREAS, winter operations of a water tower with low demand is difficult; and

WHEREAS, Champlin has capacity and a water distribution system adequate to provide service to the northeast area of Dayton during the winter months.

NOW, THEREFORE, it is agreed by and between the parties as follows:

1. Champlin shall provide water for the Dayton water customers during the winter months of December 2008 through approximately April 1, 2009, exact dates to be determined upon interconnection of the systems.
2. Dayton shall perform meter readings of their water customers just prior to Champlin supplying water to Dayton.
3. Dayton shall perform meter readings of their water customers immediately after Champlin ceases to supply water to Dayton.
4. Dayton shall complete all billing and administrative tasks for their water customers during the time when Champlin is supplying water to Dayton.

5. Dayton shall maintain its water distribution system during the time period that Champlin is supplying water to Dayton.
6. Watermain breaks, Fire suppression, or other unaccounted uses of water shall be reported to Champlin and a volume of usage determined.
7. Dayton shall pay Champlin \$2.12 / 1,000 gallons of water supplied as determined from the meter readings or billings.

IN WITNESS, WHEREOF, the parties have agreed to the foregoing terms.

The City of Dayton

By: 
Its: Administrator

Dated: 12/11/08

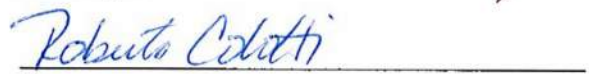
Its: City Clerk

Dated: 12/9/08

The City of Champlin

By: 
Its: Mayor

Dated: 11/12/09

By: 
Its: City Clerk

Dated: 11/12/09

JOINT POWERS AGREEMENT

WHEREAS, the City of Rogers (hereinafter "Rogers") and the City of Dayton (hereinafter "Dayton") are municipal corporations under the laws of Minnesota; and

WHEREAS, Rogers has a public sewer system which is capable of providing service to property within Dayton; and

WHEREAS, Dayton has certain properties with failing on-site septic systems primarily built in the 1970's, in the area shown on Exhibit A; where it is impractical or impossible to replace the systems with another on-site system; and

WHEREAS, both the cities of Dayton and Rogers are interested and concerned about the environment, and the extension of public sewer to the area will have both the short and long-term effect of enhancing the lake quality of Diamond Lake; and

WHEREAS, Rogers is willing under the terms of this agreement to make its public sewer available to the limited amount of property in Dayton where said septic systems are failing; and

WHEREAS, both Dayton and Rogers have the power to provide sewer service to private property, and therefore, can exercise the power jointly under Minn. Stat. §471.59;

NOW, THEREFORE, IT IS HEREBY AGREED upon this 23rd day of July, 1996, pursuant to Minn. Stat. §471.59, between Rogers and Dayton as follows:

1. Purpose. The purpose of this agreement is for Rogers to provide public sewer service to a limited number of properties within the City of Dayton under the terms of this agreement.

2. Permission to Connect. Buyer will permit up to 50 single-family residential dwelling connections to its sewer system within the Service Area shown on Exhibit A (hereinafter the Service Area). Within the Service Area the properties that will connect will be determined by Dayton, with priority given to properties with failed systems. Dayton does not need to allocate all 50 connections upon construction, but may reserve some of potential connections for future use. This prohibition on connection shall continue until such time as the sewage from the Service Area no longer flows to Rogers.

3. Construction. Dayton shall be responsible for construction of all necessary pipes, leads, valves and other appurtenances to allow the Service Area to connect with the Rogers' sewer system near Mallard Drive and County Road 144. Dayton shall be responsible for all such construction cost and may assess or otherwise charge properties as deemed appropriate by Dayton. All construction shall be done to specifications consistent with the applicable standards and regulations, including any applicable Rogers' construction standards. Rogers shall review and approve construction plans before the commencement of construction and may, to the extent desired, monitor actual construction to assure compliance with applicable Rogers' standards.

4. Charges for Service. For the sewer service provided, Dayton shall pay Rogers a connection fee of \$1,950.00 for each connection, at the time a connection to the sewer system is made. The connection charge consists of \$1,000.00 sewer access charge, \$800.00 trunk area charge, and \$150.00 water meter purchase charge. The \$1,950.00 connection fee, is the initial connection fee, and may be changed by the City of Rogers consistent with Paragraph 5 below. After connection, Dayton shall pay for ongoing sewer service at the same rate as Rogers charges its residents. The payment shall be made by Dayton on a quarterly basis. The payment made by Dayton shall be accompanied by a Water Use Report or estimate; provide, however, that at least once per year each meter shall be read for actual usage.

5. Regulations, Prohibitions and Rates. Property owners in Dayton using the sewer system shall be subject to the same rates, charges, fees and regulations, limitations, prohibitions and restrictions applicable to users in Rogers, existing now or hereinafter adopted by Rogers, including, but not limited to, connection charges, hook-up fees, periodic charges for service, limitations on the type of sewage which may be discharged and limitations and prohibitions on discharge of storm water or groundwater runoff, including specifically prohibition or restrictions on storm water or ground water inflow or infiltration into the sewer system. Before any rate, charge, fee, regulation, limitation, restriction or prohibition is effective against property in Dayton, Rogers shall give at least four (4) months notice to Dayton of the proposed change, so that Dayton will have an opportunity to appropriately amend its Ordinances and Regulations. If Dayton fails to amend its Ordinances and Regulations to conform to the prohibitions, regulations, limitations and restrictions Rogers imposes on its users within the boundaries of Rogers, Rogers may, after first giving Dayton 60 days written notice of needed changes, and Dayton's failure to make such changes, elect to terminate this Agreement. Dayton shall afford Rogers the right, during reasonable business hours, to read the meters in the lift station in Dayton.

6. Maintenance. Rogers agrees to maintain the public sanitary sewer system and the forcemain within the corporate boundaries of the City of Rogers. The City of Dayton shall maintain the sanitary sewer system and forcemain within the corporate boundaries of the City of Dayton and the Township of Hassen.

7. Rogers' Assistance. Rogers will assist Dayton by answering questions and providing information concerning maintenance, billing and other common areas of concern between the cities.

8. Dayton Ordinance. Rogers shall be provided with the opportunity to review and comment on any proposed ordinances adopted by Dayton which regulate the sanitary sewer system, its use or charges therefor. The adoption of necessary ordinances regulating use shall be done prior to the commencement of service to Dayton.

9. Arbitration. All disputes between the parties shall be resolved by arbitration pursuant to Minn. Stat. Chpt. 572. Arbitrators shall be appointed through application to the Hennepin County District Court.

10. Contingencies. This agreement is contingent upon all necessary approvals by the Minnesota Pollution Control Agency and the Metropolitan Council for the sewer service described herein.

11. Term of Agreement. This Agreement shall remain in full force and effect until the Service Area can be served by a sewer system operated by Dayton.

IN WITNESS WHEREOF, the undersigned, as of the date set forth above, being fully authorized, on behalf of the Cities of Rogers and Dayton, agree to the terms set forth above.

CITY OF ROGERS

By: _____

Mayor

Attest:

City Clerk

CITY OF DAYTON

By: _____

Mayor

Attest:

City Clerk

Appendix B Capital Improvements Plan for Water System



City of Dayton, Minnesota
Capital Improvement Plan - Water Enterprise Fund 601
Schedule of Planned Capital Outlay 2025 to 2035

Department	Paid By	Replacement Year	Item	Cost	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
					Estimated Amounts	Estimated Amounts	Estimated Amounts	Estimated Amounts	Estimated Amounts	Estimated Amounts	Estimated Amounts	Estimated Amounts	Estimated Amounts	Estimated Amounts	Estimated Amounts
Water	City	2025	Enclosed Trailer with Emergency Tools and Supplies	\$ 20,000	\$ 20,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Water	City	2025	Water Tower Maintenance Exterior Repairs	25,000	25,000	-	-	-	-	-	-	-	-	-	-
Water	City	2025	Water Main Connection/Loop from Sundance Greens West to E French Lk Rd	225,000	225,000	-	-	-	-	-	-	-	-	-	-
Water	City	2025	Land for Northeast Water Tower	400,000	400,000	-	-	-	-	-	-	-	-	-	-
Water	City/Grant (20/80)	2026	Northwest Water Tower	3,800,000	-	3,800,000	-	-	-	-	-	-	-	-	-
Water	Developer	2026	Dayton Parkway Extension (117th Ave N - East French Lake Rd)	225,000	-	225,000	-	-	-	-	-	-	-	-	-
Water	City/Grant (20/80)	2027	Wellhead Treatment Well #1	7,316,000	-	-	7,316,000	-	-	-	-	-	-	-	-
Water	Developer/Assessment (50/50)	2027	Territorial Rd Improvements (Pkwy to Brockton)	265,000	-	-	265,000	-	-	-	-	-	-	-	-
Water	City	2027	SCADA Security Cameras at Wells/Towers/Treatment Plants	80,000	-	-	80,000	-	-	-	-	-	-	-	-
Water	City	2027	113th Avenue Extension/Connection (new)	312,000	-	-	312,000	-	-	-	-	-	-	-	-
Water	City/Assessment	2027	113th Ave Reconstruction	633,000	-	-	633,000	-	-	-	-	-	-	-	-
Water	City/Grant (10/90)	2027	Permanent Generator for Well #2	175,000	-	-	175,000	-	-	-	-	-	-	-	-
Water	City	2028	SCADA Updates (Move Central System to PW Expansion)	75,000	-	-	-	75,000	-	-	-	-	-	-	-
Water	City/Grant (40/60)	2028	Northeast Water Tower (1M Gallon)	9,124,000	-	-	-	9,124,000	-	-	-	-	-	-	-
Water	City	2028	117th Ave Watermain Extension (Dayton Parkway - Brayburn Trails)	845,000	-	-	-	845,000	-	-	-	-	-	-	-
Water	City	2028	Water Loop under 94 to Territorial Road	394,000	-	-	-	394,000	-	-	-	-	-	-	-
Water	City	2029	Replace Fire Hydrant Nozzles with Storz Fittings	Various	-	-	-	-	100,000	100,000	100,000	-	-	-	-
Water	City	2029	Utility Truck Replacement (2018)	180,000	-	-	-	-	180,000	-	-	-	-	-	-
Water	City/Grant (40/60)	2029	South Dayton Water System Tower (2M Gallon)	13,912,000	-	-	-	-	13,912,000	-	-	-	-	-	-
Water	City	2029	North East Well	2,186,000	-	-	-	-	2,186,000	-	-	-	-	-	-
Water	City	2032	South Dayton Water Treatment Plant	30,449,000	-	-	-	-	-	-	-	30,449,000	-	-	-
Water	City	2032	Water Tower Repaint	150,000	-	-	-	-	-	-	-	150,000	-	-	-
Water	City	2033	North East Wellhead Treatment for Wells (2)	9,000,000	-	-	-	-	-	-	-	-	9,000,000	-	-
Water	City	2033	South Dayton Wells (3)	7,380,000	-	-	-	-	-	-	-	-	7,380,000	-	-
Water	City	2035	Media Replacement for WHTP 1 (Replace sand)	100,000	-	-	-	-	-	-	-	-	-	-	100,000
					\$ 670,000	\$ 4,025,000	\$ 8,781,000	\$ 10,438,000	\$ 16,378,000	\$ 100,000	\$ 100,000	\$ 30,599,000	\$ 16,380,000	\$ -	\$ 100,000