PUBLIC UTILITIES

I. INTRODUCTION

This portion of the Comprehensive Plan will review the:

- Municipal Wastewater Treatment/Sanitary Sewer System: Pages 1-9
- Municipal Water System: Pages 24-45
- Municipal Storm Water System; Pages 46-47
- Identify Public Utilities Policies and Objectives: Page 48

Section II below, references information included in the Sanitary Sewer Study completed in October 2007 by Bolton & Menk, Inc. the City's consulting engineer. This study is included as an appendix to this Comprehensive Plan. Additional information, as required by the Metropolitan Council, is also included in this Section.

II. SANITARY SEWER SYSTEM

A. History and Capacity. The City of Jordan owns and operates its own wastewater facility. It is not a part of the Metropolitan Council's wastewater treatment system; therefore, a number of requirements for the 2008 Comprehensive Plan relating to the sewer chapter (e.g. maps of connection points to the Metropolitan Disposal System) are not applicable and therefore, not included.

The City of Jordan sewage treatment facility and ponds were constructed in the 1970's, were rebuilt in the 1980's and upgraded in 1993. A new wastewater treatment plant was constructed in 2002. The Jordan wastewater sewer system features a mechanical plant with a capacity of 2,298,000 gallons per day, a peak demand of 1,965,000 gallons per day and an average demand of 580,000 gallons per day. The treatment plant will serve a total population of 12,000 based on an average contribution of 85 gallons per person per day. As of October 2007, the City of Jordan provided service to approximately 1,697 accounts. The City of Jordan believes the population and households will grow at a faster rate and therefore is planning for a population of 15,000 or 6,000 households. The City understands that planning for and/or constructing facilities for the increased growth is at the City's own risk.

At the time of this Comprehensive Plan, the City is not considering a potential connection to the Metropolitan Disposal System to serve the projected 2030 population. The closest metropolitan interceptor, at this time, is in Spring Lake Township, adjacent to the City of Prior Lake and Jackson Township adjacent to the City of Shakopee. The City is aware of the Metropolitan Council's plans to site a plant along the Minnesota River to serve the southwestern portions of Scott County, post 2030. One of the three sites under consideration is the Jordan wastewater treatment plant site.

B. Connections. As of October 2007, the City of Jordan provided service to 1697 connections, with apartments and the manufactured home park each noted as one connection or customer. Of the connections,1561 were residential and 136 were commercial/industrial customers.
The number of existing and potential connections for each district follows:

The City is currently divided into 12 major sanitary sewer districts. Descriptions of the district locations are included in Section II of the Bolton & Menk Sewer Chapter.

TABLE 10-1
SANITARY SEWER DISTRICTS IN JORDAN

Sanitary Sewer District	Existing Connections	Potential Connections
Syndicate Street Service Area	951	960
Northeast Service Area	0	6,962
West-Southwest Service Area	0	11,551
Valley View Road Service Area	101	99
195th Street Service Area	0	42
US 169 Lift Station Service Area	0	4,683
Delaware Avenue North Service Area	0	1,684
Delaware Avenue South Service Area	0	1,634
220th Street Lift Station Area	0	3,831
Creek Lane Service Area	339	388
Park Boulevard Lift Station Area	0	780
Minnesota River North Service Area	0	1,206

C. Population, Flow and Loading Projections:

As noted within Chapter 3 - Demographic Projections, Table 3-10 and Chapter 6-Land Use, Table 6-4, the City is planning for the following household and employment growth:

TABLE 10-2
REVISED MET COUNCIL SYSTEM STATEMENT HOUSEHOLD, POPULATION AND EMPLOYMENT PROJECTIONS

	2000	2006 Estimate*	2010 Projection	2020 Projection	2030 Met Council System Statement	2030 City's Draft Projection
Population	3,833	5,146	5,900	9,700	13,500	15,000
Households	1,349	1,832	2,150	3,700	5,200	6,000
Employment*	1,300	1,693	1,985	2,690	3,400	3,400

*2006 Estimates: Population and Household Source- MN State Demographer. 2006 Employment actual from MN Department of Employment and Economic Development.

As noted within the following Table, completed by Bolton & Menk, Inc. the following Population, Flow and Loading Projections have been calculated to estimate projected growth:

TABLE 10-3A
Population, Flow and Loading Projections Based on System Statement

Year	Population	Average Flow (mgd)	Peak Flow (mgd)	BOD (lbs/day)	TSS (lbs/day)
2000	3,833	0.326	1.091	843	958
2006	5,043	0.429	1.390	1,109	1,261
2010	5,900	0.502	1.594	1,298	1,475
2015	7,800	0.663	2.029	1,716	1,950
2020	9,700	0.825	2.447	2,134	2,425
2025	11,600	0.986	2.850	2,552	2,900
2030	13,500	1.148	3.241	2,970	3,375

TABLE 10-3B Population, Flow and Loading Projections Based on City of Jordan Projections					
Year	**Population**	**Average Flow (mgd)**	**Peak Flow (mgd)**	**BOD (lbs/day)**	**TSS (lbs/day)**
2000	3,833	0.326	1.091	843	958
2006	5,043	0.429	1.390	1,109	1,261
2010	5,900	0.502	1.594	1,298	1,475
2015	7,800	0.663	2.029	1,716	1,950
2020	9,700	0.825	2.447	2,134	2,425
2025	12,350	1.050	3.006	2,717	3,088
2030	15,000	1.275	3.542	3,330	3,750

The growth boundaries of future land use map extend into Sand Creek Township and St. Lawrence Township, in which orderly annexation agreements have not yet been negotiated. Discussions with St. Lawrence Township have been underway for some time, with progress made. The City of Jordan, Sand Creek Township and Scott County plan to begin discussions the fall/winter 2007.

D. System components: The existing sanitary sewer facilities can be divided into two distinct components: the sewage collection system and the wastewater treatment plant. The Jordan sanitary sewer collection system is illustrated on Map in Appendix A. The mechanical treatment facility is located on the northwest side of the community adjacent to Holzer Park, by U.S. Highway 169 and Syndicate Street. The plant removes solids, organic compounds, nutrients and pathogens that have a degrading effect on natural water systems. The wastewater, after treatment, is discharged into Sand Creek which flows to the Minnesota River. The City follows the regulations of the Minnesota Pollution Control Agency (MPCA). A copy of the City's National Pollutant Discharge Elimination System (NPDES) and State Disposal System (SDS) permits are attached as exhibits to this chapter.

The sanitary sewer collection system within the city was placed into service at various times. As a part of financial reporting requirements, the City is required to create an itemized inventory of the value of each individual collection main and when each main was placed into service, for the purposes of itemizing asset depreciation in conjunction with Government Accounting Standards Board (GASB) 34 directive.

The City of Jordan has five lift stations in place. The main lift station is located at 901 Syndicate. A small lift station is located in Timberline Business Park, Bridle Creek 8th Addition, and 2 small lift stations serve the homes on the south side of Jordan between TH 21 and Sand Creek.

1. Wastewater Collection System

A. Previous Studies. Previous studies were examined and utilized in the preparation of this report. They include:

1. The Northwest Quadrant Growth Study. [1]
2. The City's Comprehensive Transportation Plan. [2]
3. The Preliminary Engineering Report - 2000 Improvement Project. [3]

[1] Loose, Timothy O., P.E., April 23, 1997.

[2] Chromy, Christopher S., P.E., September 11, 2000.

[3] Caron, Carol J., P.E., December 16, 2002.

4. The Scott County Comprehensive Plan.

5. Tentative alignment concepts for interchanges with US 169. [3]

6. Record drawings showing the invert and grades of the existing sanitary sewers.

B. Wastewater Collection Design Considerations

1. General Design Considerations:

The system has to utilize comparatively small sewer districts to approximately match the situation on the ground caused by the escarpments, streams, wetlands, railroads, highways, and previous development.

These patterns also demand the use of lift stations periodically to accomplish the task of delivering the wastewater to the wastewater treatment plant

2. Topography of the Area

The City of Jordan is located near the confluence of two major glacial outwashes in the Minnesota River basin, which offer a wealth of topographic assets to the community. As such, a series of ravines define a series of rather steep escarpments, which meander through the area and divides the land into a series of irregularly shaped parcels. The term "escarpment" refers to the hillsides of the valleys cut into a relatively flat or rolling plain. All the property "on top" is roughly the same elevation.

The irregular shapes and varied ownership of these parcels have placed significant limitations on the pattern of land development. The use of curvilinear streets backed up to the escarpments seem to be the most acceptable development pattern.

In summary, Jordan is presented a series of obstacles to inexpensive development:

Ravines - too steep and narrow to permit development.

Bluffs – with slopes greater than 30% (30feet in 100 feet).

Flood plains – with special rules that apply to the construction of any buildings.

Wetland areas – where the rule of "Avoid, Minimize, Mitigate" is applied (at increased cost).

The more inexpensive property for development is open and gently rolling with access to municipal water and sewer. Although this topography is available above the escarpments, the parcels are isolated from one another by the obstacles listed above.

For these reasons, the early development of the city focused on the comparatively, level flood plain areas and only required limited utilities. The result is that developed portions of the city further obstruct the efficient extension of utilities across town from their treatment source. This is especially true for utilities that operate by gravity (storm and sanitary sewers) and therefore, have a very limited choice of routes.

This topography in Jordan presents major challenges to servicing the area with sanitary sewer. Innovative uses of newer technologies offer possible alternatives to servicing some of the individual sub-districts. Traditionally, sewer organization follows a tree structure, drawing individual wastewater flow toward major branches and eventually to the central trunk sewer (interceptor).

The topography in city of Jordan defines many major 'branches', which can serve as corridors for sewer lines. However, a number these major branches are not connected to a central trunk that is directed toward the WWTP. Therefore, major improvements will be necessary to connect these branches.

The topography presents a second challenge at the crest of the tributary area where the next tributary area starts. The downstream flow pattern in the next service area may extend far beyond the anticipated growth area for the City of Jordan. The difficulties

multiply when the area is severely broken up into small tracts that lend themselves to larger, less uniform lot shapes. Newer technologies called “low pressure sewer systems” create a network of one-way forcemains driven by individual or cluster pump stations located near each lot.

These pressure sewers can be easily bored in existing neighborhoods or trenched in new developments. As an example, a single two-inch line can serve up to 20 homes.

The capacities of existing individual collector sewers were determined and compared to the design capacity required to serve the tributary area.

3. Pipe Sizing and Analysis:

The undeveloped residential tributary areas to each manhole location in the network was divided by potential land use as 2, 3, 8 or 12 units per acre with developed areas using actual lot count. These unit counts were then extended to a population estimate using 2.5 people per unit and 100 gallons per person per day.

4. Design Criteria for Future Sanitary Sewer Improvements:

When investigating and reviewing possible improvements to the sanitary sewer system, the following design criteria were used for the sizing and preliminary alignments of new trunk sanitary sewers:

- Minimum Permitted Pipe Diameter: 8 inches
- Depth: 12-foot minimum to allow gravity service to full basements
- Slope: Sufficient to provide self cleaning velocities of 2.0 feet/second when flowing full, required slope varies by size of pipe
- Manholes: Provide at up to 500-foot intervals

5. Lift Station Design Criteria:

Attempts were made to avoid pumping in series; however it could not be totally avoided in the extremely flat portion of the city along US 169. Two major lift stations are included in the final layout:

- In the ROW of Old 169 at Sand Creek – This collects all the wastewater from upper Sand Creek and pumps it west in Old 169 until it can link with a gravity sewer that discharges northward and westward to the new West/Southwest Interceptor installed along US 169 that discharges to the WWTP. The structure of this station is already constructed but the pumps will not be installed for a few years.

- The ROW of US 169 west of Delaware – The topography of this area will make it necessary to install a second large capacity lift station to transport the wastewater to the WWTP. The specific route of the forcemain and discharge point can be determined in the actual design phase.

2. Wastewater Treatment Facility

A. Existing Wastewater Treatment Facility

A new mechanical treatment facility was placed on-line in October 2001. The mechanical facility consists of: flow equalization, pretreatment, extended aeration activated sludge with biological phosphorous removal, final clarification, disinfection, aerobic digestion and biosolids storage.

The wastewater treatment facility continues to use two of the stabilization ponds from the earlier facility for flow equalization. The treatment facility is designed to treat an average

wet weather flow of 1.289 million gallons per day (mgd) with a 5-day biochemical oxygen demand (BOD) of 1,045 pounds per day. The treatment facility discharges on a continuous basis to Sand Creek with the following limits: 15 mg/l – Biochemical Oxygen Demand (BOD); 30 mg/l – Total Suspended Solids (TSS); 1.0 to 7.7 mg/l – Ammonia, Nitrogen (limit changes seasonally); and 1 mg/l – Total Phosphorous.

Currently the treatment facility is meeting all limits and treating approximately 0.400 mgd.

3. Population, Flow and Loading Projections

The population, flow and loading projections are presented in Table 10-6A and 10-6B.

TABLE 10-6A
POPULATION, FLOW AND LOADING PROJECTIONS BASED ON SYSTEM STATEMENT

Year	Population	Average Flow (mgd)	Peak Flow (mgd)	BOD (lbs/day)	TSS (lbs/day)
2000	3,833	0.326	1.091	843	958
2006	5,043	0.429	1.390	1,109	1,261
2010	5,900	0.502	1.594	1,298	1,475
2015	7,800	0.663	2.029	1,716	1,950
2020	9,700	0.825	2.447	2,134	2,425
2025	11,600	0.986	2.850	2,552	2,900
2030	13,500	1.148	3.241	2,970	3,375

TABLE 10-6B
POPULATION, FLOW AND LOADING PROJECTIONS BASED ON CITY'S PROJECTIONS

Year	Population	Average Flow (mgd)	Peak Flow (mgd)	BOD (lbs/day)	TSS (lbs/day)
2000	3,833	0.326	1.091	843	958
2006	5,043	0.429	1.390	1,109	1,261
2010	5,900	0.502	1.594	1,298	1,475
2015	7,800	0.663	2.029	1,716	1,950
2020	9,700	0.825	2.447	2,134	2,425
2025	12,350	1.050	3.006	2,717	3,088
2030	15,000	1.275	3.542	3,300	3,750

4. Evaluation of Treatment Facilities

A. General

The wastewater treatment facility processes were evaluated using the criteria from the stream" and the "solids stream". The liquid stream combines various "Recommended Standards for Wastewater Facilities" or more commonly called "Ten State Standards". Using these standards and the population and flow estimates from above, each process was evaluated on when its capacity might be exceeded.

Mechanical wastewater treatment facilities include two separate processes combined to form an integrated treatment system. The processes are commonly referred to the "liquid treatment components to convert the wastewater into natural byproducts of biological stabilization and the capabilities of the liquid stream determine the quality of the effluent

produced by the facility. The solids stream combines treatment components to stabilize, thicken and store the solids byproducts produced by the liquid stream for eventual incorporation into the soil. Some processes are evaluated on average wastewater flows whereas others are evaluated on peak flows. Results are tabulated in the following tables along with a brief description.

B. Pretreatment

Pretreatment facilities are provided to remove sticks, rags, grit and other materials to insure that they do not interfere with subsequent wastewater processes. The pretreatment process consists of a mechanical fine screen, back-up manual screen and a grit removal system.

TABLE 10-7
PRETREATMENT FACILITIES

Equipment	Capacity, Peak (mgd)	Capacity (Year/Population)
Fine Screen	2.0	2015/8,805
Grit Removal	2.5	2020/10,916

As noted above, the pretreatment facilities were evaluated on peak flows and the fine screen is the limiting factor and additional pretreatment facilities would be required in 2015.

C. Aeration Basins

The City of Jordan operates an extended aeration activated sludge process. The major benefit of operating this type of process is the long retention times that allows for effective and efficient operation even when flows and strengths vary widely. Additionally, the activated sludge system is designed for biological phosphorous removal that occurs in two basins preceding the aeration basins. The City has two, 27-foot wide by 90-foot long and 16-feet deep aeration basins and an anaerobic and anoxic basin prior to the aeration basins for phosphorous removal. As shown below in Table X.3, organic loading is the limiting factor for the activated sludge process with additional capacity required in 2013.

TABLE 10-8
ACTIVATED SLUDGE PROCESS – AERATION BASINS

Description	Design Requirement	Capacity (Year/Population)
Hydraulic Retention Time	18 Hours	2017/9,700
Organic Loading Rate	15 lb BOD/day	2013/7,953

D. Final Clarifiers

Activated sludge final clarifiers are designed to meet thickening as well as solids separation requirements. Scum collection and removal facilities are provided as well. The City of Jordan has two, 35-foot diameter clarifiers that operate at a 14-foot water level. Two clarifiers are required to meet the Ten State Standard criteria; however, in determining the Surface Overflow Rate, only one clarifier is used. As shown below in Table X.4, the surface overflow rate governs with new clarifier(s) required in 2014.

TABLE 10-9
FINAL CLARIFIERS

Description	Design Requirement	Capacity (Year/Population)
Surface Overflow Rate	900 gpd/sq. ft.	2014*/8,658
Solids Loading Rate	35 lb/day/sq. ft.	2023/12,890
Weir Loading Rate	30,000 gpd/lin. Ft.	>2040/29,220
* Calculation based on one clarifier		

E. Disinfection

A disinfection system is required to disinfect the treated wastewater prior to entering the receiving stream. As per the City's NPDES permit, they must disinfect and dechlorinate the treated wastewater for the months of April through October. The City of Jordan uses sodium hypochlorite to disinfect and sodium bisulfite to dechlorinate. The disinfection basin is a rectangular basin with interior walls to create a serpentine flow pattern and provide the proper detention time. According to *Ten State Standards*, disinfection systems must be designed to handle the peak flows, however, since the Jordan wastewater facility is designed for flow equalization, the average flows will be used for evaluation.

TABLE 10-10

Description	Design Requirement	Capacity (Year/Population)
Disinfection	15 minutes	2026/14,530
Dechlorination	0.5 minutes	2027/15,133

As shown in Table X.5, the disinfection system has adequate capacity until 2026.

F. Biosolids Processing

Wastewater biosolids consists of solids from raw wastewater and biological solids generated in the treatment process. The City of Jordan treats biosolids using an aerobic digester and then stores the treated biosolids in a storage tank. The City contracts with a biosolids contractor to land apply the biosolids on a semi-annual basis. The biosolids system was designed to hold and treat the biosolids for 180-days at the original design population of 5,803 persons. The system can treat the biosolids for an approximate population of 6,000 persons. Once this threshold is met, the City would need to evaluate various options such as adding storage, additional treatment processes or a regional treatment solution.

5. Summary of Existing Treatment Facilities

Based upon the above discussion, the treatment facility liquid portion is limited by the aeration basins and will require upgrading in approximately 2013 or a population of nearly 8,000 persons. The final clarifiers and pretreatment facility will require upgrading in 2014 and 2015 respectively.

The solids portion, or biosolids treatment, will be at capacity in approximately 2008. Several options were discussed for upgrading and the City is currently investigating a regional treatment option for their biosolids with another municipality.

Since many of the liquid processes will be at capacity at nearly the same time, it is recommended to upgrade the pretreatment, activated sludge process and final clarification at the same time. The treatment facility was originally designed to add on additional aeration basins and final clarifiers, which will facilitate the integration of the new processes. Additional pretreatment facilities could be added adjacent to the existing pretreatment facility. Any upgrade would also require additional piping, blowers, pumps, mechanical, and electrical systems. By adding additional processes, the operation and maintenance costs would also increase.

6. Cost Implications

The range of costs for upgrading the liquid stream portion (additional pretreatment facilities, activated sludge facilities, final clarifiers, and other necessary equipment) is estimated

between $ 4.5 to $ 7 million dollars. The cost for upgrading will be dependent upon the type of processes required and any potential changes in the City's effluent limits.

The operation and maintenance costs will increase due to additional power usage, chemical usage and additional maintenance requirements.

E. Sanitary Sewer Plans. Descriptions of proposed wastewater collection system and future improvements are included on pages 9-23 of this Chapter. These include the following items included in the City's Capital Improvement Plan:

TABLE 10-11
PROPOSED SANITARY SEWER CAPITAL EXPENDITURES

Year	Description	Cost
2008	Sewer NE Service Area Interceptor	1,340,000
2010	Lift Stations	100,000
2015	Extension of Trunk SW & W	4,500,000
2015	West/Southwest & Northwest Interceptor	4,500,000
2025	Southeast 9-B Collector	450,000

The wastewater treatment facility in Jordan was designed to accommodate future growth within Jordan and the growth area identified in the future land use plan. There is ample room for expansion on the plant site, if needed in the future. According to the City Engineer, the City's capacity will service a population up to approximately 12,000, which when using population projections in the Demographic Chapter of this Plan suggests current capacity should service the City through 2020, if the city's more aggressive growth projection occur, or 2030 if the Metropolitan Council's projection holds true. This may change however depending upon the type/volume of commercial/industrial users which locate within the community. An industry which uses high levels of water could consume a large portion of the city's capacity. For planning purposes, Bolton & Menk, Inc., anticipated 1500 gallons per acre per day for commercial/industrial properties. Industrial growth, as well as actual population growth, should be monitored and sewer capacity plans be made accordingly.

The City has a "Premature Subdivision" section in its Subdivision Ordinance, which allows for the denial of plats if the City is unable to service the area with municipal sewer, among other services. The City should carefully monitor capacity, and if needed, implement and exercise a premature subdivision clause if capacity becomes limited before an expansion can be completed.

F. Proposed Wastewater Collection System Improvements

Development within the 2030 Boundary as shown in **Figure 4** will occur in stages over the 22-year period. For the purposes of this report, no individual areas have been predicted to develop in specific 5 year increments, however development will be based on:

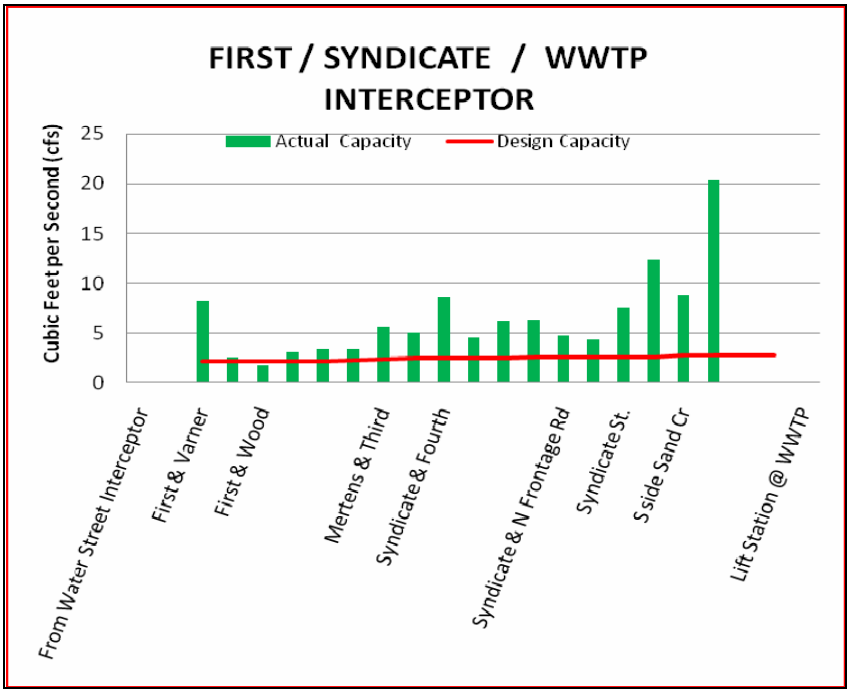
- The scheduled availability of sanitary sewer service
- Development requests and inquiries received by the City
- The predicted schedule for the improvement of the US 169 intersection with MTH 282
- The location of specific attractions such as the golf course and along some of the bluffs

1. Syndicate Street Service Area (Existing Service Area)

The Syndicate Street Interceptor's current service areas in green and future areas shown in light green in Figure 9 are completely within the 2030 Planning Boundary. As shown, this

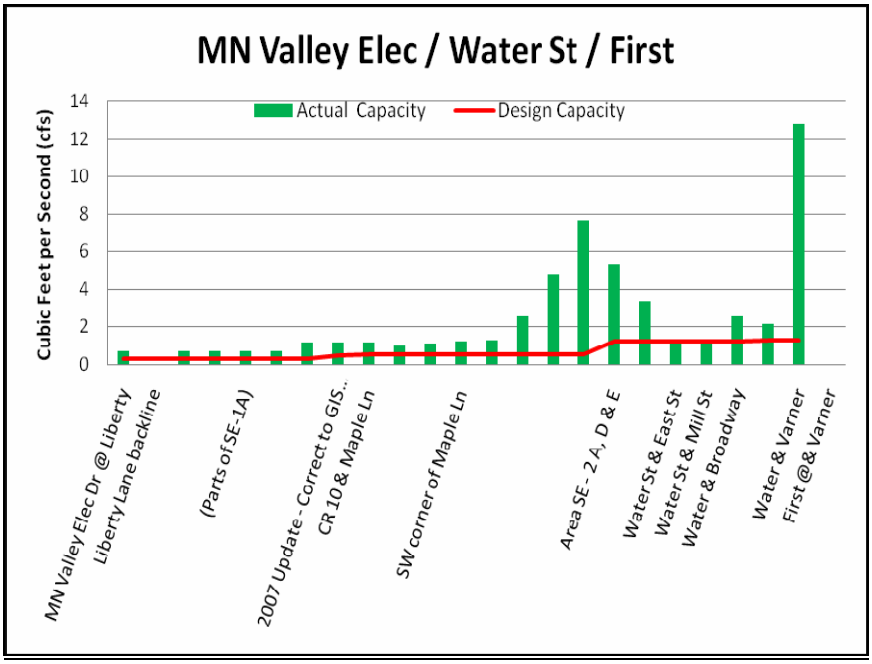
district includes the older parts of the city. The sewers were extended to serve the bluff areas to the west and the area south of TH 282, to the east. The potential service area to the east, shown on **Figure 9** could be included in the Creek Lane interceptor but is included here to maximize utilization of the capacity available in the Syndicate Street sewer rather than waiting for the northeast quadrant to develop or taxing the Creek Lane interceptor. It also permits development of a portion of the Ames property sooner, than would otherwise be anticipated.

The Syndicate Street district has a gravity sewer service boundary that includes limited growth areas near the top of the bluff. The existing interceptor sewer does have adequate capacity to accept flow from these areas with the extension of 8" sanitary sewers. See **Figure 9**.



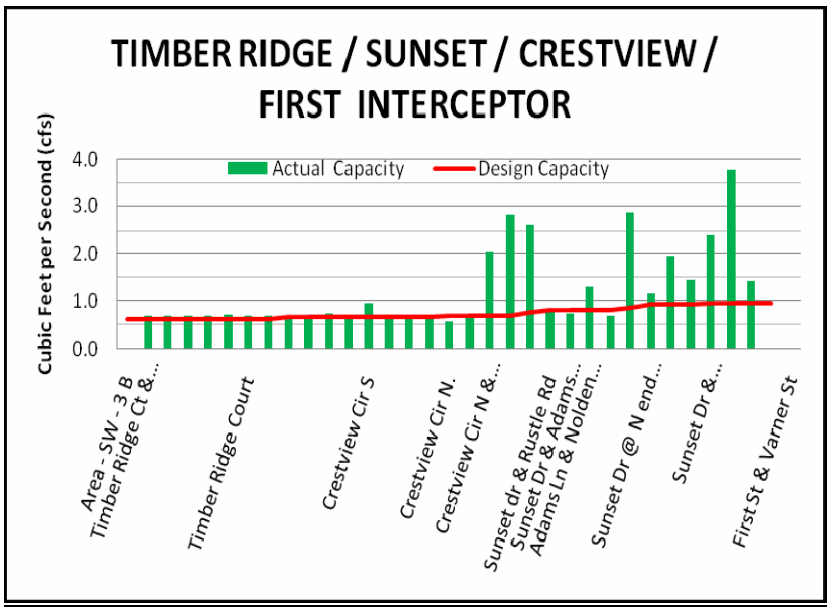
This district will continue to discharge into the Lower Sand Creek corridor near the intersection of Syndicate Street and Sand Creek, discussed above.

First / Syndicate - From WWTP to the intersection of First & Varner - This is the major interceptor which accepts flow from the other trunk lines in this district. The graph above includes full development of the tributary areas and the actual capacities generally exceed the necessary capacities, represented by the red line.



MN Valley Elec. - From First & Varner to MN Valley Elec. - This sub-district of First and Syndicate collects the flow from the east leg of the Syndicate Street interceptor, along the south side of TH 282. The large 'actual' capacities are caused by the sewers that have increased slopes along the side of the escarpment. This sewer is already extended to its maximum gravity service area and its design and actual capacities are shown in the graph above.

Timber Ridge - From First & Varner to Aberdeen & Sunset - This collector runs around the north end of Mill Pond to serve the bluff area south of US 169. The previous analysis illustrated some excess capacity; however, the predicted density for SW-3B has been revised to 50 acres at 3 units per acre and 35 acres at 8 units per acre. Therefore, attempts to develop SW-3B at a higher density or add pump stations to serve more area may cause overloading the reaches of the downstream portion of this collector. In addition, the topography prevents gravity collection further than is already included here.



The Syndicate Street interceptor, as shown, is at its maximum service area.. The Creek Lane district to the south prohibits any further expansion in that direction and the valley to the north makes expansion in that direction unnecessary. The conclusion is that the Syndicate Street interceptor is adequate to accommodate its district boundaries shown and development to "in-fill" the district at the designated densities can be permitted with little or no risk of overtaxing the collection system.

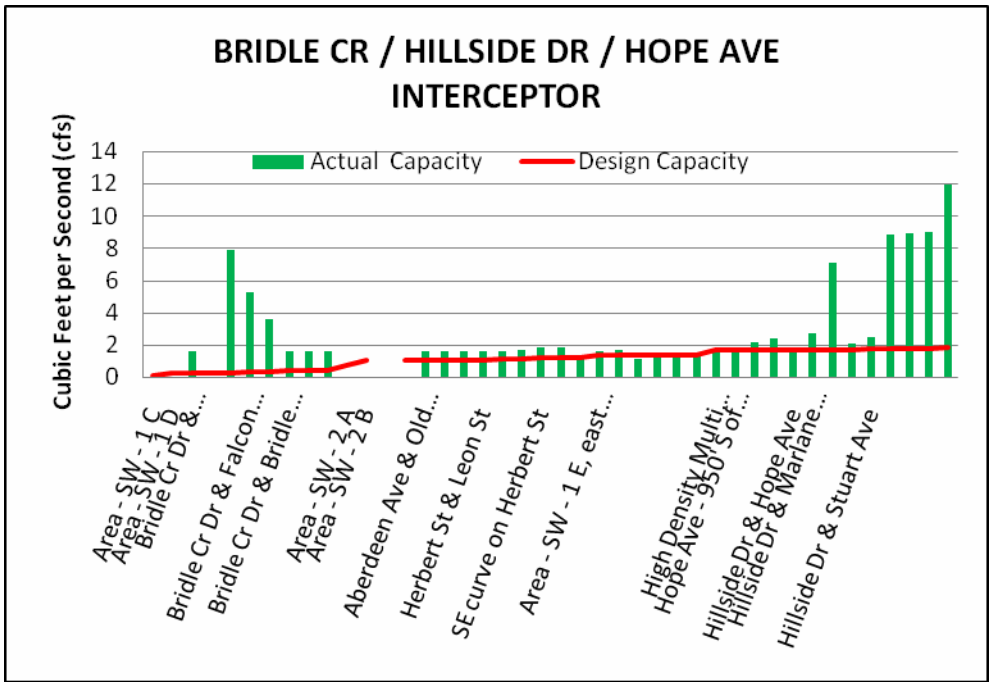
2. Creek Lane Service Area (Existing Service Area)

Creek Lane Interceptor - The current, direct service area is shown in YELLOW in **Figure 2**. In the time since the 2005 Update the City has approved or committed several areas to the southwest and southeast to be served with this interceptor. The City also constructed the wet well and diversion chamber for the recommended pump station near where Sawmill Road crosses Sand Creek but it was not necessary at that time to install the pumps or construct the forcemain the west/southwest interceptor.

Three major and one minor interceptor are tributary to Creek Lane, in addition to local connections. They are:

- Bridle Cr / Hillside Dr / Hope Ave Interceptor
- Broadway Interceptor – South (minor)
- Upper Sand Creek – West Side
- Upper Sand Creek - East Side – This includes an extensive area south and east of the city that will be served through a ravine to Sand Creek.

The areas to the southwest are tributary through the Bridle Creek Interceptor from Park Dr & Hillside to Aberdeen & Old 169. The graph below shows the capacity situation of the Hillside Drive interceptor once full development would be attained, with all the newly approved and committed developments.



The unused capacities on the ends of the graph represent regions where the sewer is going downhill at steep slopes, which increases the capacity. However, the sewers between Herbert Street and Hope Avenue may require upsizing to avoid backups. Given the improvements in the surrounding area, the cost could be significant.

A second option exists. The 48-acre tributary area (SW-3A) at the northwest corner of Aberdeen and Old 169 is not yet developed or committed. The Timber Ridge interceptor cannot accept any additional area but if this area was held from development at this time and directed to the west/southwest interceptor when constructed, it would alleviate the problem between Herbert Street and Hope Avenue. This could require a small pump station to serve the 48 acres.

One flow logger should be installed in this interceptor to serve as an alarm. When the actual flow in this interceptor approaches 2/3's of the design capacity, the City must install the pumps in the upper Sand Creek Pump Station and begin diverting the wastewater west through old 169 to the new West/Southwest interceptor.

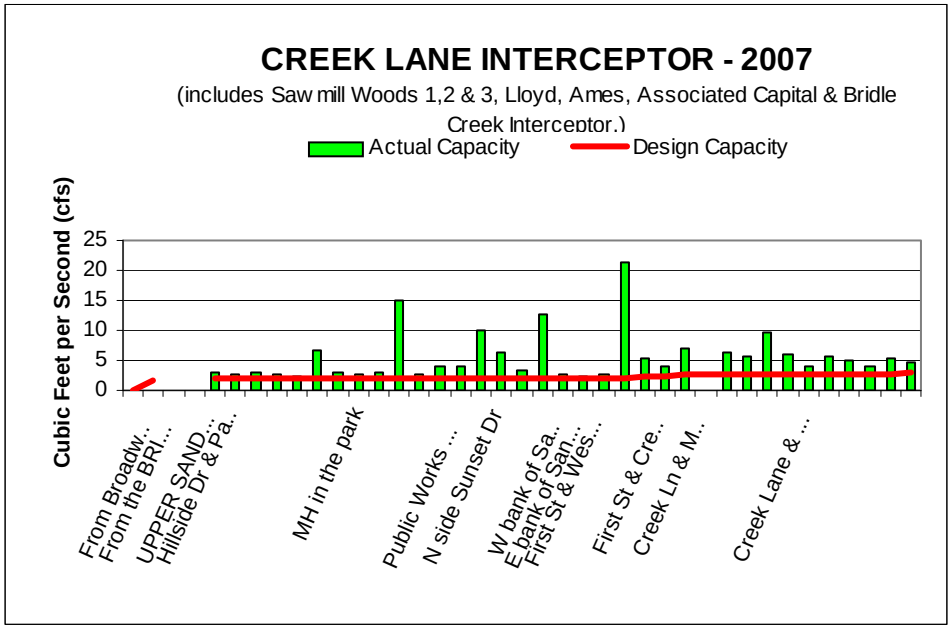
The Creek Lane Interceptor's extension to the site of the Upper Sand Creek Pump Station has greatly expanded immediate availability of sanitary sewer service to areas on both sides of Upper Sand Creek. However, the transportation system modifications are not scheduled to serve the areas east of Sand Creek until after 2030.

3. Creek Lane Service Area (Future Service Areas)

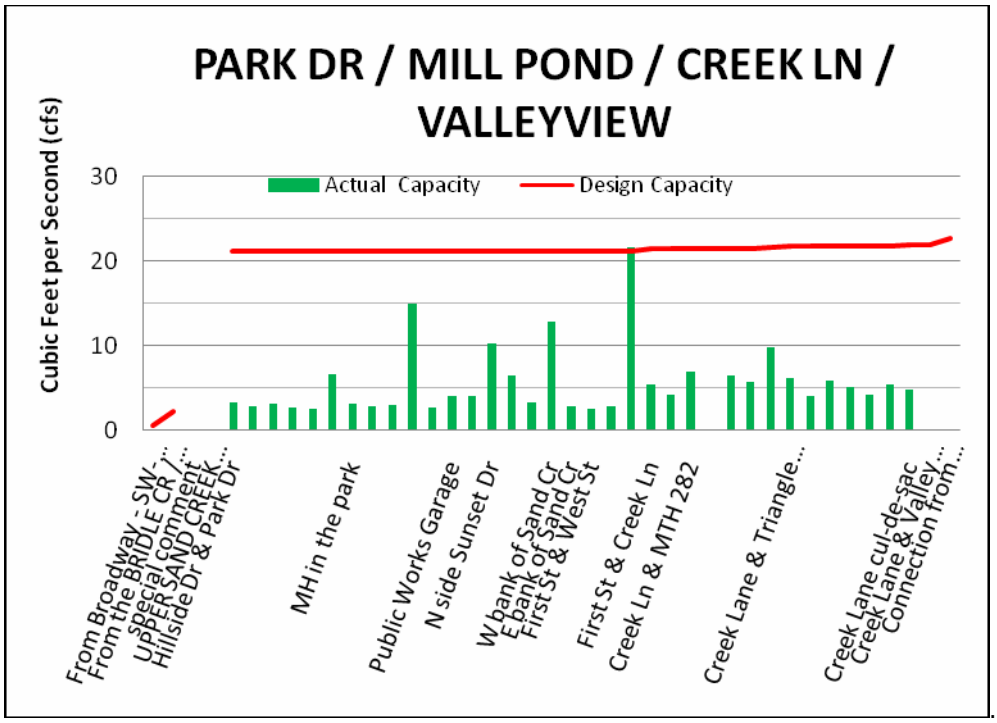
Construction has started that will serve the entire area between the city and beyond the golf course for approximately 1 mile. An extension of interceptor sewers along Sand Creek and Broadway, as shown in **Figures 7A & 7B** could help in developing the area.

Lower Sand Creek - The Creek Lane Interceptor extends from the WWTP to the intersection of Park Drive and Hillside Drive. This major interceptor accepts flow from the other collector lines in this district including, the flow from the Bridle Creek Interceptor, discussed above, and discharges to Syndicate Street at the WWTP. However, the vast majority of the tributary area is in the Upper Sand Creek area.

In the period 2005 through 2007, the City committed to provide sanitary sewer service to Sawmill Woods 1, 2, & 3, Lloyd, Ames and Associated Capital properties through plats or concept plans. The interceptor in Sawmill Woods, on the west side of Sand Creek, can serve these areas without installing the pumps in the new lift station structure, the forcemain or the west/southwest interceptor. As shown in the graph below, all the capacity in the Creek Lane Interceptor will be used.



However, any extensions further up Sand Creek, up Old 169 or up Hillside Drive, beyond those listed may result in back-ups in the park area and on First Street in downtown as shown on the graph below for service to the entire tributary area. The difficulty in determining precisely how much area can be added without over burdening the existing sewer is significant.



Therefore, the City's flow loggers were installed to monitoring sewer flow and preliminary measurements have been taken in this sewer. They revealed that current flow levels do not approach either the actual or design capacities but this can be misleading. There are many reasons for this; including

- Open areas that have not yet been developed
- Current, personal water use volumes for the population may not be as estimated
- The timing of water use during this period may not be as predicted in the *Ten States Standards* peaking factor

These loggers will continue to monitor flows at strategic locations throughout the city. When they reveal that capacity utilization of the Creek Lane Interceptor is approaching 70%, the City should perform appropriate designs and:

- Populate the pump station with pumps
- Construct the forcemains in Old 169 to the west
- Construct the West/southwest Interceptor

4. Upper Sand Creek Service Area (Upstream from Sawmill Road) -

The extension of the West Side of Sand Creek Interceptor has been started with the development of Sawmill Woods. The construction of the pump station structure was included but the equipment and the forcemain to the west/southwest interceptor are in the future.

From the previous study, the alternative to construct two interceptors in the Sand Creek valley was chosen. Individual collector sewers will be constructed up each ravine to serve tributary properties away from Sand Creek and the ravines.

This involves constructing individual interceptor lines on either side of Sand Creek, near the toe of slope. By crowding the toe of slope and keeping the invert above the flood plain, the sewers could then have a higher elevation, which may not require rock excavation. One or two inverted siphons may still be required to cross the Creek, especially in the more upstream area.

Figure 7 illustrates the collector sewers that bring wastewater to the Sand Creek Interceptors. These will follow the ravine topography in the area.

However, the southern most portion of this service area is more tributary to County Road 8. The north frontage east of TH 21 is the Ridges at Sand Creek Golf Club with limited potential for the generation of wastewater. Therefore, the most likely way to service the SE-10B and SW-6C districts will be to construct another pump station near TH 21 and County Road 8. A forcemain along TH 21 would carry the wastewater flow northward to near the northwest corner of the Golf Club where it can discharge into the SW-9B collector.

Since the properties along Golfview Drive are already developed, the area may best be served with a pressurized sewer system.

Although the existing Creek Lane Interceptor has adequate capacity to transport wastewater from the existing committed and developed areas to the WWTP, there is insufficient capacity to service all areas that are tributary to the Creek Lane interceptor route.

Current Status

Flow monitors have been installed at strategic locations in the wastewater system to monitor the growth in flow as home construction proceeds to fill in the developing subdivisions. To date, adequate capacity is available for continued home construction but virtually all capacity has been allocated to previously approved developments.

The Sawmill Road sewer and the first leg of the Upper Sand Creek interceptor sewer are constructed. One element of that project was the construction of the diversion chamber in anticipation of the lift station. In the distant future, the design of the chamber will permit maximum utilization of the capacity in the Creek Lane interceptor and thus minimize lift station operation. As long as it can, Creek Lane interceptor to accept all tributary flow.

Once the pump station is populated with pumps, the diversion gate will be closed; thus forcing all flow into the pump station. The flow will be pumped westerly on Old 160 to the west/southwest interceptor.

Eventually, when the flow is sufficient, an automatic gate can be set to monitor the flow in the Creek Lane interceptor. It would permit some flow to continue down the interceptor when the direct tributary flow permits. This will lessen the electric usage of the station as well as the wear.

5. West/Southwest Interceptor (W/SW) Service Area

Currently, this is an unsewered area requiring a new interceptor sewer. The City is currently considering a feasibility report to extend a primary interceptor along the railroad from the WWTP to the intersection of Delaware Avenue (CR 59). Eventually, this will also serve the Upper Sand Creek Area through the lift station to be constructed on Sawmill Road and the forcemains to be installed in Old Highway 169. Together, these improvements will greatly expand immediate availability of sanitary sewer service to all areas west and south.

One of the priority routes for a major collector discharging to this sewer is up the first ravine west of the city that comes from the south; out of the bluff south of US 169. Any new subdivisions near the bluff line that use pump stations may be able to redirect the wastewater to this interceptor and the pump stations decommissioned. The surrounding area will then be immediately available for development, as shown in **Figures 10A and 10B**. Until then, development is limited by the capacity of the Creek Lane Interceptor,

This collector will also be receiving the flow from the Upper Sand Creek Pump Station (discussed earlier) when it is commissioned. Currently, flow coming to this pump station

location is directed to the Creek Lane Interceptor. Creek Lane does have sufficient uncommitted capacity at this time, however the ultimate build-out of the tributary area will require commissioning the station and constructing the necessary dual forcemain along Old US 169 to west of Aberdeen. The dual forcemain is necessary to accommodate the lower flows during its first years of operation, but eventually it will be necessary to add another, larger forcemain to meet the demand of final build-out.

Portions of this W/SW interceptor corridor that have convenient vehicular access, as shown in **Figures 11A through 12B**, are anticipated in the 2008-2012 stage of growth.

An approximate routing and sizing for the interceptor and collector sewers to serve this area is shown on **Figure 11**.

The target invert elevation of the interceptor at the intersection of US 169 and Delaware Avenue is 749 MSL and the surface elevation along the highway in this area is 760. The eleven-foot depth will be capable of serving the business area immediately adjacent to the future interchange at Delaware Avenue. Extension of trunk sewers to the north, and south, in Delaware will provide service to those areas away from US 169.

Most of this interceptor will be 42-inch diameter and laid at a 0.16% grade in order to accommodate the ultimate service area. Initially, this could present problems, such as the following:

Sewers must reach a certain minimum flow (cfs) in order to keep solids suspended in the flow. This is referred to as the "scour velocity" which is 2 feet per second. A flow of 1.82 cfs at a depth of ½ feet will achieve this.

Because of the relatively long run at potentially minimum flows, there should be an expectation that hydrogen sulfide gas will be released from the decomposition of the waste in transit. This gas attacks concrete and can lead to complete deterioration of concrete pipe material. It is recommended that pipe materials other than concrete be considered for construction of this interceptor or a protective coating can be applied to concrete materials. The manholes should also be coated with a protective coating.

The downstream portion of this interceptor (W/SW) could follow the alignment of Valley View Drive since right-of-way is already available. However, the added depth may warrant the acquisition of right-of-way or an alternate alignment.

The sewer would be extended to the foot of the ravines coming out of the bluff to the south. Trunk collector sewers may then be extended up the ravines to serve future development in the area.

Although development of this area will take many years, a detailed design should be considered in the relatively near future to allow coordinated construction with Mn/DOT's reconstruction of US 169. Crossings of US 169 and the proposed intersection at CR 59 could then be installed in advance of the main interceptor.

The option selected for extending service to the Upper Sand Creek area through the construction of the lift station and forcemain to the west is reflected in the capacity of the pipes recommended for the W/SW Interceptor.

The City may also wish to include additional capacity to service the areas beyond the ultimate development boundary shown but the need for that capacity will be decades off. The City could acknowledge the situation by securing additional right-of-way.

6. 195th Street Service Area

Currently, an unsewered area requiring anew collector sewer that will tie into the portion of the Creek Lane Interceptor in Valley View Drive or the W/SW Interceptor. The Union Pacific Railroad, Creek Lane, Township Road 57 and the limits of the tributary area that bound this area. Land uses are projected to be a combination of commercial / industrial and residential as shown on the land use drawing. See **Figures 4 & 8A**. The connection to the Valley View Drive system will be made near the intersection of Valley View Drive and Creek Lane.

Although this is designated as an individual service area, the wastewater flow will likely be divided three ways as shown on **Figure 6C**:

Directly to the West/Southwest Interceptor upstream (southwest) from 195th Street or at the intersection of Delaware Avenue.

Directly to a collector to be constructed in 195th Street which will discharge to the Valley View Drive interceptor.

Directly to the West/Southwest Interceptor downstream (northeast) from 195th Street.

The ultimate flow pattern will depend on the final route and connections chosen for the W/SW interceptor. See **Figures 10A, 10B, 13A & 13B**. The main interceptor would service both the 195th Street Service Area and the West / Southwest Service Area.

7. Valley View Drive Service Area -

This area is heavily subdivided, as shown in **Figures 13A through 14**, is currently serviced through the CSAH 9-collector sewer. The current density is relatively low and the area is surrounded by other service areas in this study therefore it will not be expanded. Valley View Drive is the primary access route to the WWTP using existing public rights-of-way. Currently, it receives the flow from its own direct service area (rather limited), the Creek Lane interceptor and the CSAH 9 interceptor. In the future, the Minnesota River service area will be connected.

In addition, a feasibility study for the West/Southwest interceptor could conclude that it is advantageous to utilize this same route since the right-of-way is already available.

Continued development within this area enjoys direct connection to the Valley View Drive Interceptor and should be allowed to continue. No new major collector or interceptor sewers are required to reach the property. See **Figure 14A**.

8. Northeast Service Area- (Beyond the 2030 Boundary)

Currently, an unsewered area requiring a new interceptor sewer route to wastewater treatment plant (WWTP) to the ravine at the southeast corner of TH 21 and US 169. From that point, trunk collector sewers may be extended up the various ravines as shown on **Figures 16A & 16B**. These extensions will be capable of directly serving the gravity service portion of the area.

Development in the northeast sub-districts (NE – 3, NE – 4, and NE – 5) is more difficult to be served directly by the gravity collection system without constructing another interceptor in US 169 or installing another pump station with forcemain. Properties located in this area may be best served with pressurized sewers.

The areas to the north and east from the former study limit represent part of the area added by extending the Ultimate Boundary Area.

9. Minnesota River Service Areas - (Easterly end is within the 2030 potential) This area lies on the side-slope of the Minnesota River, north of the city and will be served in two directions.

In previous reports, the Sioux Vista area and areas downstream (NE) were discussed as requiring construction of a new interceptor sewer from near the intersection of Valley View Drive and Syndicate Street. This was presented in the Northwest Quadrant Growth Study Report and shown in **Figures 8A & 8B**. Near this intersection, the new interceptor will discharge into the Creek Lane Sewer or the West / Southwest Interceptor and flow south in Syndicate Street to the WWTP.

Significant portions of Sioux Vista have been developed as unsewered hobby farms. For long term planning, it should be acknowledged that future redevelopment and lot splits may

occur and the density could increase. However, the ultimate density will always be relatively light.

The 740 MSL contour generally defines the limit of areas within Sioux Vista that can be serviced directly by gravity flow to the WWTP. The properties located between the 740 contour and the flood plain boundary of the Minnesota River must be serviced with on-site systems, pressurized sewers or a small lift station.

The area to the west and further upstream from Sioux Vista along Park Boulevard will be served by the construction of an approximately 1,427-gpm lift station as shown in **Figure 12A & 12B**.

The Sioux Vista area itself could be served in either of these directions depending on timing and detailed design of the system.

10. West 169 Service Area (Beyond the 2030 Boundary)

The area on either side of US 169 from ½ mile to 1 mile west of Delaware Avenue will require the installation of a 3,200-gpm lift station on the south side of US 169 as shown in **Figures 11A & 11B**. The lift station will serve everything in the west and southwest portions of the Ultimate Service Area. The 220th and 228th Street service areas will discharge through the ravine east of Delaware and flow north to 169 where they can connect to the 169 Intecptor.

The forcemain from the lift station will discharge to the gravity sewer installed to serve the frontage road businesses. The discharge manhole should be near Suzette's Restaurant.

11. Delaware Avenue North Service Area (Beyond the 2030 Boundary)

As shown in **Figures 12A & 12B**, a trunk sewer will be extended northward in Delaware Avenue from US 169 to serve this area. This trunk will also receive the flow from the Park Boulevard lift station, which serves the upstream (westerly) portion of the Minnesota River service area.

12. Delaware Avenue South Service Area (Beyond the 2030 Boundary)

Service to the bluffs on the south side of US 169 will be provided by the extension of a trunk sewer south in Delaware Avenue from US 169, as shown in **Figures 11A & 11B**. Generally, it will be constructed near the bottom of the bluff and individual collectors will be extended up the ravines to the south.

13. 220th Street Service Areas (Beyond the 2030 Boundary)

The area on the north side of 220th Street W is broken into two service areas, as shown in **Figures 11A & 11B**. The westerly portion (SW-7C&D) will be served by a 346 gpm lift station.

The forcemain will extend easterly, as shown, and discharge into the second service area (SW-7B).

Ultimately, the flow from the 220th Street W service areas will flow across Delaware Avenue to the northeast and down the ravine to the north. Eventually, it will connect to the West / Southwest interceptor along US 169.

14. South of 220th Street (Beyond the 2030 Boundary)

On the most western portion of this area, gravel mining is being performed on\some specific sites. Therefore, it is recognized that the topography will be changing.

The northwesterly portion of the area can be served with straight forward connections across 220th Street. The southwest corner will require a pump station to accommodate the 316 acres in SW – 5J. The flow from this area will be to the east to the first ravine east of Delaware and then north to US 169.

15. 228th Street, west of Delaware Street

In the very southwest corner of the Ultimate Service Area is a comparatively small district that must be served by its own 600 gpm lift station. The discharge will be to the east in District SW-5I and flow into the collector in the first ravine east of Delaware.

16. Properties Beyond Municipal Service Boundary

It is acknowledged that there are specific properties within the Ultimate Service Area For which a gravity connection or even pressurized sewers to the municipal treatment system is physically impractical or impossible.

On-site and clustered treatment systems should be considered as viable alternatives but historically the operation and maintenance of these systems has frequently been neglected.

Therefore, at some point in the future it may be necessary for the City to expand its wastewater department to include the operation, monitoring and maintenance of such systems as a part of the utility operation.

G. Estimated Costs and Recommendations

1. Basis of Cost Analysis - For the purpose of estimating cost, it is assumed that there will be no easement or right-of-way costs involved with any of the proposed improvements.
2. Upper Sand Creek Lift Station / Force Main - See **Figures 7A & 7B**.

   This will require a dual forcemain (14" & 10") to reach the West / Southwest Interceptor. Initially, there will be insufficient flow to operate a large diameter main; therefore the smaller one is required. But in the future, as the area develops a single smaller diameter forcemain would be inadequate to carry the flow.

   The City has constructed the lift station diversion chamber with the Sawmill Road project. The design of the diversion chamber allows the installation of control gates in the future. By automatic monitoring the flow in the downstream Creek Lane interceptor, the gates will be capable of allowing gravity flow into Creek Lane when it is capable of accepting it. This will permit limiting operation of the lift station to times that the flow demands it.

   The interceptor and arterial sewers within the West / Southwest service area will require over sizing to accept the capacity of the pump station.
3. Service Area Collector Sewers

   Other, less critical, interceptor and trunk collectors are necessary throughout the study area to deliver the wastewater to the WWTP. Specific reaches of these sewer routes may extend through areas in which the sewer can directly service neighboring properties; however, for the purposes of this study, it was assumed that no portion of the cost would be directly assessable.

   The approximate routes and sizes are shown on individual figures for each of the service areas:

TABLE 10-12

Service Areas Within the 2030 Planning Boundary		**New Area Served - Acres**	
	Fig. No.	Residential	Commercial
Syndicate Street Service Area Extension	9	277	30
Southeast 10 Collector (C.R. 8 extended westerly)	7	278	28
Southeast 9-b Collector	7	232	0
Southeast 9-a Collector	7	358	0
Upper Sand Creek - West Side (Directly Tributary)	7	86	0
Broadway Interceptor - South - Se-6 Taken to Sand Creek	7	30	0
Bridle Cr / Hillside Dr / Hope Ave Interceptor	10	344	0
West And Southwest Interceptor	6	1776	283
195th Street Collector	13 & 14	0	172
Valley View Service Area	8 & 13	30	0
MN River Interceptor	8 & 13	857	0
Approximate New Acreage Served Within the 2030 Planning Boundary		4268	513

Service Areas Between the 2030 Planning Boundary and the Ultimate Service Area		**New Area Served - Acres**	
	Fig. No.	Residential	Commercial
Northeast Growth Area - TH 282 Interceptor	5	992	107
Northeast Growth Area - US 169 Interceptor	5	369	0
Upper Sand Creek - East Side (Directly Tributary)	7	399	0
Southeast 2 – Sawmill Rd., Ames	7	109	0
Southeast 7 Collector		861	0
Southeast 8 Collector	7	337	0
Park Boulevard Service Area	11	627	27
Delaware Avenue North Service Area	11	82	396
West US 169 Service Area	12	238	91
Delaware Avenue South Service Area	12	259	113
220th Street Service Areas	12	378	0
Approximate New Acreage Served **Between the 2030 Planning Boundary and the Ultimate Service Area**		4651	734

In summary, the cost of extending sewer service to each of these service areas, as shown, is:

TABLE 10-13

ESTIMATED COST SUMMARY

Service Area	Estimated Cost
Northeast Service Area - TH 282 Interceptor & Collectors – Includes US 169 Crossing	$2,325,000
Northeast Service Area - US 169 Interceptor & Collectors	$1.330,000
Syndicate Street - May be served without over sizing.	$0
Southeast 7 Collector	$2,003,000
Southeast 8 Collector – Includes all the SE corner	$3,850,000
Southeast 9-a Collector	$787,200
Southeast 9-b Collector (Includes Lift Station to Serve the SE-10 Service Area)	$951,900
Sand Creek - East Side Interceptor	$2,959,200
Sand Creek - West Side Interceptor	$305,500
West/southwest & Northwest Interceptor	$5,991,586
195th Street Collector	$173,090
MN River Collector	$1,757,532
Park Boulevard Service Area (Lift Station)	$1,917,308
Delaware Avenue North Service Area	$665,732
West US 169 Service Area (Lift Station)	$1,118,429
Delaware Avenue South Service Area	$379,467
220th Street Service Area (Lift Station Area – West)	
220th Street Service Area (Gravity Portion – East)	$0
Total Estimated Cost ===	$26,210,000
* Acreage included in individual tributary service areas.	

4. Cost Analysis

Assuming the City pursues these recommendations, the estimated total cost of the collection system is $ 26,210,000. Given the approximate new area served, the City's current fee of $2,601 per unit is appropriate to cover the City's participation for the construction, right-of-way acquisition, financing, etc. included in this study.

Attempts were made in this study to limit the tributary area calculations to developable property and omitting the escarpments, flood plains, ravines, etc. If the gross areas were included in the design, the capacities of the sewers would have been inflated which would have inflated the cost projections.

The current City policy applies the Sewer Area / Capital Charge to the gross area of each property. As development expands into less efficient topographic areas, the City may want to consider limiting charges to the "net" area of a development. This could only exclude areas prohibited from development by existing ordinances, i.e., the escarpments, flood plains, wetlands, etc.

H. Sanitary Sewer Rates and Fees. Sewer rates effective in 2007 were $10.28 per month as a base charge and $3.25 per 1,000 gallons. The sewer area capital charge in 2007 was $2,706 per connection with single family homes at $1,624 per connection, condominiums or apartments at $1,028 pr unit, commercial and institutional buildings at $2,057 per connection and commercial/institutional multi-tenant buildings at $1,462 per connection. The City has adopted a fee schedule identifying the type of facility, parameters and number of connections.

I. ISTSs. As of May, 2006 there were twenty-seven (27) residential units and businesses in the city limits serviced by individual sewage treatment systems (ISTS). Minnesota Rules Chapter 7080 governs construction and abandonment of ISTS's. The City has contracted with Scott County Environmental Services office to implement MN Rules 7080 locally. Scott County requires ISTS's be pumped every three years by a licensed company. A list of sites with ISTS's follows, with a map of sites attached (Map 10-4). A copy of the Ordinance is attached as Appendix A to this Plan. The City also regulates ISTSs in the City Code, Section 3.04, Rules and Regulations Relating to Municipal Utilities.

TABLE 10-14
LOCATIONS OF EXISTING INDIVIDUAL SEWAGE TREATMENTS SYSTEMS IN JORDAN

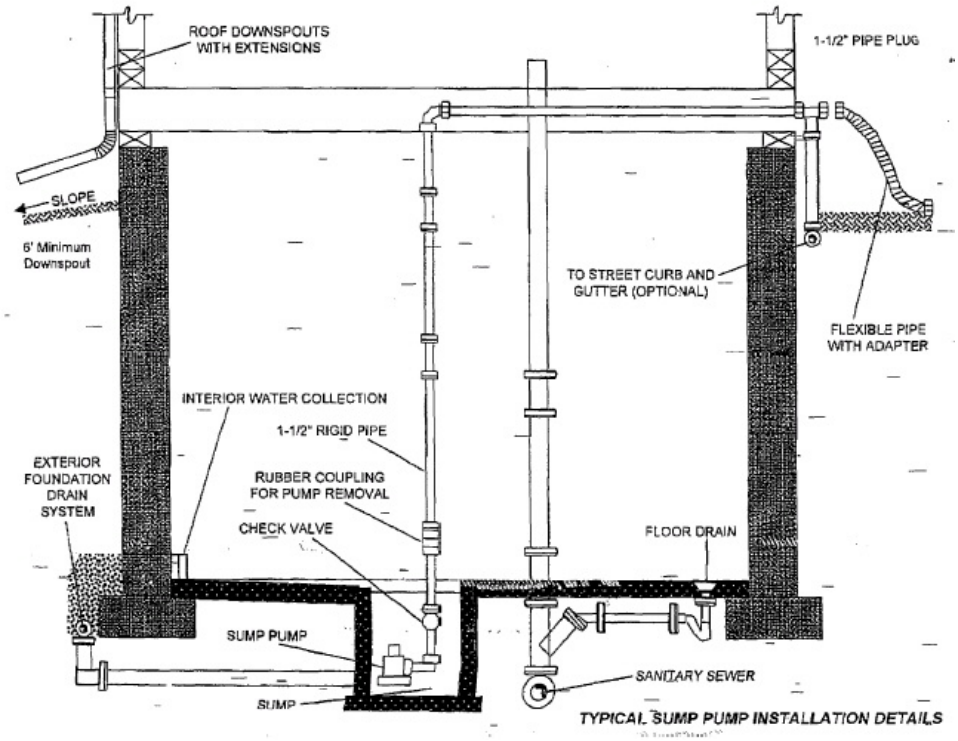
Address	Type of System	Date Installed
604 KIPP DR	GRAVITY TRENCH	8/20/1992
608 KIPP DR	GRAVITY TRENCH	6/15/1995
600 KIPP DR	GRAVITY TRENCH	6/3/1994
107 MEADOW WOOD CT	PRESSURE MOUND	5/19/1995
109 MEADOW WOOD CT	PRESSURE MOUND	1/1/1950
105 MEADOW WOOD CT	PRESSURE MOUND	1/1/1993
102 MEADOW WOOD CT	PRESSURE MOUND	1/1/1993
624 BROADWAY ST S		
625 BROADWAY ST S		
621 BROADWAY ST S		
613 BROADWAY ST S		1/1/1950
617 BROADWAY ST S		1/1/1950
104 SAWMILL RD		
230 QUAKER AV		
6050 190 ST W		
100 MEADOW WOOD CT	PRESSURE MOUND	10/25/2000
612 KIPP DR		
629 BROADWAY ST S		
710 BROADWAY ST S		
711 BROADWAY ST S		
103 MEADOW WOOD CT		1/1/1997
104 MEADOW WOOD CT		1/1/1993
106 MEADOW WOOD CT		1/1/1996
221 OLD HWY 169 BLVD		1/1/1990
101 MEADOW WOOD CT	PRESSURE MOUND	7/24/2001
100 SAWMILL RD	GRAVITY TRENCH	1/1/1996
125 MINN VALLEY ELECTRIC DR	HOLDING TANK(S)	5/15/2003

- Source: Scott County Environmental Services, May 2006

J. Infiltration/Inflow. The City has invested approximately $1 million over the past 12 years in the replacement of storm water infrastructure. It is estimated that less than 2% of the sanitary sewer system is older than 20 years. With the completion of the Highway 282 infrastructure project, this will be reduced to 0.5% of the infrastructure.

The City's Public Works Department monitors flows at the municipal wastewater treatment plant for any unusual activity which may be associated with infiltration.

Section 52.05 (D) of the City Code restricts connection of sump pumps to the sanitary sewer system, stating, "No sump pumps or tiles around perimeters can be allowed to drain into the sanitary sewer." The City Code notes failure to comply may result in penalties including charges of a misdemeanor. The City Code also illustrates the required plumbing of a sump pump, as depicted below:



K. Private Sewer Treatment Plants/Cluster Systems. The City of Jordan would not consider the approval of private sewer treatment plants or cluster systems for industries or manufactured home parks, as this would not be consistent with the City's long range sewer plan.

III. WATER.

A. Existing Water System.

The City of Jordan's municipal water system serves a majority of Jordan residents. A Comprehensive Water Supply Plan was completed in November 2007, and is **included as Appendix B** to this plan. The Water Supply Study, completed by engineering firm Bolton & Menk, Inc. evaluated the existing system and recommended improvements to the system. The study included an evaluation the existing system, impacts of future growth and recommended improvements to the water system. Following is a summary of the major components of the current water system.

Water Treatment Facility: 107 West Fourth Street.
The water treatment plant was constructed in 1991, with an upgrade in 2003. The plant removes volatile organic chemical compounds in an air stripping tower and iron and manganese are removed by feeding potassium permanganate to the aerated water.

Water Storage Facilities: The city has three elevated water storage facilities. The elevated storage facilities are located at 386 Sunset Drive, 521 Broadway Street South and within Timberline Business Park. The water towers were constructed in 1970, 1990 and 2005 respectively, and have a storage volume of 300,000 gallons, 500,000 gallons, and 500,000 gallons respectively. Repairs were made to the 1970 tower in 1995.

Wells: Jordan presently obtains its raw water supply from four wells. Under normal operating circumstances, all four wells discharge directly to the water treatment plant. The wells are located in the following locations:

Well # 3 - located at 501 North Varner
Well # 5 - located at 107 West 4th Street
Well # 6 - located at 611 North West Street
Well # 7 - located at 107 West 4th Street

One additional well, Well #8, is proposed at 107 West 4th Street to provide water supply to the Water Treatment Plant expansion.

Jordan draws its groundwater from a groundwater source with four wells ranging from 290 to 547 feet deep which draw from both the Ironton-Galesville aquifer and the Mount Simon-Hinckley Aquifer. The Minnesota Department of Health determined in 2005 that the Jordan source of groundwater *was not* particularly susceptible to contamination. Studies during that year show that no contaminants were detected at levels that violated federal drinking water standards, however, some contaminants were detected in trace amounts that were below the legal limits.

Water Distribution: A majority of Jordan's water distribution system consists of 12 inch loop water mains and 8 inch residential water mains. All existing distribution piping is either cast iron pipe or ductile iron pipe.

B. Wellhead Protection.

The City of Jordan adopted a Wellhead Protection Plan in 2003. The purpose of a Wellhead Protection Plan is to ensure the current and future safety of the City's drinking water supply and includes the following elements as required by the Minnesota Department of Health:

1. The delineation of the wellhead protection area and the drinking water supply management area.

2. An assessment of the vulnerability of the drinking water supply management area.

3. A review of expected changes to the physical environment, land use and surface and ground water sources.

4. A plan for the management of the wellhead protection area.

5. A plan to monitor the adequacy of wellhead protection measures and a plan to implement the wellhead protection plan.

The attached Water Supply Description, Emergency Preparedness Plan, and Water Conservation Plans were completed in 2007. The Water Works Plan includes a summary of current capacity as well as capital improvements required to serve the city to a projected population of 13,500 in the year 2030. The System Statement projects a population of 9,700 by 2020 and13,500 by 2030. The City is planning for a population of 13,500.

Included within this chapter is the Metropolitan Council required Water Supply Form which includes:

- A table of historic water demand,
- A list of large volume users,
- A description of treatment and storage facilities,
- Identification of groundwater and surface water sources,
- A table of 10 year demand projections,
- An assessment of resource sustainability including a contingency plan which meets the requirements of the MN Department of Health's Wellhead Protection Plan, and
- A summary of proposed capital improvements.

The Water Supply Description, Emergency Preparedness Plan, and Water Conservation Plan includes an overview of the city's water system components and connections.

C. Population and Projections

Following is a summary as it relates to the population projections identified within this Comprehensive Plan:

TABLE 10-15A
GROWTH PROJECTIONS AND ESTIMATED WATER FLOWS PER SYSTEM STATEMENT

Year	Estimated Total Population This Comp Plan	Estimated Employment Per This Comp Plan.	Estimated Flow for Projected Population and employment per 2008 Comp Plan
2006	5,043	1,632	0.50
2010	5,900	1,985	0.59
2015	7,800	2,340	0.78
2020	9,700	2,690	0.97
2025*	11,600	3,050	1.16
2030*	13,500	3,400	1.35

*Water flow estimates for 2025 and 2030 have been calculated by the City's Engineer based on the comprehensive plan's estimated population growth.

TABLE 10-15B
GROWTH PROJECTIONS AND ESTIMATED WATER FLOWS PER CITY PROJECTIONS

Year	Estimated Total Population This Comp Plan	Estimated Employment Per This Comp Plan.	Estimated Flow for Projected Population and employment per 2008 Comp Plan
2006	5,043	1,632	0.50
2010	5,900	1,985	0.59
2015	7,800	2,340	0.78
2020	9,700	2,690	0.97
2025*	12,350	3,050	1.24
2030*	15,000	3,400	1.50

TABLE 10-16A
WATER DEMAND PROJECTIONS PER SYSTEM STATEMENT PROJECTIONS

Year	Total Population	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2010	5,900	0.59	1.33	215
2020	9,700	0.97	2.18	354
2030	13,500	1.35	3.04	493

TABLE 10-16B
WATER DEMAND PROJECTIONS PER CITY'S PROJECTIONS

Year	Total Population	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2010	5,900	0.59	1.33	215
2020	9,700	0.97	2.18	354
2030	15,000	1.50	3.38	548

According to the 2007 Comprehensive Water Supply Plan., based on the 2030 population projections the average annual use is projected to be 1.35 million gallons per day (MGD), with a maximum day use of 3.04 MGD (2,110 gpm).

The 2007 Comprehensive Water Supply Plan Study Area is identified on Map 10-2 and is similar in size and geographic location to the future land use boundaries proposed within Chapter 6 of this Comprehensive Plan.

D. Water Utility Plans.

The Comprehensive Water Supply Plan approved in October, 2004, evaluates the existing municipal drinking water system and areas proposed to be serviced by municipal drinking water; includes an evaluation of the existing system, and recommends new construction routes and improvements to the existing water system to accommodate anticipated growth. If growth exceeds projections, it may be necessary to update the Water Plan to ensure sufficient planning and budgeting for capital expenditures related to water facilities.

The City has a capital improvement plan (CIP) for future water projects. The CIP includes the following capital expenditures over the next 20 years:

TABLE 10-17
CAPITAL EXPENDITURES FOR WATER PROJECTS

Year	Description	Water Utility Fund $ Amount	GO Water Revenue Bonds $ Amount	Total Expense
2008	Construct Water Treatment Facility		5,000,000	5,000,000
2008	Drill Well No. 8		300,000	300,000
2008	Water Main Costs	200,000		200,000
2009	Water Main costs	200,000		200,000
2010	Water Main Costs	200,000		200,000
2011	Water Main Costs	200,000		200,000
2012	Water Main Costs	200,000		200,000
2013	Water Main Costs	200,000		200,000
2014	Water Main Costs	200,000		200,000
2015	Water Main Costs	200,000		200,000
2015	Extension of Trunk SW & W		2,200,000	2,200,000
2015-2020	Construct 500,000 gallon elevated storage		1,500,000	1,500,000
2015	Pressure Reducing Station No.1		150,000	150,000
2016	Water Main Costs	200,000		200,000
2017	Water Main Costs	200,000		200,000
2017	Booster Pump Station No. 4	750,000		750,000
2018	Water Main Costs	200,000		200,000
2019	Water Main Costs	200,000		200,000
2020	Water Main Costs	200,000		200,000
2020	Pressure Reducing Station No.2		150,000	150,000
2021	Water Main Costs	200,000		200,000
2022	Water Main Costs	200,000		200,000
2022	Booster Pump Station No. 5		750,000	750,000
2023	Water Main Costs	200,000		200,000
2024	Water Main Costs	200,000		200,000
2025	Water Main Costs	200,000		200,000
2026	Water Main Costs	200,000		200,000
2027	Water Main Costs	200,000		200,000
2028	Water Main Costs	200,000		200,000
2029	Water Main Costs	200,000		200,000
2030	Water Main Costs	200,000		200,000
		$ 5,350,000	$ 10,050,000	$ 15,400,000
2030+	Drill Wells No. 9			
2030+	Drill Well No. 10			
2030+	Drill Well No. 11			
2030+	3300,000 Gallon Standpipe			
2030+	500,000 Gallon Elevated Storage			

E. Water Rates and Fees.

Water rates effective in 2007 are $8.12 base charge per month plus a volume charge of $3.25 per thousand gallons is charged. The City also charges a Water Connection Fees (WAC) of $1,408 per unit and a Water Area (Capital Charges) of $730 per single-family unit, $595 per condominium or apartment unit, $1,624 per commercial building or institutional facility unit and $730 per multi-tenant commercial building and institutional building unit. A fee schedule identifying the type of facility, parameters and number of connections has been adopted by the City. Rates are based on operational needs while WAC fees are based on estimated costs required to needed to support the construction of water facilities to service the new growth.

The City has included water conservation fines of $25 for a first offence, $50 for a second offense and $100 for the third or continuing offenses, in its fee schedule for 2007.

F. Wellhead Protection Plan.

The City of Jordan adopted a Wellhead Protection Plan in 2005, which was approved by the MN Department of Health (MDH) on November 29, 2005. The purpose of the Wellhead Protection Plan is to ensure the current and future safety of the City's drinking water supply and should include the following elements as required by the Minnesota Department of Health:

1. The delineation of the wellhead protection area and the drinking water supply management area.

2. An assessment of the vulnerability of the drinking water supply management area.

3. A review of expected changes to the physical environment, land use and surface and ground water sources.

4. A plan for the management of the wellhead protection area.

5. A plan to monitor the adequacy of wellhead protection measures and a plan to implement the wellhead protection plan.

Part 2, an amendment to the plan was completed in 2006. Part 2 included an inventory of the City's potential contaminant source, a potential contaminant source management strategy, the City's emergency/alternative water supply contingency plan and the City's wellhead protection program evaluation plan.

G. Water Emergency Plan.

The City's Water Emergency Plan is included in the following report on pages 21-25.

H. Water Conservation Plan.

The City's Water Supply, Preparedness and Conservation Plan is included in the following report.

I. Impact on the Comprehensive Plan.

The City's Water Plan is consistent with the various components of this Comprehensive Plan. The Water Plan has taken future land uses and population projections into consideration. Proposed capital improvement to the water system have been identified and stages to support growth, while evaluating the impact on various water rates.

WATER SUPPLY, PREPAREDNESS AND CONSERVATION PLAN

DNR Water Appropriation Permit Number(s)	1980-6175
Name of Water Supplier	City of Jordan
Address	210 1st Street East
Contact Person	Dave Bendzick
Title	Public Works Director
Phone Number	952-492-2535
E-Mail Address	dbendzick@ci.jordan.mn.us

PART I. WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION

The first step in any water supply analysis is to assess the current status of demand and supplies. Information in Part I, can be used in the development of Emergency Response Procedures and Conservation Plans.

A. ANALYSIS OF WATER DEMAND.

Fill in Table 1 for the past 10 years water demand. If your customer categories are different than the ones listed in Table 1, please note the changes below.
Customer categories correspond to categories listed.

TABLE 1 Historic Water Demand

Year	Total Population	Population Served	Total Connections	Residential Water Sold (MG)	C/I/I Water Sold (MG)	Wholesale Deliveries (MG)	Total Water Sold (MG)	Total Water Pumped (MG)	Percent Unmetered/ Unaccounted	Average Demand (MGD)	Maximum Demand (MGD)	Residential gallons/ capita/day	Total gallons/ capita/day
1997	3,000	3,000	-	-	-	-	-	117.42	-	0.32	-	-	107.2
1998	3,000	3,000	-	-	-	-	-	121.35	-	0.33	-	-	110.8
1999	3,637	3,637	-	-	-	-	-	135.00	-	0.37	0.64	-	101.7
2000	3,700	3,700	-	93.62	-	-	-	140.70	-	0.38	0.76	69	104.2
2001	4,100	4,100	-	112.20	-	-	-	153.30	-	0.42	0.90	-	102.0
2002	4,500	4,500	1,241	113.16	22.52	-	135.68	140.68	3.5	0.39	0.76	69	85.6
2003	3,833	3,833	1,386	127.24	20.03	-	147.28	169.36	13.0	0.46	1.03	91	121.0
2004	4,750	4,750	1,448	122.28	20.86	-	143.14	150.90	5.1	0.41	0.78	71	87.0
2005	4,900	4,900	1,550	121.38	21.56	-	142.94	152.12	6.0	0.42	1.04	68	85.0
2006	5,000	5,000	1,620	120.83	32.09	-	152.92	174.14	12.2	0.48	1.13	66	95.4

MG – Million Gallons **MGD** – Million Gallons per Day **C/I/I**- Commercial, Industrial, Institutional

Residential. Water used for normal household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens.

Institutional. Hospitals, nursing homes, day care centers, and other facilities that use water for essential domestic requirements. This includes public facilities and public metered uses. You may want to maintain separate institutional water use records for emergency planning and allocation purposes.

Commercial. Water used by motels, hotels, restaurants, office buildings, commercial facilities, both civilian and military.

Industrial. Water used for thermoelectric power (electric utility generation) and other industrial uses such as steel, chemical and allied products, food processing, paper and allied products, mining, and petroleum refining.

Wholesale Deliveries. Bulk water sales to other public water suppliers.

Unaccounted. Unaccounted for water is the volume of water withdrawn from all sources minus the volume sold.

Residential Gallons per Capita per Day = total residential sales in gallons/population served/365 days **Total Gallons per Capita per Day** = total water withdrawals/population served/365 days

NOTE: Non-essential water uses defined by Minnesota Statutes 103G.291, include lawn sprinkling, vehicle washing, golf course and park irrigation and other non-essential uses. Some of the above categories also include non-essential uses of water.

Water Use Trends. Discuss factors that influence trends in water demand (i.e. growth, weather, industry, conservation). If appropriate, include a discussion of other factors that affect daily water use, such as use by non-resident commuter employees or large water consuming industry.
Water demand is influenced by seasonal variations of weather.

A. TABLE 2 Large Volume Users - List the top 10 largest users.

Customer	Gallons per year	% of total annual use
Valley Green, MHC, LLC	6,099,404	4.31
Valley Green, MHC, LLC	2,200,288	1.56
Nelson, Kathy	1,032,185	0.73
PEMBCO	959,828	0.68
Werford Square HOA	844,082	0.59
Theatre Building	771,241	0.545
Miller, Jessamyn	766,498	0.541
Fairbanks, Mary	703,094	0.49
Jordan Middle School	661,207	0.46
Jordan Elementary School	630,677	0.44

B. TREATMENT AND STORAGE CAPACITY.

III. TABLE 3(A) Water Treatment

Water Treatment Plant Capacity	1,660,000	Gallons per day
Describe the treatment process used (ie, softening, chlorination, fluoridation, Fe/Mn removal, reverse osmosis, coagulation, sedimentation, filtration, others). Also, describe the annual amount and method of disposal of treatment residuals, if any.		
See Appendix A		

TABLE 3(B) Storage Capacity - List all storage structures and capacities.

Total Storage Capacity		**Average Day Demand** (average of last 5 years)	
1,346,000	Gallons	430,000	Gallons per day
Type of Structure	Number of Structures	Gallons	
Elevated Storage	2	800,000	
Ground Storage	1	46,000	
Other:0	1 (Standpipe)	500,000	

C. WATER SOURCES. List all groundwater, surface water and interconnections that supply water to the system. Add or delete lines to the tables as needed.

TABLE 4(A) Total Water Source Capacity for System (excluding emergency connections)

IV. Total Capacity of Sources	2,900	Gallons per minute
Firm Capacity (largest pump out of service)	1,800	Gallons per minute

TABLE 4(B) Groundwater Sources - Copies of water well records and well maintenance information should be included with the public water supplier's copy of the plan in Appendix B.

Well # or name	**Unique Well Number**	**Year Installed**	**Well & Casing Depth (ft)**	**Well Diameter (in)**	**Capacity (GPM)**	**Geologic Unit**	**Status**
Well #3	207133	1950	221	24	600	Ironton - Mt. Simon	Active
Well #5	462924	1991	225	18	450	Ironton - Galesville	Active
Well #6	596649	1999	220	18	750	Ironton - Galesville	Active

Well #7	693065	2003	370	24	1100	Mt. Simon-Hinkley	Active

Status: Active use, Emergency, Standby, Seasonal, Peak use, etc. GPM – Gallons per Minute
Geologic Unit: Name of formation(s), which supplies water to the well

B. TABLE 4(C) Surface Water Sources

Intake ID	Resource name	Capacity (GPM/MGD)
N/A		

GPM – Gallons per Minute MGD – Million Gallons per Day

V. TABLE 4(D) Wholesale or Retail Interconnections - List interconnections with neighboring suppliers that are used to supply water on a **regular basis** either wholesale or retail.

Water Supply System	Capacity (GPM/MGD)	Wholesale or retail
N/A		

GPM – Gallons per Minute MGD – Million Gallons per Day

VI. TABLE 4(E) Emergency Interconnections - List interconnections with neighboring suppliers or private sources that can be used to supply water on an emergency or occasional basis. Suppliers that serve less than 3,300 people can leave this section blank, but must provide this information in Section II C.

Water Supply System	Capacity (GPM/MGD)	Note any limitations on use
N/A		

GPM – Gallons per Minute MGD – Million Gallons per Day

D. DEMAND PROJECTIONS.

C. TABLE 5 Ten Year Demand Projections

Year	Population Served	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2007	5423	0.54	1.22	445.36
2008	5847	0.58	1.32	480.18
2009	6269	0.63	1.41	514.84
2010	6693	0.67	1.51	549.66
2011	7115	0.71	1.60	584.32
2012	7538	0.75	1.69	619.06
2013	7960	0.79	1.79	653.72
2014	8383	0.84	1.88	688.45
2015	8805	0.88	1.98	723.11
2016	9228	0.92	2.08	757.85

MGD – Million Gallons per Day MGY – Million Gallons per Year

Projection Method. Describe how projections were made, (assumptions for per capita, per household, per acre or other methods used).
Projections are based on historical demand of 100 gpcd and a peaking factor of 2.25.

RESOURCE SUSTAINABILITY

V.

Sustainable water use: use of water to provide for the needs of society, now and in the future, without unacceptable social, economic, or environmental consequences.

Monitoring. Records of water levels should be maintained for all production wells and source water reservoirs/basins. Water level readings should be taken monthly for a production well or observation well that is representative of the wells completed in each water source formation. **If water levels are not currently measured each year, a monitoring plan that includes a schedule for water level readings must be submitted as Attachment N/A.**

D. **TABLE 6 Monitoring Wells -** List all wells being measured.

Unique well number	Type of well (production, observation)	Frequency of Measurement (daily, monthly etc.)	Method of Measurement (steel tape, SCADA etc.)
207133	Production	Yearly	Manual
462924	Production	Yearly	Manual
596649	Production	Yearly	Manual
693065	Production	Yearly	Manual

Water Level Data. Summarize water level data including seasonal and long-term trends for each ground and/or surface water source. If water levels are not measured and recorded on a routine basis then provide the static water level (SWL) when the well was constructed and a current water level measurement for each production well. Also include all water level data taken during well and pump maintenance.
Static water level data is provided in Appendix C **Appendix C: Provide monitoring data (graph or table) for as many years as possible.**

Ground Water Level Monitoring – DNR Waters in conjunction with federal and local units of government maintain and measure approximately 750 observation wells around the state. Ground water level data are available online www.dnr.state.mn.us/waters. Information is also available by contacting the Ground Water Level Monitoring Manager, DNR Waters, 500 Lafayette Road, St. Paul, MN 55155-4032 or call (651) 296-4800.

Natural Resource Impacts. Indicate any natural resource features such as calcareous fens, wetlands, trout streams, rivers or surface water basins that are or could be influenced by water withdrawals from municipal production wells. Also indicate if resource protection thresholds have been established and if mitigation measures or management plans have been developed.
None

Sustainability. Evaluate the adequacy of the resource to sustain current and projected demands. Describe any modeling conducted to determine impacts of projected demands on the resource.
Well No. 3, 5 & 6 are in Ironton/Galesville aquifer. The City understands that Ironton/Galesville aquifer has limited capacity. But Well No. 7 is in Mt. Simon aquifer, which has adequate capacity.

Source Water Protection Plans. The emergency procedures in this plan are intended to comply with the contingency plan provisions required in the Minnesota Department of Health's (MDH) Wellhead Protection (WHP) Plan and Surface Water Protection (SWP) Plan.	
Date WHP Plan Adopted:	July 17, 2007

Date for Next WHP Update:	2017
SWP Plan:	☐ In Process ☐ Completed ☒ Not Applicable

VI. F. CAPITAL IMPROVEMENT PLAN (CIP)

Adequacy of Water Supply System. Are water supply installations, treatment facilities and distribution systems adequate to sustain current and projected demands? ☐ Yes ☒ No If no, describe any potential capital improvements over the next ten years and state the reasons for the proposed changes (See page 13 for water capital improvement plan).
The City is planning to add new wells, elevated water storage and a new water treatment facility to meet future needs. For system improvement schedule see attached Appendix D

Proposed Water Sources. Does your current CIP include the addition of new wells or intakes? Yes ☒ No If yes, list the number of new installations and projected water demands from each for the next ten years. Plans for new production wells must include the geologic source formation, well location, and proposed pumping capacity.
The City is planning to add new wells.

Water Source Alternatives. If new water sources are being proposed, describe alternative sources that were considered and any possibilities of joint efforts with neighboring communities for development of supplies.
The location of the water supply systems for the City of Jordan and the neighboring communities makes sharing resources difficult. Distribution system and joint development of surface water supply or ground water supply are not currently economical.

Preventative Maintenance. Long-term preventative programs and measures will help reduce the risk of emergency situations. Identify sections of the system that are prone to failure due to age, materials or other problems. This information should be used to prioritize capital improvements, preventative maintenance, and to determine the types of materials (pipes, valves, couplings, etc.) to have in stock to reduce repair time.
The City has a yearly program for watermain flushing and operating valves. Extra materials for water system repairs are available to staff. City staff is trained and capable of performing repairs to the water system.

PART II. EMERGENCY RESPONSE PROCECURES

Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failures, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan. If your community already has written procedures dealing with water emergencies we recommend that you use these guidelines to review and update existing procedures and water supply protection measures.

VII. Federal Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act as amended by the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Public Law 107-188, Title IV – Drinking Water Security and Safety) requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan. **Community water suppliers that have completed the Federal Emergency Response Plan and submitted the required certification to the U.S. Environmental Protection Agency have satisfied Part II, Sections A, B, and C of these guidelines and need only provide the information below regarding the emergency response plan and source water**

protection plan and complete Sections D (Allocation and Demand Reduction Procedures), and E (Enforcement).

Provide the following information regarding your completed Federal Emergency Response Plan:

Emergency Response Plan	Contact Person	Contact Number
Emergency Response Lead	Dave Bendzick	952-492-2535
Alternate Emergency Response Lead	Jerry Beckius	612-968-2202
Emergency Response Plan Certification Date	March 17, 2004	

Operational Contingency Plan. An operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance is recommended for all utilities. Check here ☐ if the utility has an operational contingency plan. At a minimum a contact list for contractors and supplies should be included in a water emergency telephone list.

Communities that have completed Federal Emergency Response Plans should skip to Section D.

EMERGENCY RESPONSE PROCEDURES

A. Emergency Telephone List. A telephone list of emergency contacts is included as Attachment E to the plan (complete template or use your own list). The list includes key utility and community personnel, contacts in adjacent communities, and appropriate local, state and federal emergency contacts. Responsibilities and services for each contact are defined.

B. Current Water Sources and Service Area. Quick access to concise and detailed information on water sources, water treatment, and the distribution system may be needed in an emergency. System operation, water well and maintenance records should be maintained in a central secured location so that the records are accessible for emergency purposes and preventative maintenance. A detailed map of the system showing the treatment plants, water sources, storage facilities, supply lines, interconnections, and other information that would be useful in an emergency should also be readily available. Check here ☒ if these records and maps exist and staff can access the documents in the event of an emergency.

C. Procedure for Augmenting Water Supplies. List all available sources of water that can be used to augment or replace existing sources in an emergency. In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the warning point for that community. Copies of cooperative agreements should be maintained with your copy of the plan and include in Attachment N/A. Be sure to include information on any physical or chemical problems that may limit interconnections to other sources of water. Approvals from the MN Department of Health are required for interconnections and reuse of water.

VII. TABLE 7 (A) Public Water Supply Systems – List interconnections with other public water supply systems that can supply water in an emergency.

Water Supply System	Capacity (GPM/MGD)	Note any limitations on use
None		

GPM – Gallons per Minute MGD – Million Gallons per Day

VIII. TABLE 7 (B) - Private Water Sources – List other sources of water available in an emergency.

Name	Capacity (GPM/MGD)	Note any limitations on use
None		

GPM – Gallons per Minute MGD – Million Gallons per Day

D. Allocation and Demand Reduction Procedures. The plan must include procedures to address gradual decreases in water supply as well as emergencies and the sudden loss of water due to line breaks, power failures, sabotage, etc. During periods of limited water supplies public water

suppliers are required to allocate water based on the priorities established in Minnesota Statutes 103G.261.

Water Use Priorities (Minnesota Statutes 103G.261)

First Priority. Domestic water supply, excluding industrial and commercial uses of municipal water supply, and use for power production that meets contingency requirements.

NOTE: Domestic use is defined (MN Rules 6115.0630, Subp. 9), as use for general household purposes for human needs such as cooking, cleaning, drinking, washing, and waste disposal, and uses for on-farm livestock watering excluding commercial livestock operations which use more than 10,000 gallons per day or one million gallons per year.

Second Priority. Water uses involving consumption of less than 10,000 gallons per day.

Third Priority. Agricultural irrigation and processing of agricultural products.

Fourth Priority. Power production in excess of the use provided for in the contingency plan under first priority.

Fifth Priority. Uses, other than agricultural irrigation, processing of agricultural products, and power production.

Sixth Priority. Non-essential uses. These uses are defined by Minnesota Statutes 103G.291 as lawn sprinkling, vehicle washing, golf course and park irrigation, and other non-essential uses.

List the statutory water use priorities along with any local priorities (hospitals, nursing homes, etc.) in Table 8. Water used for human needs at hospitals, nursing homes and similar types of facilities should be designated as a high priority to be maintained in an emergency. Local allocation priorities will need to address water used for human needs at other types of facilities such as hotels, office buildings, and manufacturing plants. The volume of water and other types of water uses at these facilities must be carefully considered. After reviewing the data, common sense should dictate local allocation priorities to protect domestic requirements over certain types of economic needs. In Table 8, list the priority ranking, average day demand and demand reduction potential for each customer category (modify customer categories if necessary).

Table 8 Water Use Priorities

Customer Category	Allocation Priority	Average Day Demand (GPD)	Demand Reduction Potential (GPD)
Residential	1	331,028	
Institutional			
Commercial	2	56,612	
Industrial			
Irrigation			
Wholesale			
Non-essential			
VIII.	**TOTALS**	387,640	

GPD – Gallons per Day

Demand Reduction Potential. The demand reduction potential for residential use will typically be the base demand during the winter months when water use for non-essential uses such as lawn watering do not occur. The difference between summer and winter demands typically defines the demand reduction that can be achieved by eliminating non-essential uses. In extreme emergency situations lower priority water uses must be restricted or eliminated to protect first priority domestic water requirements. Short-term demand reduction potential should be based on average day demands for customer categories within each priority class.

Triggers for Allocation and Demand Reduction Actions. Triggering levels must be defined for implementing emergency responses, including supply augmentation, demand reduction, and water allocation. Examples of triggers include: water demand >100% of storage, water level in well(s) below a certain elevation, treatment capacity reduced 10% etc. Each trigger should have a quantifiable indicator and actions can have multiple stages such as mild, moderate and severe responses. Check each trigger below that is used for implementing emergency responses and for each trigger indicate the actions to be taken at various levels or stages of severity in Table 9.

- ☒ Water Demand
- ☐ Treatment Capacity
- ☐ Storage Capacity
- ☐ Groundwater Levels
- ☐ Surface Water Flows or Levels
- ☒ Pump, Booster Station or Well Out of Service
- ☒ Governor's Executive Order – Critical Water Deficiency (required by statute)
- ☐ Water Main Break
- ☒ Loss of Production
- ☐ Security Breach
- ☐ Contamination
- ☐ Other (list in Table 9)

IX. Table 9 Demand Reduction Procedures

Condition	Trigger(s)	Actions
Stage 1 (Mild)	Treatment plant runs for 20 or more hours for 3 days	There will be no outside use of water between 10 a.m. to 6 p.m. year round. The use of outside water will only be permitted on an odd/even basis. Only limited use of water permitted. See Ordinances Attached
Stage 2 (Moderate)	Treatment plant runs for 20 or more hours for 5 days	The use of outside water is permitted as Stage 1, but the permitted days and hours are set by the Director of Public Works. No recreational use of outside water will be permitted.
Stage 3 (Severe)	Treatment plant runs for 20 or more hours for 7 days	A total ban of the use of all outside water within the city limits.
Critical Water Deficiency (M.S. 103G.291)	Executive Order by Governor & as provided in above triggers	Stage 1: Restrict lawn watering, vehicle washing, golf course and park irrigation and other nonessential uses Stage 2: Suspend lawn watering, vehicle washing, golf course and park irrigation and other nonessential uses

Note: The potential for water availability problems during the onset of a drought are almost impossible to predict. Significant increases in demand should be balanced with preventative measures to conserve supplies in the event of prolonged drought conditions.

Notification Procedures. List methods that will be used to inform customers regarding conservation requests, water use restrictions, and suspensions. Customers should be aware of emergency procedures and responses that they may need to implement.
A notice containing the provision of the upgraded level is delivered to each property owner within the City limits and posted in the lobby of City Hall.

E. Enforcement. Minnesota Statutes require public water supply authorities to adopt and enforce water conservation restrictions during periods of critical water shortages.

Public Water Supply Appropriation During Deficiency.
Minnesota Statutes 103G.291, Subdivision 1.

Declaration and conservation.
(a) If the governor determines and declares by executive order that there is a critical water deficiency, public water supply authorities appropriating water must adopt and enforce water conservation restrictions within their jurisdiction that are consistent with rules adopted by the commissioner.

(b) The restrictions must limit lawn sprinkling, vehicle washing, golf course and park irrigation, and other nonessential uses, and have appropriate penalties for failure to comply with the restrictions.

An ordinance that has been adopted or a draft ordinance that can be quickly adopted to comply with the critical water deficiency declaration must be included in the plan (include with other ordinances in Attachment 7 for Part III, Item 4). Enforcement responsibilities and penalties for non-compliance should be addressed in the critical water deficiency ordinance.
Sample regulations are available at www.dnr.state.mn.us/waters

Authority to Implement Water Emergency Responses. Emergency responses could be delayed if city council or utility board actions are required. Standing authority for utility or city managers to implement water restrictions can improve response times for dealing with emergencies. Who has authority to implement water use restrictions in an emergency?

☒ Utility Manager ☐ City Manager ☐ City Council or Utility Board
☐ Other (describe):

Emergency Preparedness. If city or utility managers do not have standing authority to implement water emergency responses, please indicate any intentions to delegate that authority. Also indicate any other measures that are being considered to reduce delays for implementing emergency responses.
N/A

PART III. WATER CONSERVATION PLAN

Water conservation programs are intended to reduce demand for water, improve the efficiency in use and reduce losses and waste of water. Long-term conservation measures that improve overall water use efficiencies can help reduce the need for short-term conservation measures. Water conservation is an important part of water resource management and can also help utility managers satisfy the ever-increasing demands being placed on water resources.

Minnesota Statutes 103G.291, requires public water suppliers to implement demand reduction measures before seeking approvals to construct new wells or increases in authorized volumes of water. Minnesota Rules 6115.0770, require water users to employ the best available means and practices to promote the efficient use of water. Conservation programs can be cost effective when compared to the generally higher costs of developing new sources of supply or expanding water and/or wastewater treatment plant capacities.

A. **A. Conservation Goals.** The following section establishes goals for various measures of water demand. The programs necessary to achieve the goals will be described in the following section.

Unaccounted Water (calculate five year averages with data from Table 1)		
Average annual volume unaccounted water for the last 5 years	13,050,000	gallons
Average percent unaccounted water for the last 5 years	7.99	percent
AWWA recommends that unaccounted water not exceed 10%. Describe goals to reduce unaccounted water if the average of the last 5 years exceeds 10%.		
N/A		

Residential Gallons Per Capita Demand (GPCD)		
Average residential GPCD use for the last 5 years (use data from Table 1)	72.89	GPCD
In 2002, average residential GPCD use in the Twin Cities Metropolitan Area was 75 GPCD. Describe goals to reduce residential demand if the average for the last 5 years exceeds 75 GPCD.		
N/A		

Total Per Capita Demand: From Table 1, is the trend in overall per capita demand over the past 10 years ☐ increasing or ☒ decreasing? If total GPCD is increasing, describe the goals to lower overall per capita demand or explain the reasons for the increase.
N/A

X. Peak Demands (calculate average ratio for last five years using data from Table 1)	
Average maximum day to average day ratio	2.19
If peak demands exceed a ratio of 2.6, describe the goals for lowering peak demands.	
N/A	

B. Water Conservation Programs. Describe all short-term conservation measures that are available for use in an emergency and long-term measures to improve water use efficiencies for each of the six conservation program elements listed below. Short-term demand reduction measures must be included in the emergency response procedures and must be in support of, and part of, a community all-hazard emergency operation plan.

1. **Metering.** The American Water Works Association (AWWA) recommends that every water utility meter all water taken into its system and all water distributed from its system at its customer's point of service. An effective metering program relies upon periodic performance testing, repair, repair and maintenance of all meters. AWWA also recommends that utilities conduct regular water audits to ensure accountability.

Complete Table 10 (A) regarding the number and maintenance of customer meters.

XI. TABLE 10 (A) Customer Meters

	Number of Connections	Number of Metered Connections	Meter testing schedule (years)	Average age/meter replacement schedule (years)
Residential	1480	1480		As Needed
Institutional	-	-		-
Commercial	140	140		As Needed
Industrial	-	-		-
Public Facilities	-	-		-
Other	-	-		-
TOTALS	1620	1620		

XII. Unmetered Systems. Provide an estimate of the cost to install meters and the projected water savings from metering water use. Also indicate any plans to install meters.
None

XIII. TABLE 10 (B) Water Source Meters

	Number of Meters	Meter testing schedule (years)	Average age/meter replacement schedule (years)
Water Source (wells/intakes)	4		As Needed
Treatment Plant			-

2. **Unaccounted Water.** Water audits are intended to identify, quantify, and verify water and revenue losses. The volume of unaccounted-for water should be evaluated each billing cycle. The AWWA recommends a goal of ten percent or less for unaccounted-for water. Water audit procedures are available from the AWWA and MN Rural Water Association.

Frequency of water audits: ☐ each billing cycle ☐ yearly ☒ other: Quarterly.

Leak detection and survey: ☐every year ☐ every years ☐ periodic as needed
Year last leak detection survey completed: The City does not perform leak detection surveys.

Reducing Unaccounted Water. List potential sources and efforts being taken to reduce unaccounted water. If unaccounted water exceeds 10% of total withdrawals, include the timeframe for completing work to reduce unaccounted water to 10% or less.
The spike in unaccounted for water in year 2006 could be due to bad water meters. The city will closely monitor unaccounted for water for the next year. If this amount is still high, then immediate corrective action will be taken.

3. **Conservation Water Rates.** Plans must include the current rate structure for all customers and provide information on any proposed rate changes. Discuss the basis for current price levels and rates, including cost of service data, and the impact current rates have on conservation.

Billing Frequency: ☐ Monthly ☒ Bimonthly ☐ Quarterly
☐ Other (describe):

Volume included in base rate or service charge: 1,000 gallons or cubic feet

XIV. Conservation Rate Structures
☐ Increasing block rate: rate per unit increases as water use increases
☐ Seasonal rate: higher rates in summer to reduce peak demands
☐ Service charge or base fee that does not include a water volume

XV. Conservation Neutral Rate Structure
☒ Uniform rate: rate per unit is the same regardless of volume

XVI. Non-conserving Rate Structures
☐ Service charge or base fee that includes a large volume of water
☐ Declining block rate: rate per unit decreases as water use increases
☐ Flat rate: one fee regardless of how much water is used (unmetered)

Other (describe):

Water Rates Evaluated: ☒ every year ☐ every years ☐ no schedule
Date of last rate change: January 2007

Declining block (the more water used, the cheaper the rate) and flat (one fee for an unlimited volume of water) rates should be phased out and replaced with conservation rates. Incorporating a seasonal rate structure and the benefits of a monthly billing cycle should also be considered along with the development of an emergency rate structure that could be quickly implemented to encourage conservation in an emergency.

XVII.	**Current Water Rates.** Below are current water rates including base/service fees and volume charges below.
	Water rates effective in 2007 are $8.12 base charge per month plus a volume charge of $3.25 per thousand gallons is charged. The City also charges a Water Connection Fees (WAC) of $1,408 per unit and a Water Area (Capital Charges) of $730 per single-family unit $595 per condominium or apartment unit, $1,624 per commercial building or institutional facility unit and $730 per multi-tenant commercial building and institutional building unit. A fee schedule identifying the type of facility, parameters and number of connections has been adopted by the City. Rates are based on operational needs while WAC fees are based on estimated costs required to needed to support the construction of water facilities to service the new growth.

Non-conserving Rate Structures. Provide justification for the rate structure and its impact on reducing demands or indicate intentions including the timeframe for adopting a conservation rate structure.
The rate structure includes a base rate and a usage fee. The usage fee is designed to make the heaviest user pay the most. Users that incorporate water conservation are rewarded with a smaller monthly bill.

4. **Regulation.** Plans should include regulations for short-term reductions in demand and long-term improvements in water efficiencies. Sample regulations are available from DNR Waters. Copies of adopted regulations or proposed restrictions should be included in Attachment of the plan. Indicate any of the items below that are required by local regulations and also indicate if the requirement is applied each year or just in emergencies.

☒ Time of Day: no watering between 10 am and 6 pm
(reduces evaporation) ☐ year around ☒ seasonal ☐ emergency only
☒ Odd/Even: (helps reduce peak demand) ☐ year around ☒ seasonal ☐ emergency only
☐ Water waste prohibited (no runoff from irrigation systems)
Describe ordinance:
☐ Limitations on turf areas for landscaping (reduces high water use turf areas)
Describe ordinance:
☐ Soil preparation (such as 4”-6” of organic soil on new turf areas with sandy soil)
Describe ordinance:
☐ Tree ratios (plant one tree for every square feet to reduce turf evapotranspiration)
Describe ordinance:
☐ Prohibit irrigation of medians or areas less than 8 feet wide
Describe ordinance:
☐ Permit required to fill swimming pool ☐ every year ☐ emergency only
☒ Other (describe): See attached ordinance (Appendix G)

State and Federal Regulations (mandated)

☐ Rainfall sensors on landscape irrigation systems. Minnesota Statute 103G.298 requires “All automatically operated landscape irrigation systems shall have furnished and installed technology that inhibits or interrupts operation of the landscape irrigation system during periods of sufficient moisture. The technology must be adjustable either by the end user or the professional practitioner of landscape irrigation services.”

☐ Water Efficient Plumbing Fixtures. The 1992 Federal Energy Policy Act established manufacturing standards for water efficient plumbing fixtures, including toilets, urinals, faucets, and aerators.

Enforcement. Are ordinances enforced? X Yes ☐ No If yes, indicate how ordinances are enforced along with any penalties for non-compliance.
The City has included water conservation fines of $25 for a first offence, $50 for a second offense and $100 for the third or continuing offenses, in its fee schedule for 2007.

5. **Education and Information Programs.** Customers should be provided information on how to improve water use efficiencies a minimum of two times per year. Information should be provided at appropriate times to address peak demands. Emergency notices and educational materials on how to reduce water use should be available for quick distribution during an emergency. If any of the methods listed in the table below are used to provide water conservation tips, indicate the number of times that information is provided each year and attach a list of education efforts used for the last three years.

XVIII. Current Education Programs	**XIX. Times/ Year**
Billing inserts or tips printed on the actual bill	1
Consumer Confidence Reports	2
Local news papers	1
Community news letters	1
Direct mailings (water audit/retrofit kits, showerheads, brochures)	1
Information at utility and public buildings	1
Public Service Announcements	
Cable TV Programs	
Demonstration projects (landscaping or plumbing)	
K-12 Education programs (Project Wet, Drinking Water Institute)	
School presentations	
Events (children's water festivals, environmental fairs)	
Community education	
Water Week promotions	
Information provided to groups that tour the water treatment plant	
Website (include address:)	Continually
Targeted efforts (large volume users, users with large increases)	
Notices of ordinances (include tips with notices)	
Emergency conservation notices (recommended)	
Other:	

List education efforts for the last three years in Appendix H of the plan. Be sure to indicate whether educational efforts are on-going and which efforts were initiated as an emergency or drought management effort.

Proposed Education Programs. Describe any additional efforts planned to provide conservation information to customers a minimum of twice per year (required if there are no current efforts).
N/A

A packet of conservation tips and information can be obtained by contacting DNR Waters or the Minnesota Rural Water Association (MRWA). The American Water Works Association (AWWA) www.awwa.org or www.waterwiser.org also has excellent materials on water conservation that are available in a number of formats. You can contact the MRWA 800/367-6792, the AWWA bookstore 800/926-7337 or DNR Waters 651/296-0512 for information regarding educational materials and formats that are available.

6. **Retrofitting Programs.** Education and incentive programs aimed at replacing inefficient plumbing fixtures and appliances can help reduce per capita water use as well as energy costs. It is recommended that communities develop a long-term plan to retrofit public buildings with water efficient plumbing fixtures and that the benefits of retrofitting be included in public education programs. You may also want to contact local electric or gas suppliers to see if they are interested in developing a showerhead distribution program for customers in your service area.

A study by the AWWA Research Foundation (Residential End Uses of Water, 1999) found that the average indoor water use for a non-conserving home is 69.3 gallons per capita per day (gpcd). The average indoor water use in a conserving home is 45.2 gpcd and most of the decrease in water use is related to water efficient plumbing fixtures and appliances that can reduce water, sewer and energy costs. In Minnesota, certain electric and gas providers are required (Minnesota Statute 216B.241) to fund programs that will conserve energy resources and some utilities have distributed water efficient showerheads to customers to help reduce energy demands required to supply hot water.

Retrofitting Programs. Describe any education or incentive programs to encourage the retrofitting of inefficient plumbing fixtures (toilets, showerheads, faucets, and aerators) or appliances (washing machines).
None

Plan Approval. Water Emergency and Conservation Plans must be approved by the Department of Natural Resources (DNR) every ten years. Please submit plans for approval to the following address:

DNR Waters
Water Permit Programs Supervisor
500 Lafayette Road
St. Paul, MN 55155-4032

or Submit electronically to
wateruse@dnr.state.mn.us.

Adoption of Plan. All DNR plan approvals are contingent on the formal adoption of the plan by the city council or utility board. Please submit a certificate of adoption (example available) or other action adopting the plan. Metropolitan Area communities are also required to submit these plans to the Metropolitan Council. Please see PART IV. ITEMS FOR METROPOLITAN AREA PUBLIC SUPPLIERS.

METROPOLITAN COUNCIL

PART IV. ITEMS FOR METROPOLITAN AREA PUBLIC SUPPLIERS

Minnesota Statute 473.859 requires water supply plans to be completed for all local units of government in the seven-county Metropolitan Area as part of the local comprehensive planning process. Much of the required information is contained in Parts I-III of these guidelines. However, the following additional information is necessary to make the water supply plans consistent with the Metropolitan Land Use Planning Act upon which local comprehensive plans are based. Communities should use the information collected in the development of their plans to evaluate whether or not their water supplies are being developed consistent with the Council's Water Resources Management Policy Plan.

Policies. Provide a statement(s) on the principles that will dictate operation of the water supply utility: for example, "It is the policy of the city to provide good quality water at an affordable rate, while assuring this use does not have a long-term negative resource impact."
It is the policy of the City to provide good quality water to its citizens at an affordable cost.

Impact on the Local Comprehensive Plan. Identify the impact that the adoption of this water supply plan has on the rest of the local comprehensive plan, including implications for future growth of the community, economic impact on the community and changes to the comprehensive plan that might result.
None

E. Demand Projections

Year	Total Community Population	Population Served	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2010	5,900	5,900	0.59	1.33	215
2020	9,700	9,700	0.97	2.18	354
2030	13,500	13,500	1.35	3.04	493
Ultimate	15,000	15,000	1.500	3.38	548

Population projections should be consistent with those in the Metropolitan Council's *2030 Regional Development Framework* or the Communities 2008 Comprehensive Plan update**.** If population served differs from total population, explain in detail why the difference (ie, service to other communities, not complete service within community etc.).

PLAN SUBMITTAL AND REVIEW OF THE PLAN

The plan will be reviewed by the Council according to the sequence outlined in Minnesota Statutes 473.175. **Prior to submittal to the Council, the plan must be submitted to adjacent governmental units for a 60-day review period.** Following submittal, the Council determines if the plan is complete for review within 15 days. If incomplete, the Council will notify the community and request the necessary information. When complete the Council will complete its review within 60 days or a mutually agreed upon extension. The community officially adopts the plan after the Council provides its comments.

Plans can be submitted electronically to the Council; however, the review process will not begin until the Council receives a paper copy of the materials. Electronic submissions can be via a CD, 3 ½" floppy disk or to the email address below. Metropolitan communities should submit their plans to:

Reviews Coordinator
Metropolitan Council
230 E 5th Street,
St. Paul, MN 55101

electronically to:
watersupply@metc.state.mn.us

IV. Storm Water Utility

The City of Jordan is committed to preserving its natural resources as evidenced by its review of storm water drainage issues and its desire to educate the public on issues relative to surface water quality.

Storm water management is used to guide the development and expansion of the City's drainage system in a cost-effective manner that preserves existing water resources. Goals of surface water management include, but are not limited to: reduction of public expenditures necessary to control excessive volumes and rates of runoff; flood prevention especially those urban in nature; identification of current and future drainage patterns; protection and enhancement of the areas natural habitat; promotion of ground water recharge; protection of the water quantity and quality in wetland, the Minnesota river, and reduction in erosion from surface flows.

A. Existing Storm Water Facilities.

Jordan's Storm Water facilities include a combination of storm sewer trunk lines, pipes, channels, manholes, overland drainage ways, catch basins and ponds.

The City, in its Surface Water Management Plan of 2002/03 has divided the city and its growth area into six drainage district.

Drainage District A -	6,100 acres located on the southwest growth area.
Drainage District B -	1,200 acres located in the south central section of the study area.
Drainage District C -	2,600 acres in the southeastern growth area.
Drainage District D -	2,100 acres in the northeastern section of the study area.
Drainage District E -	1,150 acres in the northwest side of the city, bordered by the Minnesota River to the north.
Drainage District F -	600 acres located in the area immediately west of the intersection of U.S. Highway 169 and Quaker Avenue.

B. Storm Water Management Plan. Jordan is a part of the Scott Watershed Management Organization. The Scott Watershed Management Organization, in May of 2005, issued rules for cities within the district including calculations of storm water volumes, design of ponds and other measures to improve water quality. Minnesota Statutes Chapter 103B provides the Scott WMO with power to accomplish its statutory purpose which is to protect, preserve and manage surface and groundwater systems within the watershed.

The City adopted a Comprehensive Surface Water Management Plan in February 2002, with a revision approved in June 2003. A supplement to the SWMP, the Stormwater, Erosion Control Ordinance was approved August 7, 2006. Statutes require municipalities with land located within a watershed to prepare local surface water management plans consistent with applicable WMO plans, within two years from the date the WMO has adopted the watershed plan. The City of Jordan, following the implementation of rules by the Scott WMO, updated its ordinances to ensure consistency. This is included in the City's Zoning Ordinance as Ordinance No. 2007-009. The current revision of the SWMP adds new design information required by the Scott Watershed Management Organization. A copy of the City's Surface Water Plan, adopted in November 2007 is **included as Appendix A** to this Comprehensive Plan.

C. Maintenance of the Storm Water System.

Storm water pipes are currently replaced in coordination with other street and utility projects. Storm water ponds, their inlets and outlets are maintained by Public Works staff.

D. Storm Water Fees.

In order to service the future growth with regional ponds, trunk pipe and channels, the City currently charged storm availability fees in 2007 as follows: $3.09 per unit per month for single-family units and $6.34 per acre per month for all other uses. In addition, the city charged storm water management area/capital charges of $4,271 per acre for single family residential subdivisions, $7,048 per acre for medium and high density residential subdivisions and $8,287 per acre for commercial and industrial subdivisions.

E. Storm Water System Improvements.

The following capital expenditures are proposed for storm water system improvements, in the City's Capital Improvement Plan:

TABLE 10-18
PROPOSED STORM WATER SYSTEM IMPROVEMENTS

Year	Description	Cost
2007	Dredge Mill Pond	$450,000
2012	Storm Water regional pond	$700,000
2017	Storm Water Regional Pond	$800,000
2022	Storm Water Regional Pond	$900,000

V. Municipal Utilities Policies and Objectives

A. Municipal Utility Objectives

1. Continue to provide quality utility services to Jordan residents and businesses at cost effective rates.

2. Continue to plan for future utility needs and structure rates and fees to ensure future development pays for infrastructure costs needed to support the growth.

3. Continue to upgrade existing utility infrastructure as well as plan for future extensions and improvements.

B. Municipal Utility Policies

1. The City should review and calculate the impact of all proposed development and land subdivision on the capacity of the existing sanitary sewer system to determine whether the City can provide services requested within a timely manner (i.e. two years).

2. The City should emphasize redevelopment/infill in existing urban areas to maximize existing municipal utilities.

3. The City should continually review the appropriateness of: utility rates, sewer and water availability and connection charges and trunk area charges to determine whether or not said fees are sufficient to provide for future reconstruction and expansion of the system.

4. To avoid duplicate costs, the City should continue to coordinate future street construction/reconstruction with needed municipal utility construction and reconstruction.

5. Standard review procedures should be continued to ensure all (re) development within the city is in compliance with the grading and storm water management controls outlined in the Surface Water Management Plan.

6. Development proposals shall continue to be reviewed in accordance with the Wellhead Protection Plan. Any potentially contaminating land uses shall be sited outside the wellhead protection area.