

Chapter 9

Water Supply

- ◆ Introduction
- ◆ Water Supply System
- ◆ Water Consumption
- ◆ Emergency Preparedness
- ◆ Programs and Challenges
- ◆ Goals, Objectives, and Policies

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Contents

1. Introduction	9-1
2. Water Supply System	9-3
Water Storage and Transmission	9-4
3. Water Consumption	9-5
Future Water Consumption	9-7
4. Emergency Preparedness	9-9
5. Programs and Challenges	
Water Supply Challenges.....	9-11
Water Supply Programs	9-12
6. Goals, Objectives, & Policies	
Goal 1: Reduce Water Consumption	9-13
Goal 2: Emergency Supply	9-15
Goal 3: Backup Water Supply	9-15



photo by City staff

Section 1: Introduction

The City of Golden Valley faces a continual need to operate, maintain, and invest in its water supply and distribution system. By setting forth a broad planning vision of water stewardship, the City provides a frame of reference for making individual water supply decisions. It also helps ensure that each new decision is consistent with others rather than at cross-purposes. This chapter of the City's Comprehensive Plan outlines the goals, objectives, and policies to guide future decisions regarding the supply of clean, potable drinking water to Golden Valley residents. Golden Valley's water supply plan includes a description of the City's water supply system and water consumption patterns. 🌊



photo by City staff

Section 2: Water Supply System

SINCE THE early 1960s, Golden Valley's drinking water has come from the Mississippi River and is treated and conveyed by the City of Minneapolis. Since the mid-1960s, Golden Valley has been a member of the Joint Water Commission (JWC), a partnership that includes the cities of Crystal and New Hope. These three cities jointly own and operate the water system that stores and transmits potable drinking water throughout the three-city service area. Golden Valley owns and operates the network of smaller diameter pipelines that directly serve Golden Valley residents. Neither Golden Valley nor the JWC maintains an independent source of water supply.

The JWC currently purchases Minneapolis potable water under a 20-year agreement signed in 2004 (which replaced a previous agreement signed in 1963). As the supplier, Minneapolis must deliver treated water that meets federal Primary Drinking Water Standards.

Minneapolis owns and operates two water treatment plants: Fridley and Columbia Heights. Almost all of the water purchased by the JWC is treated at the Fridley plant. The Fridley facility provides lime softening, filtration, fluoridation, and chlorination. Minneapolis plans to initiate membrane ultrafiltration treatment at the Fridley facility in 2012.

The Columbia Heights water treatment plant currently provides membrane ultra-filtration in addition to filtration and chlorination.

The JWC has two separate connections to the Minneapolis water system: a 36-inch connection in Crystal and a 48-inch connection in Golden Valley.

Water Storage and Transmission

Due to the level terrain, the Golden Valley water system operates as a single pressure zone. Five ground reservoirs and three elevated tanks provide a total of 31.5 million gallons of storage for the JWC water system.

The Golden Valley reservoir consists of two 4.5 million-gallon (MG) tanks that typically receive water from the City of Minneapolis between 11 pm and 6 am. Water is pumped from the reservoirs and into the JWC water transmission system by five vertical turbine pumps.

The Crystal ground reservoir system consists of two 4.5-MG tanks and one 10-MG tank. These tanks typically receive water from Minneapolis between 11 pm and 6 am. Five vertical turbine pumps deliver water from the Crystal reservoir into the JWC water transmission system.



photo by City staff

Vertical turbine pumps and piping at the Golden Valley reservoir

Golden Valley residents are served from both reservoir systems, depending on the time of year and specific water demands.

The JWC water system also has three elevated water tanks, one in Golden Valley and two in New Hope. These tanks provide a total of 3.5 million gallons of operating storage. They are used to store water during low demand periods and release water during high demand periods and emergency situations, such as fires.

Since the water system is deemed adequate to provide both storage and firm pumping capacities during maximum day demand through 2017, the JWC has no current plans to expand or modify the water system. Worn equipment is repaired and replaced on a regular schedule and as needed through a capital improvement planning process. 🌊



photo by Nancy M. Fontana, 2004 Views of the Valley

Section 3: Water Consumption

THE WATER supply system is designed to meet expected future water consumption of Golden Valley residents.

Over the last 10 years, Golden Valley's population has been fairly consistent and water demand has shown relatively little variability (see Table 9.1). Variations in water use during this time have been due mainly to variations in precipitation.

Table 9.1: Golden Valley Water Demand

Year	Population	Water Service Connections	Total Water Sold (MG)	Average Day Water Demand (MGD)
1998	21,001	7,093	985	2.70
1999	21,037	7,105	944	2.59
2000	20,281	6,850	1,023	2.80
2001	20,391	6,887	1,060	2.90
2002	20,636	6,970	959	2.63
2003	20,736	7,003	1,055	2.89
2004	20,674	6,983	974	2.67
2005	20,510	6,927	977	2.68
2006	20,630	6,968	1,009	2.77
2007	20,705	6,993	1,041	2.85

Historical annual water sales data is reported in three customer categories: residential, commercial and industrial (see Table 9.2). Over the last 10 years, residential water consumption has averaged 64 percent of water sold.

Table 9.2: Golden Valley Water Sales

Year	Residential (gallons)	Commercial (gallons)	Industrial (gallons)	Total
1998	628,422,000	267,208,000	67,308,000	985,447,000
1999	593,916,009	245,639,329	104,470,662	944,026,000
2000	643,554,476	277,335,235	102,408,290	1,023,298,000
2001	659,784,270	290,559,423	109,710,407	1,060,054,100
2002	607,070,807	256,964,101	94,853,092	958,888,000
2003	701,168,000	266,348,000	87,789,000	1,055,305,000
2004	628,107,000	257,906,000	88,155,000	974,168,000
2005	612,975,000	257,995,000	106,001,000	976,971,000
2006	632,312,000	270,864,000	106,229,000	1,009,405,000
2007	654,717,115	270,786,223	115,165,662	1,040,669,000
Total Water Sold (gallons)	5,707,309,562	2,390,819,087	866,924,451	8,987,526,100
Percentage	64%	27%	10%	

Per Capita Water Use

Per capita water use is determined by dividing total daily water use (including residential, commercial, and industrial categories) by the total service area population and is expressed as gallons per capita per day (GPCD). Total residential per capita water use has averaged 81 GPCD over the last 10

years (see Table 9.3).

Residential per capita water consumption is calculated by dividing the average residential daily water demand by the total population. For Golden Valley, this falls within the range normally expected for residential water use and is slightly above the 75 GPCD average

Table 9.3: Golden Valley Per Capita Water Use

Year	Population	Total Water Sold (gallons)	Residential Water Sold (gallons)	Residential GPCD	Total GPCD
1998	66,288	2,534,433,352	1,956,908,870	80.9	104.7
1999	66,331	2,441,906,999	1,881,033,102	77.7	100.9
2000	63,852	2,593,693,190	1,992,727,285	85.5	111.3
2001	64,049	2,695,781,943	2,058,127,457	88.0	115.3
2002	64,386	2,350,147,868	1,801,990,216	76.7	100.0
2003	64,658	2,627,680,940	2,049,560,696	86.8	111.3
2004	64,253	3,345,746,072	1,816,041,059	77.4	100.0
2005	63,852	2,412,241,872	1,832,308,676	78.6	103.5
2006	64,230	2,434,561,020	1,858,794,019	79.3	103.8
2007	64,505	2,471,696,246	1,886,918,882	80.1	105.0
Average				81.1	105.6

for the Twin Cities metropolitan area.

Unaccounted-For Water Use

As in all water systems, some of the water the JWC purchases from Minneapolis is never sold to water system customers. The difference between the water produced and the water sold is referred to as unaccounted-for water. It can result from many factors, including:

- ♦ unidentified leaks in the distribution system
- ♦ water main breaks
- ♦ periodic fire hydrant flushing
- ♦ fire fighting and training
- ♦ unmetered hockey rink flooding
- ♦ municipal pool uses
- ♦ storage tank maintenance
- ♦ unauthorized use
- ♦ unmetered services
- ♦ inaccurate meters.

Unaccounted-for water use below 10 percent is considered acceptable for normal system leakage, unbilled water uses, and meter inaccuracies.

Golden Valley's unaccounted-for water use is estimated by comparing the average annual water purchased from the City of Minneapolis with the average annual metered consumption of Golden Valley customers. Unaccounted-for water use has ranged from 5 to 13 percent of the total water purchased from Minneapolis.

Historically, Golden Valley has identified some inconsistencies in purchased and sold water data. In some years, the volume of water purchased from Minneapolis is reported as lower than the volume of water billed to customers. To remedy this, the City of Golden Valley replaced a number of water meters within the last 10 years.



Photo by City staff

Golden Valley's Public Safety Open House

In 2007, the JWC purchased and installed new intake meters for the Crystal and Golden Valley reservoirs. The JWC also works with the City of Minneapolis to calibrate water supply meters regularly.

Future Water Consumption

Water use projections (see Table 9.4) are based on the following assumptions:

- ♦ continued stable or slightly increasing population in accordance with the Metropolitan Council's projections
- ♦ reduced per capita water consumption due to enhanced water conservation efforts
- ♦ a maximum day to average day water demand ratio of 2.4 (based on statistics from 2005-2007)
- ♦ adequacy of the existing water supply for meeting projected wa-

ter demands through 2017 and beyond (based on the demand projections). 🌊

Table 9.4: Golden Valley Water Use Projections

Year	Population Served	Per Capita Residential Use (GPCD)	Average Day Use (MG)	Maximum Day Use (MG)	Annual Water Use (MGal)
2008	20,800	86	2.80	7.00	1,032
2009	21,000	77	2.83	7.07	967
2010	21,200	75	2.85	7.13	957
2011	21,400	74	2.88	7.20	955
2012	21,600	73	2.91	7.27	953
2013	21,800	71	2.93	7.34	942
2014	22,000	70	2.96	7.40	939
2015	22,200	70	2.99	7.47	944
2016	22,500	70	3.03	7.57	952
2017	22,800	70	3.07	7.67	960



photo by City staff

Section 4: Emergency Preparedness

IF THE JWC were to experience an interruption in the Minneapolis water supply, it would rely on the 31.5 million gallons of operating storage in the five ground reservoirs and three elevated water tanks as described in Section 2. This storage can continue to support the average daily demands for more than four days, assuming all of the reservoirs and elevated water tanks are full. To date, storage has been adequate to meet all demands, but the JWC still must plan for emergencies.

To comply with Minnesota Statutes, which require a water supply plan be adopted as a component of the Public Facilities Plan, the JWC is preparing A Water Supply, Emergency and Conservation Plan. This plan will also be submitted to the Metropolitan Council as an amendment to the local comprehensive plan for communities with municipal water supplies in the seven-county Twin Cities metropolitan area.

The JWC and the City of Golden Valley developed an Emergency Plan to follow during conditions that require curtailing water service. Potential situations include natural disasters such as drought, flood, tornado, or contamination of the Mississippi River, or operational difficulties with the JWC or Minneapolis treatment or distribution systems. The Emergency Plan will be incorporated into an overall Emergency Plan for Golden Valley, which would also include the Golden Valley police and fire departments and local electrical utility.

photo by Candis Erickson, 2006 Views of the Valley

Section 5: Challenges and Programs

COMMUNITIES OFTEN face a number of challenges when managing a water supply and distribution system and being a good steward of water resources.

Water Supply Challenges

Water supply challenges include aging infrastructure, conservation, and back-up water supply. Specifically, the JWC and City of Golden Valley face the following challenges:

- ♦ Renew and replace aging infrastructure cost-effectively and in a manner that reduces service risks.
- ♦ Reduce per capita residential water consumption in a manner that minimizes operational financial impacts.
- ♦ Create appropriate incentives for commercial and multi-family residential customers to reduce water consumption through water-saving irrigation systems and landscaping.
- ♦ Develop an emergency backup supply designed to provide minimal domestic water needs during water emergencies.
- ♦ Preserve options to develop supplemental sources of supply should climatic or other conditions render the Mississippi River source less reliable or too costly.

Water Supply Programs

To help meet or overcome these challenges, the City administers several programs to address the needs of the water supply system and Golden Valley residents. These include:

- ♦ coordinating water main replacement with the City's Pavement Management Program, reducing costly and disruptive street construction
- ♦ avoiding unnecessary water consumption associated with excessive hydrant flushing
- ♦ quickly responding to water main breaks to reduce the loss of water
- ♦ managing active and ongoing water meter replacement repair and testing programs
- ♦ maintaining an active water conservation public education program that provides residents with tips on how to conserve water
- ♦ maintaining a water-conserving rate structure
- ♦ providing assistance to developers during the plan review process to properly design irrigation systems and landscaping to reduce water consumption 

photo by City staff

Section 6: Goals, Objectives, & Policies

THE FOUNDATION of Golden Valley's water supply plan rests on three goal statements supported by objectives and policies.

Goal 1: Reduce Water Consumption

Reducing residential and commercial water consumption provides several benefits. It reduces reliance on vulnerable resources, it reduces the amount of water that must be purchased, and it directly reduces the cost of water service.

The City of Golden Valley and the JWC have established the following water conservation objectives:

- ♦ Limit per capita residential demand to 75 gallons per capita per day (GPCD), which is the Twin Cities metro median.
- ♦ Limit peak daily demand to less than 2.5 times average daily demand.
- ♦ Limit total peak daily purchases from Minneapolis to less than 18 million gallons per day (MGD).
- ♦ Limit unaccounted-for water to less than 9.75 percent.

These objectives meet or exceed those set forth in the Phase I interim report to the Minnesota Legislature by the Metropolitan Council as part of the Regional Water Supply Plan currently in development.

By meeting these objectives, the City of Golden Valley and the JWC can postpone development of new water supply facilities, avoid surcharges imposed by Minneapolis, reduce the impact

of a short-term emergency or longer-term drought, and decrease operating costs.

Residential Water Demands

Reducing excessive discretionary summer residential water demand is a primary objective. Residential demands comprise 64 percent of total water use. The JWC's 10-year goal will be to maintain residential per capita use at 75 GPCD.

Commercial Water Demands

Reducing excessive discretionary summer commercial water demand is also a primary objective, particularly water use related to commercial landscape irrigation. The JWC's goal is to reduce commercial peak water demands through public education and other programs.

Unaccounted-For Water Use

Water main leaks, inaccurate meters, unmetered connections, and fire department use all contribute to unaccounted-for water use. Planned

meter replacements and regular calibration, leak detection surveys, and maintenance programs will improve measurement of water use and help identify if there is a water loss problem. The JWC's goal is to maintain unaccounted-for water use at or below 9.75 percent of Minneapolis water purchases.

Policies

The City and the JWC will maintain water conservation goals through programs focusing on short-term and long-term objectives. Long-term conservation will be accomplished by improving water use efficiencies. Specific elements include the following:

- ♦ Continue the meter maintenance program to continue billing accuracy and efficiency and to track water losses.
- ♦ Test meters when customers request that they be checked or when meter readings indicate, as determined by the utility staff or by

computer software, that the meter may be inaccurate.

- ♦ Annually review water billings and compare with Minneapolis metered water delivery volumes to monitor unaccounted-for water use.
- ♦ Maintain a program of voluntary and mandatory reduction measures in the event of an emergency. Contact the media, including local television, radio stations and newspapers, and issue a notice to residents that there is an imminent water shortage and they must reduce their water use. Reduction measures would include odd/even sprinkling, restricting vehicle washing, minimizing bath use, reducing shower length, and other measures, mainly among domestic users. The impacts of these reductions in water use are difficult to determine, as data from conservation and non-conservation periods are not available. The amount saved will likely be minimal in the first years of use during the early stages of public education efforts. An average reduction in per capita use of 1 gallon per day would reduce demand by 0.07 MGD (one-percent of total daily demand).
- ♦ Maintain a program of mandatory water use reduction measures in the event of an emergency. Implement a total sprinkling ban in an extreme emergency. The sprinkling ban ordinance makes violation of the sprinkling ban a petty misdemeanor. Customers that violate the sprinkling ban can receive a citation by a City Manager's designee. People who do not pay their fines can be held in contempt of court.
- ♦ Maintain a program of mandatory total water use restrictions in the event of an emergency. Based on



photo by Richard Gunderson, 2007 Views of the Valley

The fountain at Golden Valley Commons is a community gathering spot.

the length and severity of the emergency conditions, water use would be decreased based on priorities established in state statutes.

- ♦ Protect domestic water supply, excluding industrial and commercial uses of municipal water supply, and use for power production that meets the contingency planning requirements. According to MN Rules 6115.0630, Subp. 9, domestic use is defined as use for general household purposes for human needs such as cooking, cleaning, drinking, washing, and waste disposal, and for on-farm livestock watering, excluding commercial livestock operations which use more than 10,000 gallons per day. Allocation procedures should distribute water equitably within each water use priority and customer category. Non-essential water uses are the lowest priority and will be the first water use subject to allocation restrictions. Quick responses to restrict non-essential uses of water during periods of limited supplies will help protect domestic and economic uses of water. Water used for human needs at hospitals, nursing homes, and similar types of facilities should be designated as high priority to be maintained in an emergency. Local water allocation will need to address water used for other human needs at other types of facilities such as hotels, office buildings, and manufacturing plants. Domestic use must have priority over economic needs.
- ♦ Achieve additional water demand reduction through more aggressive water conserving rates that incorporate inclining pricing tiers. Seasonal rates or surcharges that increase the cost for excess water use during the summer peak usage season could also be implemented.



photo by City staff

The goals, objectives, and policies in the water supply plan guide future decisions regarding the supply of clean, potable drinking water to Golden Valley residents.

- ♦ Adopt a uniform ordinance governing installation and operation of commercial landscape irrigation systems. Such an ordinance would establish minimum design standards, link approvals for system designs to overall development approvals, focus on reducing peak summer demands, minimize the wasting of water, and reduce overall landscape water consumption. Design standards would avoid overspray, runoff, and low head drainage Control equipment would include rain sensors, repeat cycles, battery backup, and multiple program capabilities and would be calibrated and timed to deliver $\frac{3}{4}$ to 1 inch of water per cycle. Designs would address sprinkler spacing and coverage, and turf area zones would be separate from landscape zones.
- ♦ Enact an education program to inform people about how to sprinkle more efficiently. Peak water use in the summer months is attributed to lawn and garden sprinkling. A JWC conservation education program is

planned to include: web site information, informational cable television announcements, indoor water efficiency brochures, pamphlets describing water-saving sprinkling practices, billing inserts, literature racks at city halls, and consumer confidence reports.

Goal 2: Emergency Supply

The JWC is working to confirm the viability of an emergency water supply from existing, proven General Mills wells and a New Hope well. These wells draw water from the Prairie du Chien/Jordan aquifer. In an emergency, the JWC would use these resources to augment or replace the existing Minneapolis supply.

Goal 3: Backup Water Supply

The JWC has identified groundwater from the Prairie du Chien/Jordan aquifer as a viable alternative water source to serve its customers, either as

a replacement for its existing Minneapolis river supply or to supplement that supply on either an ongoing or emergency basis. The JWC recently evaluated the efficacy of replacing its Minneapolis water supply with groundwater to be drawn from the Prairie du Chien/Jordan aquifer.

To support this effort, the JWC sought and obtained legislative approval to develop this groundwater source subject to final DNR approval. The JWC subsequently deferred these plans and entered into a new 20-year water purchase agreement with the City of Minneapolis. However, a backup or

supplemental water supply may indeed be necessary some time in the future and reserves the right to develop such a source if needed. 