2030 WATER PLAN
Appendix C of the 2008 Elko New Market Comprehensive Plan

for

Elko New Market, Minnesota

BMI Project No. T15.22070

April, 2008

Prepared by

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

DESIGNING FOR A BETTER TOMORROW

2030 WATER PLAN
Appendix C of the 2008 Elko New Market Comprehensive Plan

ELKO NEW MARKET, MINNESOTA

APRIL 2008

T15.22070

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY ES-1

A. INTRODUCTION ES-1

B. WATER USE PROJECTIONS ES-1

C. DRINKING WATER QUALITY ES-2

D. EVALUATION OF EXISTING FACILITIES ES-3
1. Water Supply ES-3
2. Water Treatment ES-3
3. Storage ES-4

E. WATER SUPPLY IMPROVEMENTS ES-5
1. Dispersed Wells ES-5
2. Well Field ES-5

F. WATER TREATMENT IMPROVEMENTS ES-6
1. Dispersed Treatment ES-6
2. Centralized Treatment ES-6

G. WATER STORAGE IMPROVEMENTS ES-7

H. DISTRIBUTION SYSTEM IMPROVEMENTS ES-8

I. RECOMMENDATIONS AND IMPLEMENTATION ES-9

SECTION 1 INTRODUCTION 1-1

A. Purpose 1-1

B. Community Background 1-1

C. Planning Period 1-1

D. Report Organization 1-1

SECTION 2 WATER USE PROJECTIONS 2-1

A. GENERAL 2-1

B. SERVICE AREA 2-1

C. Planning Period 2-1

D. POPULATION PROJECTIONS 2-1

E. HISTORICAL WATER USAGE 2-2

F. MAXIMUM DAY WATER USE 2-3

G. WATER USE PROJECTIONS 2-3

SECTION 3 DRINKING WATER QUALITY 3-1

A. GENERAL 3-1

B. SAFE DRINKING WATER ACT REGULATIONS 3-1
1. National Primary Drinking Water Regulations (NPDWRs) 3-2
2. Disinfection and Disinfection By-Products (D/DBP's) 3-2
3. Total Coliform Rule 3-2

4. Ground Water Rule 3-3
5. Drinking Water Contaminant Candidate List (DWCCL) 3-3

C. SECONDARY DRINKING WATER STANDARDS 3-4

D. ELKO NEW MARKET WATER QUALITY ISSUES 3-4
1. Radium and Gross Alpha Particles 3-4

SECTION 4 EVALUATION OF EXISTING FACILITIES 4-1

A. GENERAL 4-1

B. WATER SUPPLY 4-1
1. General 4-1
2. Well Capacity 4-2
3. Wellhead Protection 4-3

C. TREATMENT 4-4

D. STORAGE 4-6

E. DISTRIBUTION 4-8

SECTION 5 WATER SUPPLY AND TREATMENT 5-1

A. GENERAL 5-1

B. REGULATORY REQUIREMENTS 5-1

C. WATER SUPPLY – ALTERNATIVES 5-1
1. Dispersed Wells 5-1
2. Well Field 5-2

D. WATER TREATMENT ALTERNATIVES 5-2
1. Dispersed Treatment 5-3
2. Centralized Treatment 5-4
1. Ion Exchange Softening 5-6
2. Granular Media Filtration 5-7
3. Reverse Osmosis 5-8
4. Lime Softening 5-8

SECTION 6 WATER STORAGE AND DISTRIBUTION SYSTEM 6-1

A. PURPOSE 6-1

B. GENERAL 6-1

C. SIMULATION CRITERIA 6-1

D. COMBINED WATER SYSTEM OPERATION 6-2

E. WATER STORAGE FACILITY IMPROVEMENTS 6-3

F. DISTRIBUTION SYSTEM IMPROVEMENTS 6-3

SECTION 7 RECOMMENDATION AND IMPLEMENTATION 7-1

A. GENERAL 7-1

B. RECOMMENDED CAPITAL IMPROVEMENTS 7-1
1. Water Supply 7-1
2. Water Treatment 7-1

3. Water Storage 7-1
4. Water Distribution System Improvements 7-1

C. FUNDING OPTIONS 7-2
1. Small Cities Development Program (SCDP) 7-2
2. Drinking Water Revolving Loan Fund 7-2
3. Rural Development (RD)- Water and Waste Disposal Systems for Rural Communities 7-3

D. COST AND IMPLEMENTATION SCHEDULE 7-3

LIST OF APPENDICES

Appendix A Population and Water Use Projections
Appendix B Well Logs
Appendix C Water Quality Data
Appendix D Water Supply Plan

ABBREVIATIONS

MGD	Million Gallons per Day
GPM	Gallons per Minute
SDWA	Safe Drinking Water Act
EPA	U.S. Environmental Protection Agency
GPCD	Gallons per Person per Day
MG	Million Gallons
GPD	Gallons per Day

LIST OF FIGURES

Figure Number		Page/ Follows Page
2.1	Population Projections	2-2
4.1	Existing Well Locations	4-1
4.2	Scott County Bedrock Geology	4-4
6.1	Existing Water System	6-3
6.2	Proposed 2010 Water System	6-3
6.3	Proposed 2015 Water System	6-3
6.4	Proposed 2020 Water System	6-3
6.5	Proposed 2030 Water System	6-3

LIST OF TABLES

Table Number		Page
2.1	Elko Water Supply Inventory	2-2
2.2	New Market Water Supply Inventory	2-3

2.3	Average and Maximum Daily Water Demand	2-3
2.4	Projected Per Capita Water Use	2-4
2.5	Projected Water Use Demands	2-4
3.1	Radium 226+228 Test Results – New Market Water System	3-5
3.2	Gross Alpha Test Results – New Market Water System	3-6
3.3	Radium 226+228 Test Results – Elko Water System	3-6
3.4	Gross Alpha Test Results – Elko Water System	3-6
4.1	Well Construction Summary – City of Elko New Market	4-1
4.2	Existing Well Capacity – City of Elko New Market	4-2
4.3	Projected Water Supply Requirements – City of Elko New Market	4-3
4.4	Treatment Capacity Analysis – New Market Water System	4-5
4.5	Existing Storage Facilities	4-6
4.6	Required Storage Based on Average Day Criteria	4-6
4.7	Required Storage Based on Maximum Day, Fire Protection & Emergency Storage Criteria	4-7
4.8	Projected Storage Improvements Summary	4-8
5.1	Treatment Facility Sizing Evaluation	5-3
5.2	Dispersed Treatment Facility Costs	5-4
5.3	Central Treatment Facility Costs – Gravity Concrete Filter Alternative	5-4
5.4	Central Treatment Facility Costs – Gravity Steel Filter Alternative	5-5
5.5	Summary of Treatment Technologies Considered	5-9
6.1	Pressure Zone Service Elevations	6-2
6.2	Proposed New Storage Reservoirs	6-3
6.3	Major Distribution System Improvements	6-4
7.1	Construction Projects Cost and Implementation Schedule	7-4

EXECUTIVE SUMMARY

A. INTRODUCTION

The purpose of this report is to provide the City of Elko New Market with the necessary information regarding the City's water supply, treatment, storage and distribution system so the City can establish priorities, plan, fund and implement required future water system improvements.

The City of Elko New Market is projected to grow substantially over the next 10 to 20 years. For overall planning purposes, population projections and water use estimates will be developed through the year 2030. The first phase of the infrastructure development plans will be projected to meet the system needs for the next 10 years, to the year 2020.

B. WATER USE PROJECTIONS

Water use projections form the basis of planning for future water infrastructure needs. The City of Elko New Market will be experiencing a large amount of growth in the coming years. This report uses population estimates from the Southeast Scott County Comprehensive Plan. Historical population data and projected populations are presented in Figure ES.1.

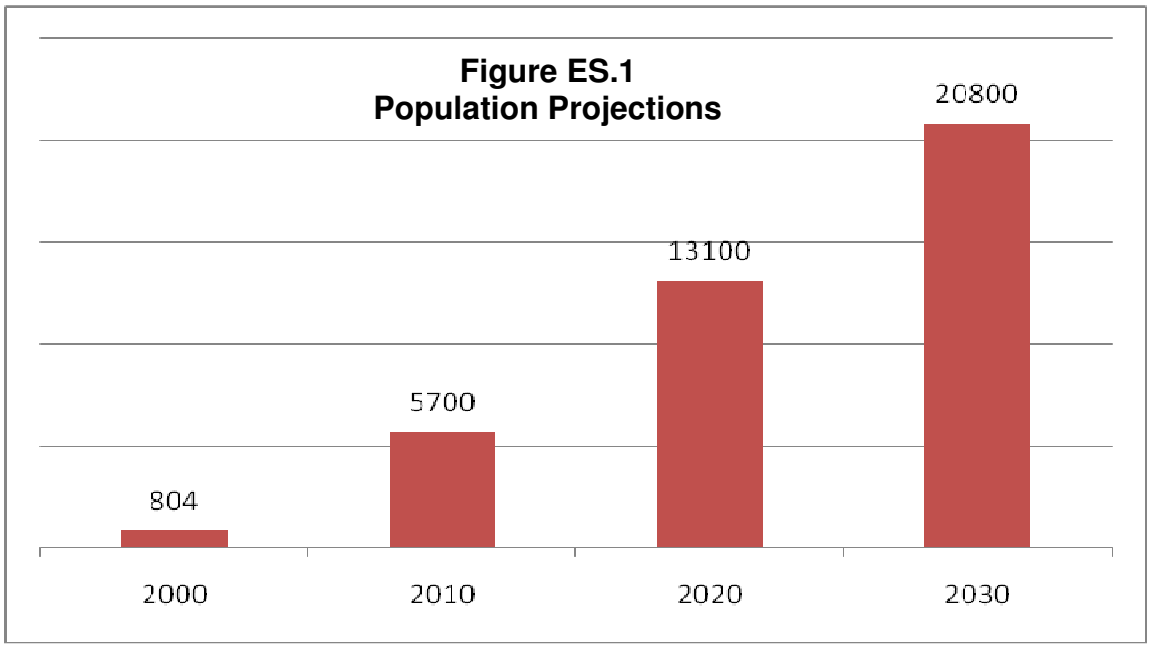


Table ES.1 provides a summary of the projected average daily water demand and maximum daily water demand.

TABLE ES.1 PROJECTED WATER USE DEMANDS			
Year	**Service Area Population**	**Average [1] Daily Demand (MGD)**	**Maximum [2] Daily Demand (MGD)**
2010	5739	0.63	1.89
2020	13137	1.44	3.60
2030	20800	2.29	5.73

[1] Average daily demand based on 110 gpcd total water usage
[2] Maximum daily demand based on maximum to average day ratio of 3.0 thru 2010 and 2.5 thru 2030.

C. DRINKING WATER QUALITY

Numerous Federal and State regulations regulate drinking water quality. In addition, the finished drinking water quality must meet local expectations for taste, odor, hardness, and general quality.

Through the passage of the Safe Drinking Water Act (SDWA) in 1974, the U.S. Congress authorized the United States Environmental Protection Agency (EPA) to establish drinking water regulations that apply to all public water systems in the United States. State governments, through their health departments and environmental agencies, are responsible for implementation and enforcement of the SDWA.

The major components of the SDWA of interest to the City of Elko New Market are as follows:

- National Primary Drinking Water Regulations (NPDWRs)
- Disinfection/Disinfection By-Products Rule (D/DBP)
- Total Coliform Rule
- Ground Water Rule
- Drinking Water Contaminant Candidate List (DWCCL)

Contaminants that exceed EPA limits in the Elko New Market water supply include Radium 226+228, Gross Alpha Particles, Iron and Manganese. Elevated levels of Radium and Alpha particles pose potential long-term health risks and should be

addressed immediately. Iron and manganese, on the other hand, can be removed to improve the aesthetic qualities of the water, but do not pose health risks.

D. EVALUATION OF EXISTING FACILITIES

1. Water Supply

The City of Elko currently obtains water from two wells named Elko 2 and Elko 3. The City of New Market also draws water from two wells named New Market 2 and New Market 3. New Market maintains an older low capacity well, New Market 1, as an emergency backup well.

The total pumping capacity of the existing wells is 1300 gpm, producing 1.56 million gallons per day (MGD). Based on water use projections developed previously, an estimated 5 new wells will be required by 2030. Projected water supply requirements are presented in Table ES.2.

TABLE ES.2
CITY OF ELKO NEW MARKET, MINNESOTA
PROJECTED WATER SUPPLY REQUIREMENTS

Year	Average Day Demand (mgd)	Maximum Day Demand (mgd)	No. of New Wells Required	Firm Capacity	Total Capacity
Existing	0.31	1.19		0.96	1.56
2010	0.63	1.89	1	2.28	3.36
2020	1.44	3.60	3	4.44	5.52
2030	2.29	5.73	5	6.60	7.68
Need Firm Capacity > Maximum Day					

Note: 1. Assumes new well capacities of 1.08 mgd (900 gpm)

2. Water Treatment

Treatment in the Elko Water System consists of chlorination and fluoridation at each pump house. Radium in excess of the MCL was only recently discovered in the Elko Water System during investigative testing by the Minnesota Department of Health. There is currently no treatment for Radium or Gross Alpha particles in the Elko water system. The wells are now under quarterly compliance monitoring by the MDH. If high radium levels continue, public notices will be issued and a plan of action for reducing radium levels will be required.

The New Market Water System provides onsite treatment at each of the two wells, New Market Well No. 2 and New Market Well No. 3. Each treatment facility provides ion exchange water softening, chlorination and fluoridation. The ion exchange softening units have in the past successfully removed Radium and Gross Alpha Particles to below acceptable limits. However, in recent years as flow demands have increased, a number of violations have been recorded.

The ion exchange softener units in the New Market Water System are undersized. The Recommended Standards for Water Works requires that treatment systems be capable of meeting the maximum day demands at the design year. The 2006 peak day demand in New Market was 617,000 gallons. Even with recommended improvements, the total capacity of both treatment units is only 180,000 gpd. Table ES.3 presents an analysis of current treatment capacity as compared to required treatment capacity.

TABLE ES.3
TREATMENT CAPACITY ANALYSIS
NEW MARKET WATER SYSTEM

	WTP No. 1	WTP No. 2
Treatment Capacity[1]	45,000 gpd	45,000 gpd
Flow Available with 50% Blending Ratio	90,000 gpd	90,000 gpd
Total Flow Available	180,000 gpd	
2006 Peak Demand	617,000 gpd	
2010 Peak Design Flow	992,000 gpd	

[1] Capacity after minor improvements are made as recommended by C. Emery Nelson.

3. Storage

Existing storage facilities in the City of Elko New Market consist of two elevated water towers. The tower details are listed in Table ES.4.

TABLE ES.4
EXISTING STORAGE FACILITIES

	Elko Tower No. 1	**New Market Tower No. 1**
Capacity (gals)	150,000	250,000
Year Constructed	1997	2000
High Water Level	1322	1275
Support Type	Pedestal	Pedestal

The recommended additional storage required is based on the higher of two criteria. Based on current water use patterns, the Maximum Day, Fire Protection and Emergency Storage Criteria governs through 2020 when the Average Day Criteria takes over. Table ES.5 summarizes the required storage improvements.

TABLE ES.5
PROJECTED STORAGE IMPROVEMENTS SUMMARY

Year	New Storage Required (gallons)
2010	600,000
2020	400,000
2030	1,000,000

E. WATER SUPPLY IMPROVEMENTS

Currently, the combined well capacity of the Elko New Market water system is 1300 gpm. By the year 2030, an estimated 5000 gpm pumping capacity will be required. Therefore, approximately 5 new wells will be necessary to meet projected water demands in the year 2030. Refer to Table ES.2 for a breakdown of when and how many new wells will be necessary.

1. Dispersed Wells

The current water systems contain wells spread throughout the system. The wells simply pump directly into the nearest watermain. The advantages and disadvantages of this type of water supply system are listed below:

Advantages

- Can reuse all existing wells
- New wells can be located anywhere land is available

Disadvantages

- Separate treatment plants need to be constructed and maintained at each well site
- More difficult to control well head contamination at multiple remote sites

2. Well Field

Developing a well field where wells can be drilled as needed has the following advantages and disadvantages.

Advantages

- Allows centralized treatment

Disadvantages

- Existing New Market wells would not

- Easier to protect well field from contamination

be reused due to high cost of raw water transmission mains

New wells in the Elko New Market area are approximately 530 feet deep and cost an estimated $250,000 to $300,000 each. One new well will be required in 2010 and another well every 5 years is needed to keep pace with projected population growth.

F. WATER TREATMENT IMPROVEMENTS

The current treatment facilities are inadequate to meet future needs of the City of Elko New Market. In fact, due to rapid population growth, significant treatment upgrades will be necessary within the next 5 years. Water treatment facilities are typically sized based on 20-year population projections. However, due to the rapid growth rate projected for Elko New Market it may be more feasible to build treatment facilities to first accommodate 10-year population projections. Then, if the actual growth rate keeps pace with the projected growth rate, a second phase of treatment improvements can be designed and implemented.

1. Dispersed Treatment

The current New Market water system maintains a separate treatment plant at each of the two operating wells. From there water is pumped directly into the distribution system. Continuing this treatment strategy would require treatment plants to be constructed at each of the proposed new wells. Advantages and disadvantages of dispersed treatment are as follows:

Advantages	Disadvantages
▪ Can utilize all existing wells	▪ Higher capital construction costs
▪ No raw water transmission mains required	▪ Higher maintenance costs

2. Centralized Treatment

A common method of locating water treatment facilities is at a centralized treatment facility. Typically, a well field is developed nearby that pumps raw water to the treatment facility. From there treated water is pumped to the distribution system. A tract of land at least 3 acres in size should be purchased for this alternative. Advantages and disadvantages of a central treatment facility include:

Advantages	Disadvantages
▪ Lower capital construction costs ▪ Lower maintenance costs ▪ Central location easier to maintain	▪ Existing New Market wells will not be used

Estimated capital construction costs of a centralized treatment facility with concrete or steel gravity filters are presented in Tables ES.6 and ES.7. Concrete filters have a higher initial cost but last longer. Steel filters require significant rehabilitation every 10 to 15 years.

TABLE ES.6
CENTRAL TREATMENT FACILITY COSTS
GRAVITY CONCRETE FILTER ALTERNATIVE

Construction Phase	Completion Date	Estimated Construction Cost
Phase 1 – 3.0 MGD	2010	$6,000,000
Phase 2 – 3.0 MGD	2020	$6,000,000
Total Estimated Construction Cost		**$12,000,000**
40-Year Average Annual Cost		$300,000

TABLE ES.7
CENTRAL TREATMENT FACILITY COSTS
GRAVITY STEEL FILTER ALTERNATIVE

Construction Phase	Completion Date	Estimated Construction Cost
Phase 1 – 2.4 MGD (2 x 1000 gpm filters with space for 3rd filter)	2010	$5,000,000
Phase 2 – 1.2 MGD (1 x 1000 gpm filters)	2015	$1,000,000
Phase 3 – 2.4 MGD (2 x 1000 gpm filters with building expansion)	2020	$4,000,000
Total Estimated Construction Cost		**$10,000,000**[1]
40-Year Average Annual Cost		$300,000

[1] Steel filters require rehabilitation every 10-15 years at an estimated cost of $250,000 per filter.

G. WATER STORAGE IMPROVEMENTS

The Elko and New Market water systems are currently not connected. The high water level in the Elko tower is 47 feet higher than that of the New Market tower. A pressure reducing valve would be necessary at any interconnections of the systems to prevent overflowing of the New Market tower.

Connecting the two systems would allow "water sharing" between the towers and provide the ability to loop dead-end watermains. But maintaining continuous flow through pressure reducing valves is not recommended as it wastes energy.

Based on the evaluation presented in Section 4, an additional 500,000 gallons of water storage capacity will be needed in the next 5 years and a total of 2 million gallons by 2030.

Table ES.8 presents a summary of new tower locations, sizes, projected completion years, and estimated construction costs.

TABLE ES.8
PROPOSED NEW STORAGE RESERVOIRS

Reservoir/Location	Size (gallons)	Target Completion Date	Estimated Construction Cost
Ground Storage at New Water Treatment Facility	500,000	2010	$650,000
East Tower	1,000,000	2015	$1,800,000
West Tower	500,000	2020	$1,300,000
South Tower	500,000	2030	$1,300,000

H. DISTRIBUTION SYSTEM IMPROVEMENTS

Land use and topographic survey maps of the 2030 and ultimate development boundary areas were consulted to develop projected watermain service areas in 5-year intervals through 2030.

The main components of the distribution master plan include:

1) Develop 12-inch watermain "loops" around the projected 2015 development area.
2) Develop 16-inch watermain "loops" around the projected 2030 development area.

In accordance with City policy for trunk watermains in new development areas, developers would be required to install at least an 8-inch watermain, while the incremental cost increase to a larger diameter watermain would be paid by the City.

I. RECOMMENDATIONS AND IMPLEMENTATION

Table ES.9 summarizes the proposed implementation schedule and today's estimated construction cost for each project.

TABLE ES.9
CONSTRUCTION PROJECTS COST AND IMPLEMENTATION SCHEDULE

Item	Target Completion Date	Estimated Construction Cost
A. Water Supply and Treatment Improvements		
1. ELNM Well No. 4	2010	$300,000
2. ELNM Well No. 5	2015	$300,000
3. ELNM Well No. 6	2020	$300,000
4. ELNM Well No. 7	2030	$300,000
5. ELNM Well No. 8	2030	$300,000
6. 3.0 MG Central Treatment Facility Phase 1 Gravity Concrete Filter Alternative	2010	$6,000,000
7. 3.0 MG Central Treatment Facility Expansion Phase 2 Gravity Concrete Filter Alternative	2020	$6,000,000
B. Water Storage Improvements		
1. 0.5 MG Ground Storage	2010	$650,000
2. 1.0 MG East Tower	2015	$1,800,000
3. 1.0 MG West Tower	2020	$1,800,000
4. 0.5 MG South Tower	2030	$1,300,000
C. Distribution System		
1. 2010 Watermain Upsizing	2010	$660,000
2. 2015 Watermain Upsizing	2015	$470,000
3. 2030 Watermain Upsizing	2030	$850,000
Total 2010 Construction Costs		**$7,610,000**
Total 2015 Construction Costs		**$2,570,000**
Total 2020 Construction Costs		**$8,100,000**
Total 2030 Construction Costs		**$2,750,000**

SECTION 1 INTRODUCTION

A. PURPOSE

The purpose of this report is to provide the City of Elko New Market with the necessary information regarding the City's water supply, treatment, storage and distribution system so the City can establish priorities, plan, fund and implement required future water system improvements.

B. COMMUNITY BACKGROUND

The City of Elko New Market is located in Scott County in the south Twin Cities metropolitan area. This region is growing rapidly, and projections indicate that this growth will continue.

The population of Elko New Market has increased from 804 in 2000 to 2,525 in 2005. This kind of growth places pressure on public infrastructure including water supply and delivery systems.

The Cities of Elko and New Market have recently merged to form a single municipality. However, much of the infrastructure continues to operate as two separate systems. The two water systems are not currently connected.

C. PLANNING PERIOD

The City of Elko New Market is projected to grow substantially over the next 10 to 20 years. For overall planning purposes, population projections and water use estimates will be developed through the year 2030. The first phase of the infrastructure development plans will be projected to meet the system needs for the next 10 years, to the year 2020.

D. REPORT ORGANIZATION

This report is organized into seven sections as shown below:

- Section 1 summarizes report purpose and background
- Section 2 reviews projected water use demands based on anticipated population trends and historical water use.
- Section 3 presents a summary of Federal and State Drinking Water Regulations and the impact on the City of Elko New Market's water system

- Section 4 evaluates the existing major water system components
- Section 5 evaluates water supply and treatment alternatives
- Section 6 analyzes the distribution system and water storage alternatives
- Section 7 summarizes recommendations and provides an implementation plan

SECTION 2 WATER USE PROJECTIONS

A. GENERAL

Water use projections form the basis of planning for future water infrastructure needs. The City of Elko New Market is located in southeastern Scott County and is experiencing tremendous growth which will require expansion of the water supply system.

The following sections will provide an analysis of land use trends based on comprehensive plan projections, population growth trends, historical water usage, allocation of water demands to residential, commercial and industrial user categories, and projection of future water demands.

B. SERVICE AREA

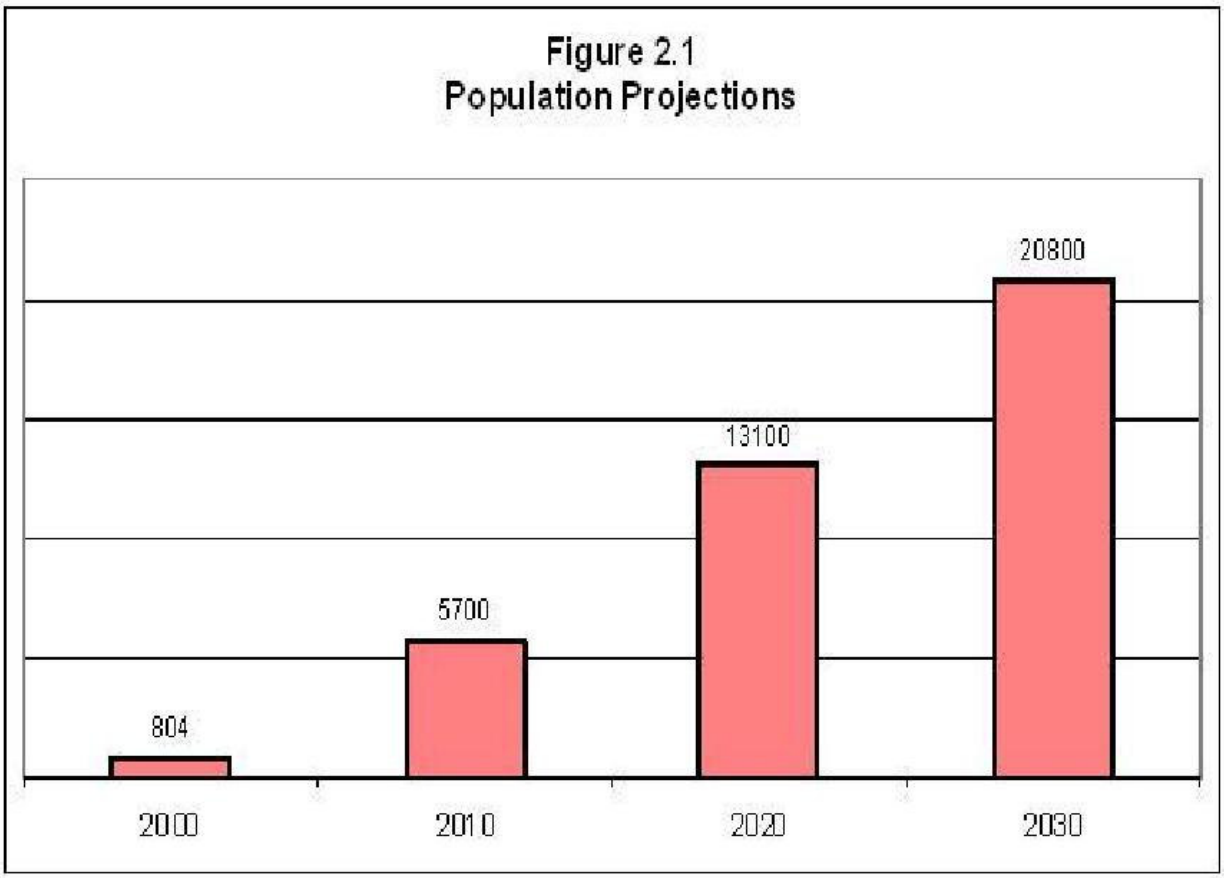
The water service planning area has been based on providing service in the current City limits, as well as projected growth areas. The planning area includes providing service within the 2030 Development Boundary with considerations made for the Ultimate Development Boundary, as shown in Figure 6.1.

C. PLANNING PERIOD

For the purposes of this study, year 2030 will be utilized as the design year in order to plan for future development.

D. POPULATION PROJECTIONS

The City of Elko New Market will be experiencing a large amount of growth in the coming years. This report uses population estimates from the Southeast Scott County Comprehensive Plan. Historical population data and projected populations are presented in Figure 2.1.



E. HISTORICAL WATER USAGE

Historical water data is an important tool for determining trends and helping to assist the City in determining if there are problems within the system. The historical water usage for 2004 through 2006 is presented in Tables 2.1 and 2.2.

TABLE 2.1
ELKO WATER SUPPLY INVENTORY

	2004	**2005**	**2006**
Total Pumped (MG)	35.8	38.3	45.8
Total Sold (MG)	33.5	37.7	54.6
Total Unaccounted (MG) *	2.3	0.6	--
Percent Unaccounted	6%	2%	--
Population	1,024	1,126	1,447
Gallons per capita **	96	93	104

* Unaccounted for water is the difference between Total Pumped and Total Sold

** Gallons per capita is the Total Pumped divided by the population

TABLE 2.2 NEW MARKET WATER SUPPLY INVENTORY			
	2004	**2005**	**2006**
Total Pumped (MG)	50.5	57.9	68.4
Total Sold (MG)	48.8	54.0	64.4
Total Unaccounted (MG) *	1.7	3.9	4.0
Percent Unaccounted	3%	7%	6%
Population	1,297	1,399	1,720
Gallons per capita **	107	113	109
* Unaccounted for water is the difference between Total Pumped and Total Sold			
** Gallons per capita is the Total Pumped divided by the population			

F. MAXIMUM DAY WATER USE

In every water system there will be periods of peak usage, typically during summer months. A peaking factor is used to calculate the maximum daily water demands of the community. Again, past records give an indication of what the peaking factor should be for the City of Elko New Market. Table 2.3 provides a summary of average day, maximum day, and maximum/average day ratio for years 2004 thru 2006.

TABLE 2.3 AVERAGE AND MAXIMUM DAILY WATER DEMAND			
Year	**Average Day (MGD)**	**Maximum Day* (MGD)**	**Maximum Day/ Average Day Ratio**
2004	0.24	0.88	3.7
2005	0.26	0.93	3.6
2006	0.31	1.19	3.8
* Maximum day determined from daily pumping records			

G. WATER USE PROJECTIONS

Future water demands have been developed using the background data discussed above. Since Elko New Market is a developing community, with many new lawns, yards and gardens requiring watering, the average per capita usage will be estimated to be 90 gallons per person per day (gpcd) for residential users.

There is very little commercial and industrial usage in the City of Elko New Market. It is expected that the City will add commercial and industrial users as the City grows. It is projected that commercial/industrial growth water use will be approximately 10 percent

in the future. Thus, commercial/industrial per capita water usage is projected at 10 gpcd. The City is expecting to grow significantly in the future and population projections may not adequately address this growth. Therefore, in order to allow the City greater flexibility with future growth, a growth allowance of 10 gpcd will be included in future predictions. This growth allowance will account for additional residential and light commercial growth. Table 2.4 provides a summary of the projected per capita water demands.

TABLE 2.4
PROJECTED PER CAPITA WATER USE

Residential	90 gpd
Commercial/Industrial	10 gpd
Growth Allowance	10 gpd
Total	**110 gpd**

Peak day water usage is projected based on estimated average day use. The peak flows are calculated using a peaking factor, which is a ratio of the expected peak day flow to average day flow. The peaking factor for estimating future water demands will be 3.0 thru 2010 and 2.5 during later years. Table 2.5 provides a summary of the projected average daily demand and maximum daily demand.

TABLE 2.5
PROJECTED WATER USE DEMANDS

Year	Service Area Population	Average [1] Daily Demand (MGD)	Maximum [2] Daily Demand (MGD)
2010	5700	0.63	1.89
2020	13100	1.44	3.60
2030	20800	2.29	5.73

[1] Average daily demand based on 110 gpcd total water usage
[2] Maximum daily demand based on maximum to average day ratio of 3.0 thru 2010 and 2.5 thru 2030.

The average and maximum daily demands calculated in Table 2.5 will be used to determine the adequacy of the existing wells and storage and when additional wells, storage or treatment facilities are required.

SECTION 3 DRINKING WATER QUALITY

A. GENERAL

Numerous Federal and State regulations regulate drinking water quality. In addition, the finished drinking water quality must meet local expectations for taste, odor, hardness, and general quality. This section will provide a background of drinking water regulations and a summary of existing water quality data. Additionally, up to date information can be found on the EPA web site at www.epa.gov. Drinking water contaminant limits are listed in Appendix C for primary, secondary and candidate contaminants. Water quality design targets will be established based on regulatory requirements and public expectations.

B. SAFE DRINKING WATER ACT REGULATIONS

Through the passage of the Safe Drinking Water Act (SDWA) in 1974, the U.S. Congress authorized the United States Environmental Protection Agency (EPA) to establish drinking water regulations that apply to all public water systems in the United States. State governments, through their health departments and environmental agencies, are responsible for implementation and enforcement of the SDWA.

Under the SDWA, the EPA initially proposed National Interim Primary Drinking Water Regulations (NIPDWR). The regulations were referred to as "interim" because they were to be revised upon further research and special studies. The interim regulations were adopted as National Primary Drinking Water Regulations (NPDWRs) upon the passage of the 1986 Amendments to the SDWA. There were 83 contaminants to be regulated at that time.

Changes were made to the SDWA by the 1996 amendments. These amendments retained most of the NPDWRs previously enacted. The 1996 amendments changed the process for selecting contaminants to be regulated and mandated new rules regarding arsenic, uranium, radon, and groundwater disinfection. The 1996 amendments placed increasing emphasis on ensuring that all new and existing water systems have the technical, managerial and financial capacity to comply with NPDWRs. Systems that do not commit the resources required to comply with the new rules may not be eligible for loans from the Drinking Water State Revolving Fund (DWSRF) and may be vulnerable to enforcement actions.

The major components of the SDWA of interest to the City of Elko New Market are as follows:

- National Primary Drinking Water Regulations (NPDWRs)
- Disinfection/Disinfection By-Products Rule (D/DBP)
- Total Coliform Rule
- Ground Water Rule
- Drinking Water Contaminant Candidate List (DWCCL)

The following paragraphs summarize each of these components.

1. National Primary Drinking Water Regulations (NPDWRs)

NPDWRs are the enforceable standards with which water suppliers must comply. Currently, there are standards for 92 contaminants, including turbidity, 8 microorganism indicators, 4 radionuclides, 19 inorganic contaminants, and 60 organic contaminants. The United States Environmental Protection Agency (EPA) is required to review and revise, as appropriate, each NPDWR every six years.

2. Disinfection and Disinfection By-Products (D/DBP's)

In December 1998, the USEPA established maximum residual disinfectant levels for water systems that use a chemical disinfectant. The maximum residual disinfectant level is 4.0 mg/l of chlorine as free Cl2. The compliance date for groundwater systems was January 2004. Maximum limits have been established to limit the health effects of disinfection by-products.

3. Total Coliform Rule

The USEPA promulgated a total coliform rule on June 29, 1989. This rule applies to both surface water supplies as well as groundwater supplies. The total coliform rule became effective December 31, 1990. A presence/absence approach is now used to determine compliance with the coliform maximum contaminant level (MCL). The Maximum Contaminant Level Goal (MCLG) is zero. In general, coliforms must be absent in at least 95 percent of samples. Compliance is determined on a monthly basis.

Recommended guidelines for total coliform control are:

- maintenance of detectable disinfectant residual throughout the distribution system;
- proper repair, replacement and maintenance of the distribution system.

According to an article published by the American Water Works Association, "water systems that do not disinfect and do not carry a disinfection residual in their distribution system must carefully consider their security vulnerabilities because they do not have a disinfection residual that would guard against microbial contamination from whatever source."[1]

4. Ground Water Rule

In May 2000, the proposed Federal Ground Water Rule was published. The rule utilizes a multiple barrier structure to guard against microbiological contamination. The four major components include (1) periodic on-site inspections; (2) source water monitoring for sensitive aquifers without treatment or with other risk indicators; (3) requirement for correction of significant deficiencies; and (4) requirement for treatment when deficiencies are not or cannot be corrected. Universal disinfection is not required, although systems vulnerable to contamination may be required to disinfect.

5. Drinking Water Contaminant Candidate List (DWCCL)

Although not regulated at this time, the Drinking Water Contaminant Candidate List (DWCCL) contains contaminants and contaminant groups that are known or anticipated to occur in public water systems. The first list of 60 contaminants was published in March 1998. In July 2003, EPA announced that there was sufficient data available to remove nine of the contaminants, including manganese, from the list. EPA, in effect, determined there was sufficient data available to show these contaminants were not a significant risk to public health.

[1]Regulatory Compliance Planning to Ensure Water Supply Safety, Pontias, W. Frederick, Journal AWWA, 94:3, March 2002.

C. SECONDARY DRINKING WATER STANDARDS

In addition to the National Primary Drinking Water Regulations that cover the contaminants that affect public health, USEPA recommends Secondary Drinking Water Regulations with limits on those contaminants that affect the aesthetic qualities of drinking water. The secondary regulations are intended to serve as guidelines and are not federally enforceable. Table 4.1 lists the secondary standards. Although water utilities are not required to treat to Secondary Drinking Water Standards, they should be aware that keeping the quality of drinking water within these guidelines makes it more acceptable to consumers, thereby decreasing complaints.

Total dissolved solids, including sulfates and chlorides, generally become a problem only in deep well sources. These constituents impart a mineral taste to the water and can cause gastrointestinal discomfort to those not accustomed to them. Since they are not effectively removed by conventional treatment, selection of a source with low levels of these constituents is quite important.

D. ELKO NEW MARKET WATER QUALITY ISSUES

Contaminants that exceed EPA limits in the Elko New Market water supply include Radium 226+228, Gross Alpha Particles, Iron and Manganese. Elevated levels of Radium and Alpha particles pose potential long-term health risks and should be addressed immediately. Iron and manganese, on the other hand, can be removed to improve the aesthetic qualities of the water, but do not pose health risks.

1. Radium and Gross Alpha Particles

Radium occurs naturally in our environment. It is a natural component of underground rock and soil, and it can work its way into ground water. As a result, radium has been found in some Minnesota community water supplies in quantities that exceed the drinking water standard.

The EPA has established the Maximum Contaminant Level (MCL) for Radium 226+228 at 5.4 pCi/L. Exposure to Radium in drinking water in excess of the MCL and over an entire lifetime can result in an increased risk of cancer. The radioactive particles emitted by Radium can damage parts of living tissue, which can lead to the unnatural reproduction of a cell and an increased risk of cancer.

The detection of Gross Alpha particles is an indicator that a particular type of radioactivity is present. If Gross Alpha activity is found, further testing for Radium 226+228 is conducted. The MCL for Gross Alpha particles is 15 pCi/L.

If a water system exceeds the standard for Radium or Gross Alpha activity, it must take corrective actions, which include notifying those who drink water from the system. The notification includes information on what the system is doing to remedy the situation and what precautions if any the people should take.

Results of Radium 226+228 and Gross Alpha testing for both the Elko and New Market water systems are summarized in Tables 3.1 thru 3.4.

TABLE 3.1
RADIUM 226+228 TEST RESULTS
NEW MARKET WATER SYSTEM

Date Collected	New Market Well No. 2 Radium			New Market Well No. 3 Radium		MCL
	Raw Water	Treated Water		Raw Water	Treated Water	
August 3, 2004					9.6	5.4 pCi/L
November 10, 2004					8.3	
January 31, 2005					9.5	
March 23, 2005	3.3				7.7	
May 31, 2005					6.5	
December 12, 2005	6.0	3.4		7.7	5.2	
January 30, 2006		4.4				
April 26, 2006		4.7				
July 19, 2006				11.1	12.0	
August 3, 2006		10.2				
November 1, 2006		6.0	6.3	Compliance Average		

TABLE 3.2 GROSS ALPHA TEST RESULTS NEW MARKET WATER SYSTEM						
Date Collected	**New Market Well No. 2 Radium**			**New Market Well No. 3 Radium**		
	Raw Water	**Treated Water**		**Raw Water**	**Treated Water**	**MCL**
August 3, 2004					26.7	15 pCi/L
November 10, 2004					23.1	
January 31, 2005					28.8	
March 23, 2005					32.9	
May 23, 2005	17.3				17.3	
May 31, 2005					26.1	
December 12, 2005	16.2	19.4		25.5	19.1	
January 30, 2006		6.2				
April 26, 2006		12.5				
July 19, 2006				20.9	19.0	
August 3, 2006		14.6				
November 1, 2006		20.6	13.5	Compliance Average		

TABLE 3.3 RADIUM 226+228 TEST RESULTS ELKO WATER SYSTEM				
Date Collected	**Elko Well No. 2**		**Elko Well No. 3**	**MCL**
	Raw Water		**Raw Water**	
August 22, 2006	8.6		10.0	5.4 pCi/L

TABLE 3.4 GROSS ALPHA TEST RESULTS ELKO WATER SYSTEM				
Date Collected	**Elko Well No. 2**		**Elko Well No. 3**	**MCL**
	Raw Water		**Raw Water**	
August 22, 2006	5.7		12.2	15 pCi/L
January 30, 2007	4.5		14.0	

Both the Elko and New Market water systems have detected Radium 226+228 in excess of the MCL in raw water samples. New Market had previously been successful in reducing Radium to below the MCL by ion exchange softening

treatment. However, the treatment units are undersized for current demands and Radium in excess of the MCL has been recorded in finished water samples. Residents of New Market have been notified of the violations and efforts are underway to provide additional treatment.

The Elko water system has only recently detected Radium 226+228 and Gross Alpha particles in excess of the MCL's. Efforts are now underway to provide additional treatment to reduce Radium and Alpha particles to below acceptable limits.

SECTION 4 EVALUATION OF EXISTING FACILITIES

A. GENERAL

This Section provides a summary of existing water supply, treatment, storage and water distribution facilities for the City of Elko New Market. Currently, two separate water systems exist. Facilities within each system include the following:

Elko Water System

- 2 wells
- Fluoride and liquid chlorine treatment
- 150,000 gallon elevated storage tank

New Market Water System

- 2 wells
- Ion exchange softening
- Fluoride and liquid chlorine treatment
- 250,000 gallon elevated storage tank

Each system includes a network of water mains ranging from 6 to 12 inches in diameter. An evaluation of the existing water infrastructure facilities is discussed below. The distribution system will be discussed in Section 6.

B. WATER SUPPLY

1. General

The City of Elko currently obtains water from two wells named Elko 2 and Elko 3. The City of New Market also draws water from two wells named New Market 2 and New Market 3. New Market maintains an older low capacity well, New Market 1, as an emergency backup well. The location of these wells is shown in Figure 4.1.

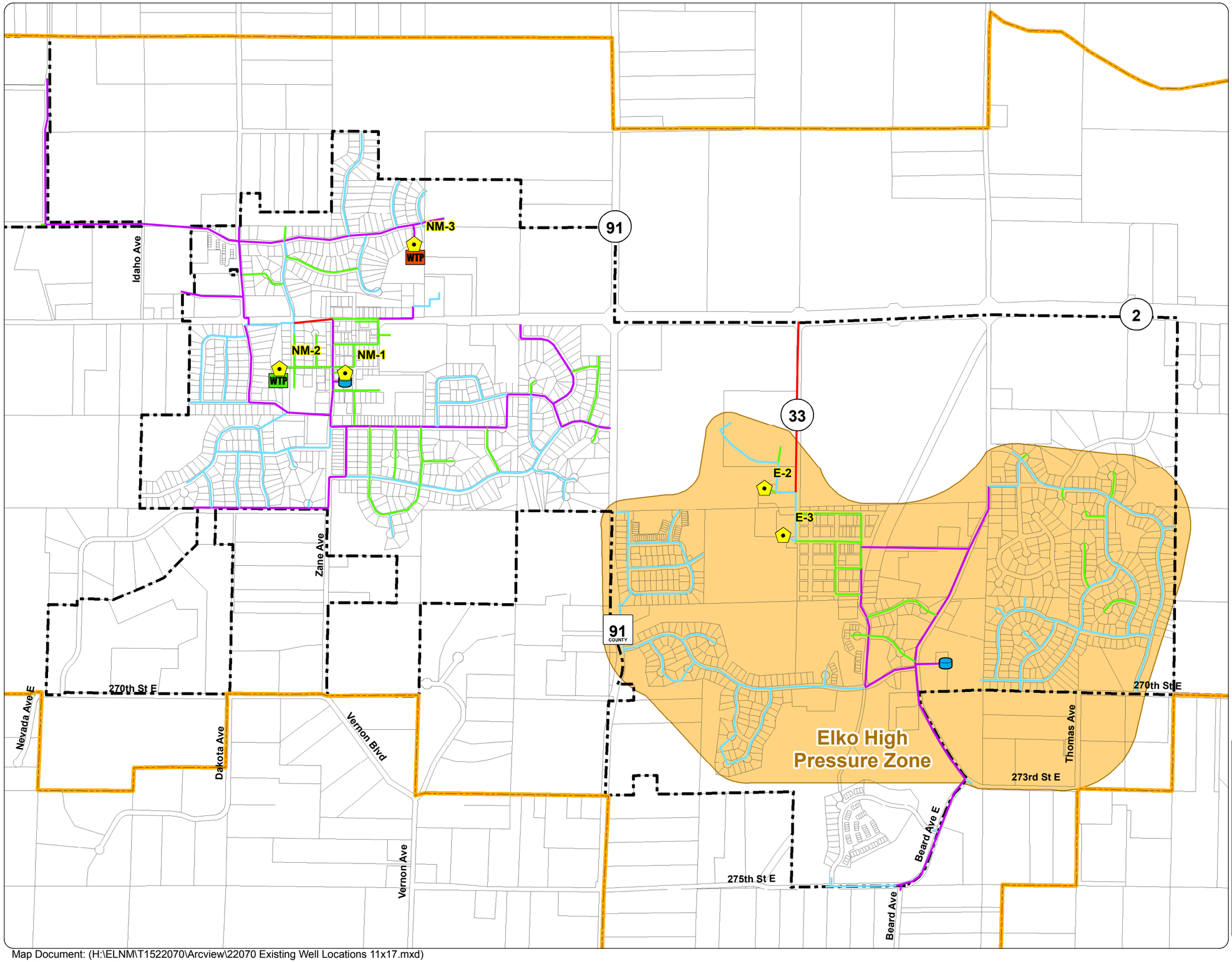
A summary of the specific well construction is presented in Table 4.1.

TABLE 4.1
CITY OF ELKO NEW MARKET, MINNESOTA
WELL CONSTRUCTION SUMMARY

	Elko 2	**Elko 3**	**New Market 1**	**New Market 2**	**New Market 3**
Unique Well No.	594234	680569	211953	451825	686687
Year Installed	1997	2002	1930	1988	2003
Well Capacity	300 gpm	650 gpm	80 gpm	250 gpm	945 gpm
Casing (in)/ Depth (ft)	20 in./53 ft. 12 in./326 ft.	20 in./75 ft. 12 in./330 ft.		12 in./ 290 ft.	20 in./192 ft. 14 in./294 ft.
Total Depth	521 ft	525 ft	410 ft.	435 ft.	439 ft.
Water Quality Issues	Iron and Manganese/ Radionuclides	Iron and Manganese/ Radionuclides	Iron and Manganese/ Radionuclides	Iron and Manganese/ Radionuclides	Iron and Manganese/ Radionuclides

ELKO NEW MARKET WATER DISTRIBUTION PLAN EXISTING WELL LOCATIONS

FIGURE 4.1
SEPTEMBER, 2007



Legend

Wells

- Elko Well 2 - 300 gpm
- Elko Well 3 - 650 gpm
- New Market Well 1 - 80 gpm
- New Market Well 2 - 250 gpm
- New Market Well 3 - 945 gpm

Storage Tanks

- Elko Tower 1 - 150,000 gallons
- New Market Tower 1 - 250,000 gallons

Water Treatment Plants

- WTP No. 1 - 90,000 gallons
- WTP No. 2 - 90,000 gallons

Watermain

- 6"
- 8"
- 10"
- 12"
- 16"
- Elko Pressure Zone
- 2030 Undesignated MUSA Reserve Boundary
- Elko New Market City Limits
- County Boundary
- Lakes

N
W E
S

0.25 0 0.25
Miles

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Map Document: (H:\ELNM\T1522070\Arcview\22070 Existing Well Locations 11x17.mxd)
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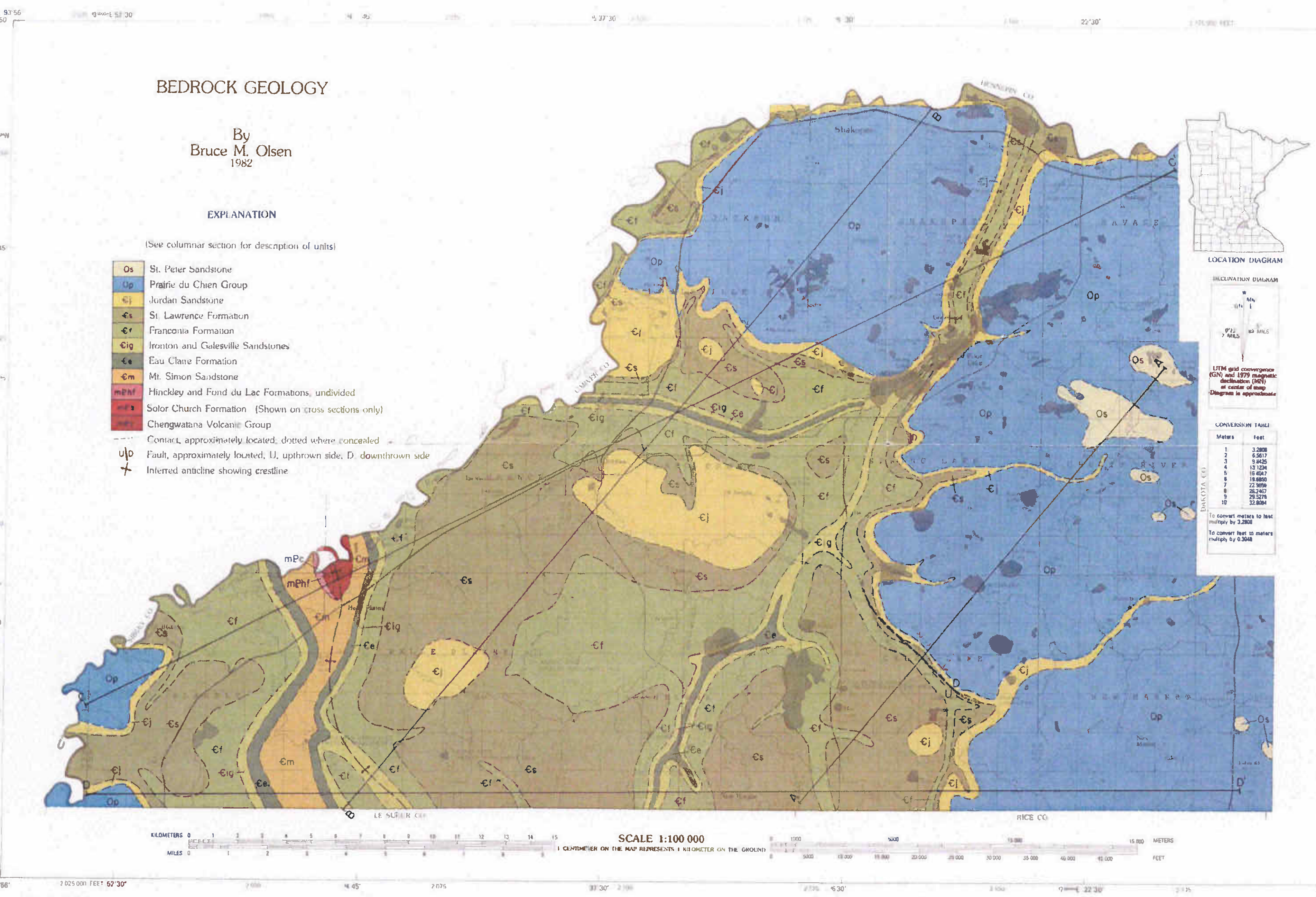
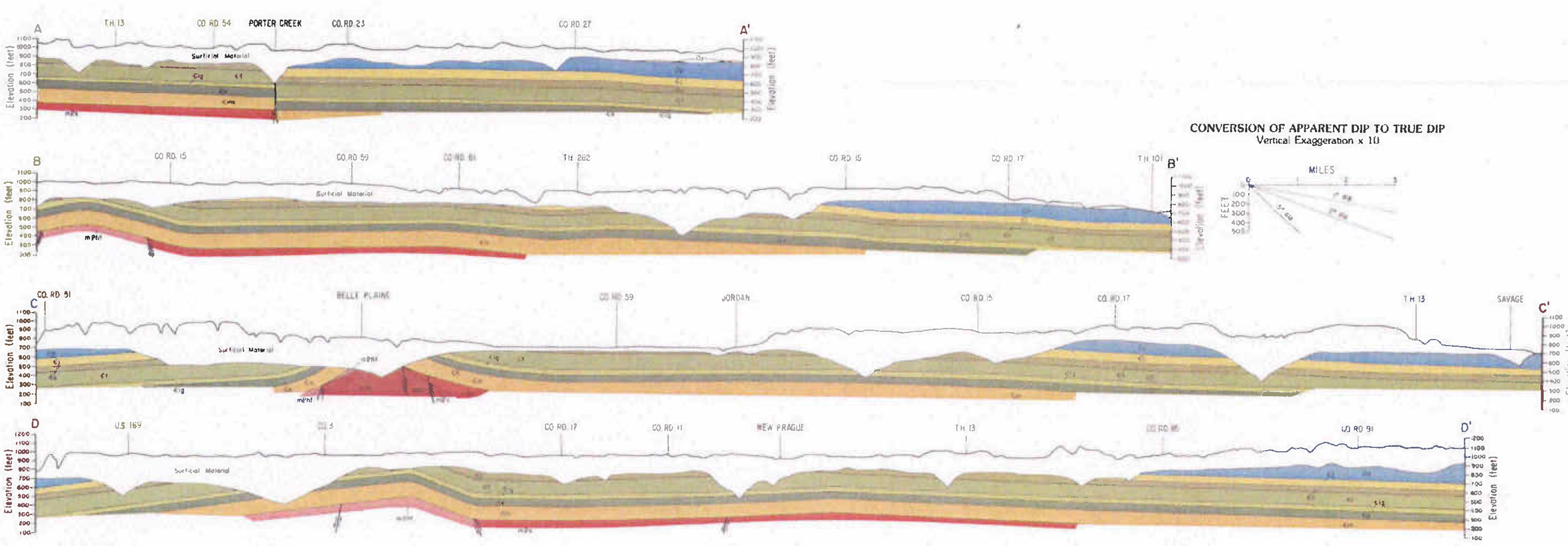
UNIVERSITY OF MINNESOTA
MINNESOTA GEOLOGICAL SURVEY
Matt Walton, Director

PREPARED WITH THE SUPPORT OF THE LEGISLATIVE COMMISSION ON MINNESOTA RESOURCES
PUBLISHED WITH THE SUPPORT OF THE SCOTT COUNTY BOARD OF COMMISSIONERS

COUNTY ATLAS SERIES
MAP C-1, PLATE 5
BEDROCK GEOLOGY





BEDROCK HISTORY

Changes in ancient environments caused changes in bedrock types. The oldest rocks that occur just beneath the glacial deposits are basalts, or solidified lavas, which formed about 1,100 million years ago. These basalts, termed the Chengwatana Volcanic Group, are thousands of feet thick and occur as the uppermost bedrock only in the vicinity of Belle Plaine. However, they are thought to underlie all the younger bedrock formations in the county.

The outpouring of the Chengwatana lavas was followed by millions of years of stream erosion and the deposition of thick layers of reddish-colored alluvial muds and sands. Faulting and uplift of the basalts affected the distribution and the thicknesses of these sedimentary layers. The oldest sedimentary layer, the Solor Church Formation, accumulated for about 100 million years after volcanic activity had ceased. It underlies younger bedrock except in parts of Belle Plaine and Blakely Townships where faulting of the basalts is known to have occurred. Here, the slightly younger Fond du Lac Formation accumulated from about 950 million to 570 million years ago. Near the end of this time, a thin layer of lake sands called the Hinckley Sandstone began to accumulate. These sands may once have covered the entire county, but occur now only as thin, scattered patches.

No rock formations have been identified that date from the end of Proterozoic time (570 million years ago) to the beginning of Late Cambrian time (520 million years ago). However, during that 50-million-year hiatus, the terrestrial volcanic and stream-deposited sedimentary rocks of the Proterozoic were extensively weathered. At around the beginning of Late Cambrian time, the area was inundated by a shallow sea, in which almost a thousand feet of sediments were to accumulate. These Paleozoic marine sedimentary rocks, which comprise the rest of the bedrock formations shown on the map, were deposited from the beginning of Late Cambrian through Middle Ordovician time (520 to 460 million years ago). None of the Paleozoic formations is more than 200 feet thick in Scott County and they differ greatly in rock type. Their deposition therefore must have been influenced by periodic changes in water level and by changes in the types of sediments being washed into the sea.

About 600 feet of sandstone, shale, and dolomite were deposited during Late Cambrian time, 520 to 500 million years ago. In three separate invasions, seas covered the area, spreading beach and near-shore sands which were to become the Mt. Simon, Galesville, Ironton, and Jordan Sandstones. Farther from shore the shales, mudstones, siltstones, and fine-grained sandstones of the Eau Claire Formation and portions of the Franconia and St. Lawrence Formations were deposited. Where some areas of the seafloor received little or no sediment from the land, limey oozes accumulated that became the dolomite beds found in the Franconia and St. Lawrence Formations.

Deposition following the third Cambrian sea advance continued throughout Early Ordovician time (500 to 480 million years ago). Limey muds with little sediment other than sand accumulated to form the Prairie du Chien Group. Its lower unit, called the Oneota Dolomite, formed in shallow water far from shore, whereas its upper unit, the Shakopee Formation, formed as reefs and as tidal flat deposits. Shakopee deposition appears to have ended when the seas receded and the area was exposed to erosion. The duration of this erosional interval is unknown and it is impossible to estimate how much of the Shakopee Formation may have been removed. The maximum reported thickness for the Prairie du Chien Group in Scott County is 152 feet near Prior Lake.

About 470 million years ago, Scott County was again covered by a shallow sea and the beach sands of the St. Peter Sandstone began to accumulate. To the east in Dakota County, the St. Peter Sandstone is overlain by younger Ordovician rocks and its thickness there exceeds 140 feet. Probably it also reached such a thickness in Scott County, but the overlying rocks have been removed and the St. Peter has been reduced to remnants no thicker than 35 feet in eastern Credit River and New Market Townships.

No rocks remain to record the bedrock history of Scott County following the deposition of the St. Peter Sandstone. The bedrock topography indicates that any rock which may have formed was removed by stream and glacial erosion.

STRUCTURAL GEOLOGY

The cross sections on this plate show, in generalized form, the relationships of the bedrock formations. The present land surface profile and some cultural features are also shown for reference. The horizontal direction is at the same scale as the map but the vertical direction is exaggerated ten times in order to show the relatively thin Paleozoic formations. This vertical exaggeration magnifies geologic structures and makes the formations appear to dip more steeply than they do. The scale next to the cross sections shows what the actual dips are in relation to the vertical exaggeration.

The northeastward trend of older to younger bedrock formations resulted not only from the greater resistance of the younger bedrock formations to erosion, but also from the geologic structure. Scott County is situated on the southwestern flank of the Twin Cities artesian basin, a structure which underlies all of the seven-county Metropolitan Area. This basin is the dominant structural feature in Scott County, although local folds and faults also occur. From southwestern Belle Plaine Township to northeastern Glendale Township, the Paleozoic formations drop more than 300 feet toward the center of the Twin Cities artesian basin in Hennepin County. This dip is not constant, but occurs in sinuous, northwest-trending monoclinal folds; the distribution of the Prairie du Chien Group in the eastern half of the county reflects one of these structures. Localized, minor anticlines and synclines occur along the trend of these monoclinal folds. Minor faulting may also exist, but cannot be confirmed with present subsurface data.

The Paleozoic formations are so thin that a dip as small as 2 degrees elevates any of them within a mile by the amount of its total thickness. Faulting and folding uplifted and fractured even very hard rocks and increased their susceptibility to erosion. The small changes in elevation coupled with long-term erosion produced the present distribution of bedrock formations.

Faulting of the Proterozoic basalt flows influenced the formation of the Twin Cities artesian basin and contributed to the development of two major structural features in Scott County. The Belle Plaine anticline, located along the boundary of Blakely and Belle Plaine Townships, appears to be a structure of Paleozoic rocks draped over Proterozoic fault blocks and modified during basin formation. The fault along Porter Creek east of St. Patrick in Cedar Lake Township coincides with a Proterozoic fault. The Porter Creek fault appears to reflect transverse (horizontal) adjustment of the Paleozoic rocks to folding along a monoclinal structure. Probably the trend for this adjustment was guided by irregularities in the Proterozoic surface associated with its faulting or by small-scale slippage on the Proterozoic fault.

STRATIGRAPHIC CLASSIFICATION				DESCRIPTION OF ROCK UNITS	
SYSTEM SERIES	YEARS BEFORE PRESENT	GROUP OR FORMATION NAME	MAP SYMBOL	THICKNESS	DOMINANT ROCK TYPES
MIDDLE ORDOVICIAN		ST. PETER SANDSTONE	Os	Occurs as erosional remnants; maximum reported thickness 35 feet	Fine- to medium-grained, poorly cemented quartzose sandstone; basal contact minor erosional surface
LOWER ORDOVICIAN		PRAIRIE DU CHIEN GROUP	Op	Typically occurs as erosional remnants; maximum reported thickness 152 feet	Sandy dolomite with thin beds of quartzose sandstone; in the south may contain thin beds of quartzose sandstone and soft shale
UPPER CAMBRIAN	500 m.y.	JORDAN SANDSTONE	€j	85 to 100 feet	Fine- to coarse-grained, poorly cemented quartzose sandstone
UPPER CAMBRIAN		ST. LAWRENCE FORMATION	€s	45 to 60 feet	Silty dolomite interbedded with siltstone, soft shale, and very fine-grained quartzose sandstone
UPPER CAMBRIAN		FRANCONIA FORMATION	€f	130 to 150 feet	Very fine-grained, glauconitic quartzose sandstone and shale; in the south may contain thick beds of slightly glauconitic dolomite
UPPER CAMBRIAN		IRONTON & GALESVILLE SANDSTONES	€ig	45 to 55 feet	Fine- to very coarse-grained quartzose sandstone with thin beds of soft shale
UPPER CAMBRIAN		EAU CLAIRE FORMATION	€e	65 to 80 feet	Interbedded siltstone, mudstone, and shale with scattered beds of very fine-grained quartzose sandstone
UPPER CAMBRIAN		MT. SIMON SANDSTONE	€m	140 to 165 feet	Medium- to coarse-grained, poorly cemented quartzose sandstone; may contain pebbles to granules of quartz in lower 20 feet and thin beds of mudstone. Basal contact major erosional surface
MIDDLE PROTEROZOIC	520 m.y.	HINCKLEY & FOND DU LAC FORMATIONS, UNDIVIDED	mPhf	Combined thickness probably exceeds 1000 feet. Hinckley probably does not exceed 20 feet and thus is too thin to map as a separate unit	Fine- to coarse-grained quartzose sandstone of the Hinckley sporadically overlies the interbedded shale and arkosic sandstone of the Fond du Lac
MIDDLE PROTEROZOIC	950 m.y.	SOLOR CHURCH FORMATION	mPs	Unknown, but probably attains several thousand feet	Interbedded mudstone, siltstone, and lithic sandstone
MIDDLE PROTEROZOIC	1100 m.y.	CHENGWATANA VOLCANIC GP	mPc	Unknown, but probably attains several thousand feet	Basalt flows, largely inferred from gravity and magnetic studies

GEOLOGIC ATLAS OF SCOTT COUNTY, MINNESOTA

FIGURE 4.2

2. Well Capacity

The pumping capacity of each of the existing wells has been listed in Table 4.2. The Recommended Standards for Water Works (Ten State Standards) states that the maximum day demand should be met with the largest producing well out of service, known as firm capacity. The maximum day water demands for the Elko New Market system were determined in Section 2 and are repeated here. Table 4.3 outlines the required well capacities to accommodate population growth over the next 20 years for a combined Elko New Market water system.

TABLE 4.2
CITY OF ELKO NEW MARKET, MINNESOTA
EXISTING WELL CAPACITY

Well	Pump Capacity (gpm)	Total Daily Capacity[1] (mgd)
Elko 2	250	0.30
Elko 3	500	0.60
New Market 2	250	0.30
New Market 3	300	0.36
Subtotal	**1300**	**1.56**
Firm Capacity[2]	**800**	**0.96**

[1] Based on 20 hours of pumping per day to allow for aquifer recharge
[2] Minus largest well out of service

Based on this, the existing capacity is 1.56 mgd and the firm capacity is 0.96 mgd as shown in Table 4.2. Based on projected growth, a peaking factor of 2.5 and a well capacity of 900 gpm per new well, a total of five new wells will be needed over the next 20 years to meet the maximum day demand as shown in Table 4.3. With the addition of five new wells, the peak capacity would be 7.68 mgd and the firm capacity would be 6.60 mgd.

TABLE 4.3 CITY OF ELKO NEW MARKET, MINNESOTA PROJECTED WATER SUPPLY REQUIREMENTS					
Year	**Average Day Demand (mgd)**	**Maximum Day Demand (mgd)**	**No. of New Wells Required**	**Firm Capacity**	**Total Capacity**
Existing	0.31	1.19		0.96	1.56
2010	0.63	1.89	1	2.28	3.36
2020	1.44	3.60	3	4.44	5.52
2030	2.29	5.73	5	6.60	7.68
Need Firm Capacity > Maximum Day Note: 1. Assumes new well capacities of 1.08 mgd (900 gpm)					

3. Wellhead Protection

Wellhead protection should be given consideration when evaluating new well locations. Wellhead protection is a method of preventing contamination of public water supplies by managing potential contaminant sources in the area that contributes to a public water supply well. Land uses relative to commercial, industrial and underground storage of chemicals and petroleum are considered higher risks to ground water protection than permanent open spaces, parks, farmland and low-density residential lots. All public water suppliers are required to implement wellhead protection measures. The Minnesota Department of Health (MDH) was granted authority to implement wellhead protection and rules governing wellhead protection were adopted in November of 1997.

The Cities of Elko and New Market have completed wellhead protection plans. The plans included vulnerability assessments of Elko well numbers 2 and 3 and New Market well numbers 2 and 3. A brief summary of the plans is given below. For more detailed information, the reader is referred to the actual plans on file with the City or online at http://mdh-agua.health.state.mn.us/swa.

The area around Elko New Market is generally characterized by thick fine-grained till deposits above bedrock. These unconsolidated deposits consist mostly of Des Moines Lobe tills that are at least 150 feet thick. The fine-grained nature of the surficial materials serves to isolate surficial processes such as precipitation, surface water interactions, and land use from the deep bedrock aquifers used by the City of Elko New Market.

Elko New Market pumps from the Prairie du Chein-Jordan Aquifer system. The Prairie du Chien group is composed of two formations, the Shakopee Formation and the Oneota

Dolomite. Each of these units is comprised largely of sandy dolomite with occasional thin layers of shale and sandstone. The porosity exhibited by these formations is chiefly secondary, commonly including a combination of fractures and solution-enhanced cavities. Together, the Prairie du Chien and Jordan function as a single aquifer in most parts of Scott County. Figure 4.2 shows the bedrock geology of Scott County and the locations of available aquifers.

As for the vulnerability of the wells, vulnerable wells are identified by the presence of contamination, such as nitrate-nitrogen in excess of 10 mg/l, or young water, as indicated by the presence of 1 tritium unit or greater in the well water. Elko Well Nos. 2 and 3, and New Market Well Nos. 2 and 3 are not considered vulnerable to contamination from activities at the land surface. This is determined by the low-permeability protective materials above the aquifer, no chemical data indicating influence by land surface activities, and documentation of sound construction. Based on this information, the wells in Elko New Market are expected to have a low vulnerability to contamination.

C. TREATMENT

Treatment in the Elko Water System consists of chlorination and fluoridation at each pump house. Chlorine is added as a preventative measure. Chlorine acts as a disinfectant, and works to prevent the growth of harmful bacteria within the distribution system should contamination occur. Fluoride is added for the purpose of reducing tooth decay as prescribed by the State of Minnesota.

Radium in excess of the MCL was only recently discovered in the Elko Water System during investigative testing by the Minnesota Department of Health. There is currently no treatment for Radium or Gross Alpha particles in the Elko water system. The wells are now under quarterly compliance monitoring by the MDH. If high radium levels continue, public notices will be issued and a plan of action for reducing radium levels will be required.

The New Market Water System provides onsite treatment at each of the two wells, New Market Well No. 2 and New Market Well No. 3. Each treatment facility provides ion exchange water softening, chlorination and fluoridation. The ion exchange softening units have in the past successfully removed Radium and Gross Alpha Particles to below acceptable limits. However, in recent years as flow demands have increased, a number of

violations have been recorded. In response, the City requested an evaluation of the softener units.

In February 2007 C. Emery Nelson conducted an evaluation of the existing ion exchange softening units. Recommendations from this evaluation included the following:

- Operate at a higher brine concentration
- Install new brine tanks
- Increase blending ratio from 30 to 50%
- Reconfigure piping layout
- Visually verify programming sequences
- Remove and clean key components and repair where necessary

Currently, only 30% of the City's flow passes through the softener units. The softeners remove nearly all of the Radium and Gross Alpha particles present. However, only about 50% removal is necessary to reduce the raw water Radium 226+228 from 10 pCi/L to 5.4 pCi/L. By blending treated water with raw water, contaminant levels are effectively reduced to acceptable levels.

The ion exchange softener units in the New Market Water System are undersized. The Recommended Standards for Water Works requires that treatment systems be capable of meeting the maximum day demands at the design year. The 2006 peak day demand in New Market was 617,000 gallons. Even with the recommended improvements, the total capacity of both treatment units is only 180,000 gpd. Table 4.4 presents an analysis of current treatment capacity as compared to required treatment capacity.

TABLE 4.4
TREATMENT CAPACITY ANALYSIS
NEW MARKET WATER SYSTEM

	WTP No. 1	WTP No. 2
Treatment Capacity[1]	45,000 gpd	45,000 gpd
Flow Available with 50% Blending Ratio	90,000 gpd	90,000 gpd
Total Flow Available	180,000 gpd	
2006 Peak Demand	617,000 gpd	
2010 Peak Design Flow	992,000 gpd	

[1] Capacity after minor improvements are made as recommended by C. Emery Nelson.

D. STORAGE

Existing storage facilities in the City of Elko New Market consist of two elevated water towers. The tower locations are shown in Figure 4.1 and tower details are listed in Table 4.5.

TABLE 4.5
EXISTING STORAGE FACILITIES

	Elko Tower No. 1	**New Market Tower No. 1**
Capacity (gals)	150,000	250,000
Year Constructed	1997	2000
High Water Level	1322	1275
Support Type	Pedestal	Pedestal

The principal purpose of storage is to provide the ability to equalize pumping rates during periods of peak demand. Adequate storage permits a reduction in the size of pumps required to supply a community because peak demands are diminished by the reserves provided in storage. Other reasons for providing storage include:

- Fire protection
- Emergency requirements (pump failures, power failures, etc.)
- To equalize pressure in the distribution system

The amount of storage recommended for a city can either be based on Average Day Criteria or the Maximum Day, Fire Protection and Emergency Storage Criteria. These two sets of criteria are discussed in the following paragraphs.

Average Day Criteria

Generally, the minimum recommended standard without fire protection is equal to the average day demand (Recommended Standards for Water Works, 2003 Edition). By this standard, a one million gallon storage deficit is projected by the year 2020 and a two million gallon storage deficit is projected for the year 2030. Refer to Table 4.6 for storage deficits based on the average day criteria.

TABLE 4.6
REQUIRED STORAGE BASED ON AVERAGE DAY CRITERIA

Year	**Average Day Demand (gal/day)**	**Existing Storage (gal)**	**Storage Deficit (gal)**
2010	627,000	400,000	230,000
2020	1,440,000	400,000	1,050,000
2030	2,290,000	400,000	1,980,000

Maximum Day, Fire Protection and Emergency Storage Criteria

Another approach is to compare the individual storage requirements for equalization, fire demand and emergency reserve versus actual storage capacity and the amount of water contributed continuously from the water treatment process. Water storage requirements using this approach are summarized in Table 4.7. This approach shows that a 1 million gallon storage deficit is projected for the year 2020 and a 1.6 million gallon storage deficit is projected for the year 2030.

TABLE 4.7
REQUIRED STORAGE BASED ON MAXIMUM DAY,
FIRE PROTECTION AND EMERGENCY STORAGE CRITERIA

Year	2005	2010	2020	2030
Fire Demand (gpm)(1)	3,500	3,500	3,500	3,500
Max. Day Demand (gpm)	648	1,306	2,502	3,972
Peak Usage (gpm)	4,148	4,806	6,002	7,472
Firm Pumping Supply (2)	667	1,458	3,333	5,208
Withdrawal from Storage (gpm)	3,481	3,348	2,669	2,264
Fire Flow Duration (hrs)	3	3	3	3
Fire Demand Storage (gallons)	626,700	604,300	481,600	435,600
Emergency Storage (gals)(3)	186,700	378,800	722,600	1,144,000
Total Storage Needed (gallons)	813,400	983,100	1,204,200	1,624,500
Current Available Storage (gallons)	400,000	400,000	400,000	400,000
Net Storage Surplus/Deficit (gallons)	(413,400)	(583,100)	(804,200)	(1,224,500)

(1) Fire flow requirements vary within the City depending on type and construction of facilities. Fire flow requirements for normal residential development vary between 1000 to 1500 gpm. For multi-family and commercial areas such as the downtown business district, residential apartment areas, schools and industrial areas; flows of 3500 gpm for 3 hours are generally considered acceptable.
(2) Based on firm capacity listed in Table 4.3.
(3) Emergency storage equals 20% of maximum day demand.

The recommended additional storage required is based on the higher of the two criteria. Based on current water use patterns, the Maximum Day, Fire Protection and Emergency Storage Criteria governs through 2020 when the Average Day Criteria takes over. Table 4.8 summarizes the required storage improvements.

TABLE 4.8 PROJECTED STORAGE IMPROVEMENTS SUMMARY	
Year	**New Storage Required (gallons)**
2010	600,000
2020	400,000
2030	1,000,000

E. DISTRIBUTION

The existing distribution system consists of a network of mains ranging in size from 2-inches to 12-inches in diameter. Much of the older mains are cast iron and ductile iron pipe. New construction has been utilizing ductile iron pipe. In general, older mains are replaced prior to street reconstruction to minimize the costs of asphalt repair. However, occasionally the replacement of old mains or construction of new watermains is recommended to eliminate bottlenecks within the system or to accommodate new development.

SECTION 5 WATER SUPPLY AND TREATMENT

A. GENERAL

This section will evaluate water supply and treatment alternatives for the City of Elko New Market.

A water system can be divided into four components: supply, treatment, storage and distribution. As stated earlier, two separate water systems currently exist. Both the Elko and New Market water systems require immediate improvements to their treatment processes. Also, increased supply by improving existing wells or drilling new wells will be necessary in the next 5 years.

This section will present alternatives for improvements to the water supply and treatment processes. Section 6 will present recommendations for improvements to the distribution and storage processes. In addition, the next section will discuss issues associated with the combined operation of the two water systems.

B. REGULATORY REQUIREMENTS

Based on the water quality regulatory issues provided in Section 3 of this report, water quality goals can be summarized as follows:

1. The City exceeds the MCL for Gross Alpha and Combined Radium.
2. The City exceeds the secondary standards for iron and manganese.

C. WATER SUPPLY – ALTERNATIVES

Currently, the combined well capacity of the Elko New Market water system is 1300 gpm. By the year 2030, an estimated 5000 gpm pumping capacity will be required. Therefore, approximately 5 new wells will be necessary to meet projected water demands in the year 2030. Refer to Table 4.3 for a breakdown of when and how many new wells will be necessary.

1. Dispersed Wells

The current water systems contain wells spread throughout the system. The wells simply pump directly into the nearest watermain. The advantages and disadvantages of this type of water supply system are listed below:

Advantages	Disadvantages
▪ Can reuse all existing wells ▪ New wells can be located anywhere land is available	▪ Separate treatment plants need to be constructed and maintained at each well site ▪ More difficult to control well head contamination at multiple remote sites

2. Well Field

Developing a well field where wells can be drilled as needed has a number of advantages. First it reduces raw water line costs by clustering wells and allowing multiple wells to pump through the same transmission main to the treatment facility. Second, a concentrated well field can more easily be protected from potential contaminant sources. A minimum 750-foot spacing should be maintained between wells to minimize drawdown influences of adjacent wells. A summary of advantages and disadvantages is shown below:

Advantages	Disadvantages
▪ Allows centralized treatment ▪ Easier to protect well field from contamination	▪ Existing New Market wells would not be reused due to high cost of raw water transmission mains

New wells in the Elko New Market area are approximately 530 feet deep and cost an estimated $250,000 to $300,000 each. One new well will be required in 2010 and another well every 5 years is needed to keep pace with projected population growth.

D. WATER TREATMENT ALTERNATIVES

The current treatment facilities are inadequate to meet future needs of the City of Elko New Market. In fact, due to rapid population growth, significant treatment upgrades will be necessary within the next 5 years. This section will discuss sizing, location and treatment alternatives to meet the water needs of the community in the coming years.

Sizing

Water treatment facilities are typically sized based on 20-year population projections. However, due to the rapid growth rate projected for Elko New Market it may be more feasible to build treatment facilities to first accommodate 10-year population projections.

Then, if the actual growth rate keeps pace with the projected growth rate, a second phase of treatment improvements can be designed and implemented. Treatment facilities should use a modular design to allow for expansion within each of the treatment processes. Design flows for the sizing of treatment improvements were presented in Section 2 and are reprinted in Table 5.1.

TABLE 5.1
TREATMENT FACILITY SIZING EVALUATION

Description	Flow (mgd)
Current Treatment Capacity	0.18
Current Demand	0.62
Projected Demand – 2010	1.89
Projected Demand – 2020	3.60
Projected Demand – 2030	5.73

Location

1. Dispersed Treatment

The current New Market water system maintains a separate treatment plant at each of the two operating wells. From there water is pumped directly into the distribution system. Continuing this treatment strategy would require treatment plants to be constructed at each of the proposed new wells. Also, 5 new wells and 5 treatment plants would need to be constructed to meet projected 2030 demands. Advantages and disadvantages of dispersed treatment are as follows:

Advantages

- Can utilize all existing wells
- No raw water transmission mains required

Disadvantages

- Higher capital construction costs
- Higher maintenance costs

Estimated capital construction costs of dispersed treatment facilities are presented in Table 5.2.

TABLE 5.2 DISPERSED TREATMENT FACILITY COSTS		
Facility[1]	**Completion Date**	**Estimated Construction Cost**
WTP No. 3	2010	$2,750,000
WTP No. 4	2015	$2,750,000
WTP No. 5	2020	$2,750,000
WTP No. 6	2025	$2,750,000
WTP No. 7	2030	$2,750,000
	TOTAL	**$13,750,000**
[1] Each treatment facility contains a 900 gpm Tonka Dualator steel package filter.		

2. Centralized Treatment

A common method of locating water treatment facilities is at a centralized treatment facility. Typically, a well field is developed nearby that pumps raw water to the treatment facility. From there treated water is pumped to the distribution system. A tract of land at least 3 acres in size should be purchased for this alternative. Advantages and disadvantages of a central treatment facility include:

Advantages

- Lower capital construction costs
- Lower maintenance costs
- Central location easier to maintain

Disadvantages

- Existing New Market wells will not be used

Estimated capital construction costs of a centralized treatment facility with concrete or steel gravity filters are presented in Tables 5.3 and 5.4. Concrete filters have a higher initial cost but last longer. Steel filters require significant rehabilitation every 10 to 15 years.

TABLE 5.3 CENTRAL TREATMENT FACILITY COSTS GRAVITY CONCRETE FILTER ALTERNATIVE		
Construction Phase	**Completion Date**	**Estimated Construction Cost**
Phase 1 – 3.0 MGD	2010	$6,000,000
Phase 2 – 3.0 MGD	2020	$6,000,000
	Total Estimated Construction Cost	**$12,000,000**
	40-Year Average Annual Cost	$300,000

TABLE 5.4 CENTRAL TREATMENT FACILITY COSTS GRAVITY STEEL FILTER ALTERNATIVE		
Construction Phase	**Completion Date**	**Estimated Construction Cost**
Phase 1 – 2.4 MGD (2 x 1000 gpm filters with space for 3rd filter)	2010	$5,000,000
Phase 2 – 1.2 MGD (1 x 1000 gpm filters)	2015	$1,000,000
Phase 3 – 2.4 MGD (2 x 1000 gpm filters with building expansion)	2020	$4,000,000
Total Estimated Construction Cost		**$10,000,000[1]**
40-Year Average Annual Cost		$300,000
[1] Steel filters require rehabilitation every 10-15 years at an estimated cost of $250,000 per filter.		

Locating water treatment facilities should consider the following:

- Close to wells/well field
- Depth of water table
- Wetland setbacks (75 feet)
- Distance to industrial/contamination sources (1500 feet)
- Accessibility to major highways
- Neighborhood acceptance
- Distance to land application sites
- Future expansion
- Environmental impact

A potential site has been identified to accommodate both a centralized treatment facility and a well field. The site lies east of France Avenue and north of 265th Street. This site will utilize the existing Elko wells and is centrally located to be able to supply both the Elko and New Market pressure zones. The proposed site is shown in Figure 6.2.

Treatment Techniques

Based on the water quality regulatory issues provided in Section 3 and discussions with City staff, the treatment process chosen should be effective at removing the following constituents, in order of priority:

1. Gross Alpha and Combined Radium
2. Total Coliforms and Disinfection
3. Iron and Manganese
4. Hardness

In order to meet these water quality goals, a number of treatment techniques are available to choose from. Techniques should be evaluated for their ability to remove contaminants, ease of use, construction and operating costs and the waste (residuals) produced by the treatment process. Based on discussions with City Staff and an evaluation of past projects with similar treatment goals the following treatment techniques have been selected and evaluated for this report:

- Ion Exchange Softening
- Granular Media Filtration
- Reverse Osmosis
- Lime Softening

These options and applicability for the City of Elko New Market are summarized in the following paragraphs.

1. Ion Exchange Softening

Ion exchange softening is a common treatment method used in household water softeners. Occasionally, it is also used in small community water systems. The process of ion exchange removes undesirable ions from raw water by exchanging them with desirable ions. As raw water is passed through a column of resin beads, contaminant ions replace exchanger ions. Contaminant and exchange ions are given in the following list:

Contaminant Ions Removed	Exchange Ions Added
▪ Iron	▪ Sodium (from salt)
▪ Manganese	
▪ Radium	
▪ Calcium (Hardness)	
▪ Magnesium (Hardness)	

Since the exchange resin has a limited number of exchange sites, it must be washed with a regenerating solution to regain its function. This wash water is

typically drained to the sanitary sewer system. The volume of wash water produced in a community-size ion exchange unit is often too much for the sewer system to handle and renders this treatment technology impractical for larger systems.

Ion exchange can remove up to 95 percent of the contaminant ions listed. It is often unnecessary to achieve this high of removal rate. Therefore, it is common practice to allow a percentage of the raw water to bypass the treatment unit and be mixed with treated water.

Wastes generated from ion exchange softening include regenerant wash water and spent resin. The resin typically lasts from 2 to 5 years depending on the contaminants present in the water. Radium can accumulate in the resin to high enough levels that the resin must be treated as radioactive waste for disposal.

2. Granular Media Filtration

Granular media filtration is effective in removing radionuclides, manganese, and other contaminants such as iron and arsenic. First the raw water is aerated to oxidize the iron from its naturally occurring soluble form to an insoluble form (appearing like small particles in the water). Then the manganese is also oxidized by adding a chemical oxidant such as potassium permanganate. The oxidation with permanganate forms hydrous manganese oxides (HMO's), which have an affinity for adsorbing radium and alpha particles. Once precipitated, the iron and manganese particles are easily captured and removed using granular media filters.

Granular media filters can be either gravity type or pressure type filters. Pressure filtration is not generally used for radionuclide contaminant removal however, due to build up of radon gas in the system.

Granular media filtration has been a commonly used treatment technology in Minnesota for removal of iron and manganese. Through a few simple modifications, the process can be optimized to also remove Gross Alpha Particles and Combined Radium.

Wastes generated from optimized iron and manganese removal include settled iron, manganese and radium sludge that is generally disposed of through the sanitary sewer system.

3. Reverse Osmosis

Reverse osmosis treatment is effective in removing radionuclides and other contaminants. The process works by forcing water through semi-permeable membranes that allow the passage of water but that reject dissolved salts and other substances. If manganese is present in the water supply, pretreatment by granular media filtration would be required prior to treatment by reverse osmosis. Reverse osmosis systems waste approximately 30% of the raw water flow, thus increasing wastewater flows and costs as well as increasing the water supply capacity requirement.

4. Lime Softening

Lime softening treatment is effective in removing radionuclide, manganese and other contaminants such as iron and arsenic. Lime softening will also produce much softer water than granular media filtration. By adding lime to the raw water the pH increases and calcium and magnesium are precipitated from a soluble state to small particles in the water. The particles are settled out and removed from the water. Lime softening systems are generally more expensive than granular media filtration systems and also create a significant amount of waste sludge.

Due to the presence of radium in Elko New Market source water, pressure filters are not recommended. Pressure filters are cheaper to build and are often recommended but can produce toxic radon gas when supplied with a source water containing radium.

Reverse osmosis and softening treatment are not required and granular media filtration is more cost effective for iron and manganese removal. Therefore, the recommended Treatment would be to install a gravity type granular media filter and chemical feed equipment for optimized removal of iron and manganese as well as Gross Alpha and Combined Radium.

A summary of treatment technologies considered for treatment of the City of Elko New Market's water supply is presented in Table 5.5.

TABLE 5.5
SUMMARY OF TREATMENT TECHNOLOGIES CONSIDERED

Technology	Relative Cost	Advantages	Disadvantages
Ion Exchange	Medium	• Effective Radium removal • Removes hardness • Removes Iron and Manganese	• Produces high volumes of regenerant wastes • Requires frequent operator attention
Optimized Iron & Manganese Removal	Low	• Effective Radium removal • Removes Iron & Manganese	• Does not remove hardness, chlorides or dissolved solids
Reverse Osmosis	Medium	• Effective Radium removal • Removes hardness, sulfates and dissolved solids	• May require pretreatment for Iron & Manganese removal • Approximately 20-30% feed water wasted
Lime Softening	High	• Effective Radium removal • Removes hardness • Removes Iron & Manganese	• Produces biosolids with Radium • Need skilled operators

SECTION 6 WATER STORAGE AND DISTRIBUTION SYSTEM

A. PURPOSE

The purpose of this Section is to identify major watermain and storage improvements needed to ensure adequate pressure and fire flow are available for both immediate and projected population growth.

B. GENERAL

Watermains are typically added to a system to keep pace with development. However, long term planning of the size and location of watermains is necessary to ensure acceptable water pressure and adequate fire flows are available. The sizing and location of storage tanks is also critical to ensure enough treated water is readily available for domestic and industrial use and fire fighting.

The water distribution system for the City of Elko New Market was modeled using WaterCAD. The computer model is used to analyze steady state flows for pipe distribution systems. The information required by the models includes data such as diameter, length, and Hazen-Williams C Factor (pipe roughness) for each pipe in the system. Other data required include ground elevation of pipe junctions, elevated storage water level and water demand on the system.

The model developed for the City of Elko New Market's distribution system is first calibrated to match known conditions. The model is then analyzed to predict pressures and available fire fighting flows in different parts of the City and the effects of various system improvements under future demand conditions.

C. SIMULATION CRITERIA

In designing and analyzing the simulations, a set of design criteria was established. Recommended Standards for Water Works recommends that a minimum pressure of 20 psi be maintained at all times in the system, with normal working pressure in the 35-70 psi range. Static pressure higher than 100 psi is not recommended as higher pressures increase the frequency of watermain breaks. Fire flow is determined at a pressure of 20 psi in order to correlate with the guidelines of the Insurance Services Office (ISO).

Water tower levels were established at one-half total capacity during fire flow simulations.

D. COMBINED WATER SYSTEM OPERATION

The Elko and New Market water systems are currently not connected. The high water level in the Elko tower is 47 feet higher than that of the New Market tower. A pressure reducing valve would be necessary at any interconnections of the systems to prevent overflowing of the New Market tower.

The higher water level in the Elko tower is necessary to service residents on a high plateau east of the Elko tower. Outside this plateau, the remaining area within the Ultimate Development Boundary can be serviced on the New Market tower level. Table 6.1 presents maximum and minimum elevations that can be serviced by the two tower levels to maintain a minimum 35 psi and maximum 90 psi static pressure.

TABLE 6.1
PRESSURE ZONE SERVICE ELEVATIONS

Pressure Zone	Minimum Elevation, @ 35 psi	Maximum Elevation @ 90 psi
New Market Tower HWL 1275	1065	1195
Elko Tower HWL 1322	1110	1245

Connecting the two systems would allow "water sharing" between the towers and provide the ability to loop dead-end watermains. But maintaining continuous flow through pressure reducing valves is not recommended as it wastes energy.

The preferred layout is to provide separate pumps from the treatment facilities to each pressure zone. In a dispersed well and treatment scheme, a well, treatment unit and two high service pumps would be provided at each treatment plant location to pump directly into the nearest watermain. In the case of centralized treatment, the treatment facility would be located between the two systems and two sets of pumps provided, one set pumping to each of the two pressure zones.

E. WATER STORAGE FACILITY IMPROVEMENTS

Based on the evaluation presented in Section 4, an additional 500,000 gallons of water storage capacity will be needed in the next 5 years and a total of 2 million gallons by 2030. All new water towers should be built to the same high water level as the existing New Market water tower (HWL 1275).

The proposed locations of new storage reservoirs are shown in Figures 6.2 through 6.5. Table 6.2 presents a summary of new tower locations, sizes, projected completion years, and estimated construction costs.

TABLE 6.2
PROPOSED NEW STORAGE RESERVOIRS

Reservoir/Location	Size (gallons)	Target Completion Date	Estimated Construction Cost
Ground Storage at New Water Treatment Facility	500,000	2010	$650,000
East Tower	1,000,000	2015	$1,800,000
West Tower	500,000	2020	$1,300,000
South Tower	500,000	2030	$1,300,000

F. DISTRIBUTION SYSTEM IMPROVEMENTS

Distribution system master planning is a "road-map" to assist the City of Elko New Market in determining the optimal size and location for future major water distribution improvements. The purpose is to ensure adequate pressure and flow is maintained throughout the entire distribution system at any given time and at the most economical cost.

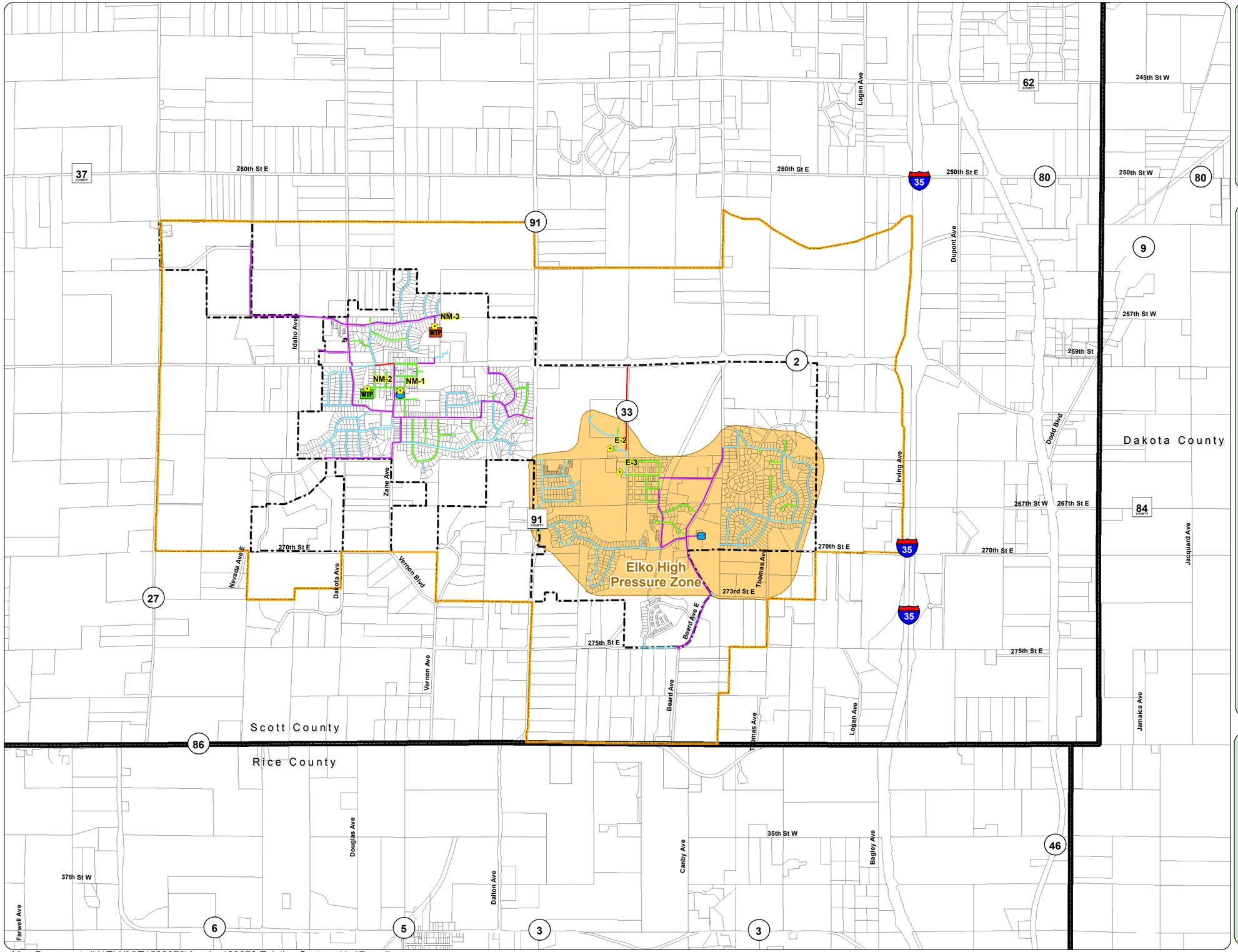
Land use and topographic survey maps of the 2030 and ultimate development boundary areas were consulted to develop projected watermain service areas in 5-year intervals through 2030. These networks are shown in Figures 6.1 through 6.5.

The main components of the distribution master plan include:

3) Develop 12-inch watermain "loops" around the projected 2015 development area.
4) Develop 16-inch watermain "loops" around the projected 2030 development area.

ELKO NEW MARKET WATER DISTRIBUTION PLAN EXISTING WATER SYSTEM

FIGURE 6.1
SEPTEMBER, 2007



Legend

Wells

- Elko Well 2 - 300 gpm
- Elko Well 3 - 650 gpm
- New Market Well 1 - 80 gpm
- New Market Well 2 - 250 gpm
- New Market Well 3 - 945 gpm

Storage Tanks

- Elko Tower 1 - 150,000 gallons
- New Market Tower 1 - 250,000 gallons

Water Treatment Plants

- WTP No. 1 - 90,000 gallons
- WTP No. 2 - 90,000 gallons

Watermain

- 6"
- 8"
- 10"
- 12"
- 16"
- Elko Pressure Zone
- 2030 Undesignated MUSA Reserve Boundary
- Elko New Market City Limits
- County Boundary
- Lakes

N W E S

0.5 0 0.5 Miles

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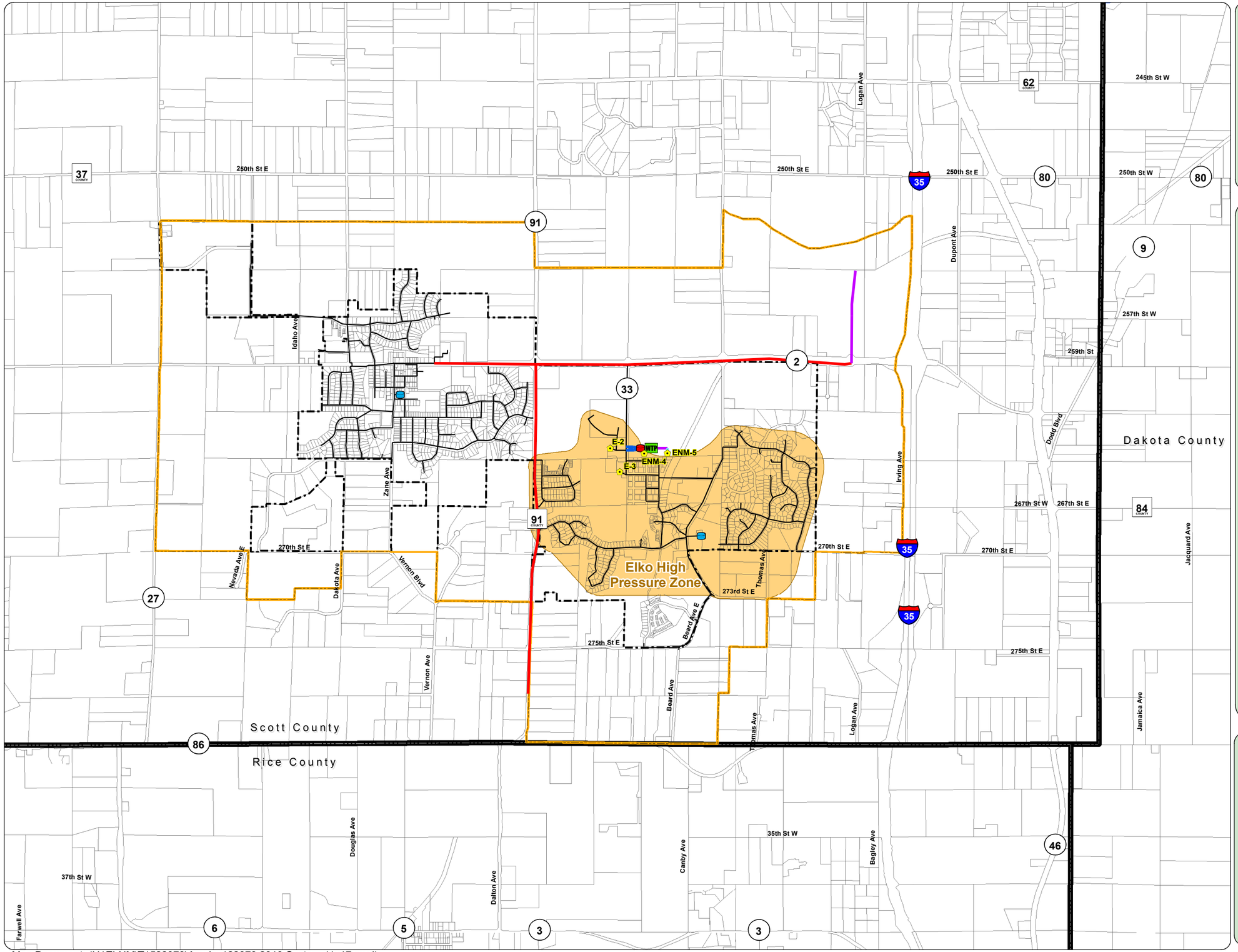
ELKO NEW MARKET WATER DISTRIBUTION PLAN PROPOSED 2010 WATER SYSTEM

FIGURE 6.2
SEPTEMBER, 2007



Legend

Wells

- Elko Well 2 - 300 gpm
- Elko Well 3 - 650 gpm
- Elko New Market Well 4 - 900 gpm
- Elko New Market Well 5 - 900 gpm

Storage Tanks

- Proposed Resevoir - 500,000 gallons
- Elko Tower 1 - 150,000 gallons
- New Market Tower 1 - 250,000 gallons

Water Treatment Plants

- WTP Proposed WTP

Proposed Watermain

- 6"
- 8"
- 10"
- 12"
- 16"
- Existing Watermain
- Elko Pressure Zone
- 2030 Undesignated MUSA Reserve Boundary
- Elko New Market City Limits
- County Boundary
- Lakes

N W E S

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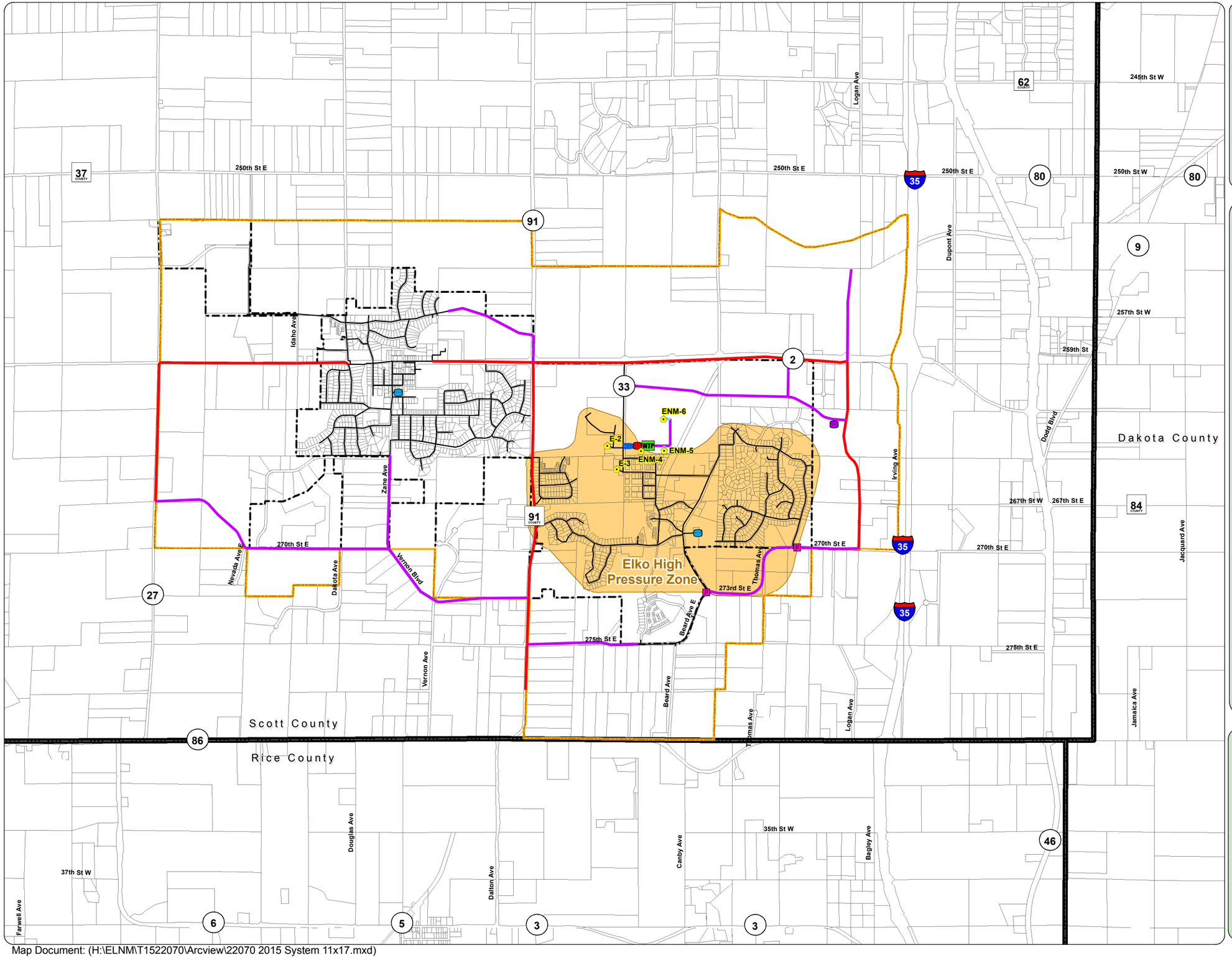
ELKO NEW MARKET WATER DISTRIBUTION PLAN PROPOSED 2015 WATER SYSTEM

FIGURE 6.3
SEPTEMBER, 2007



Map Document: (H:\ELNM\T1522070\Arcview\22070 2015 System 11x17.mxd)
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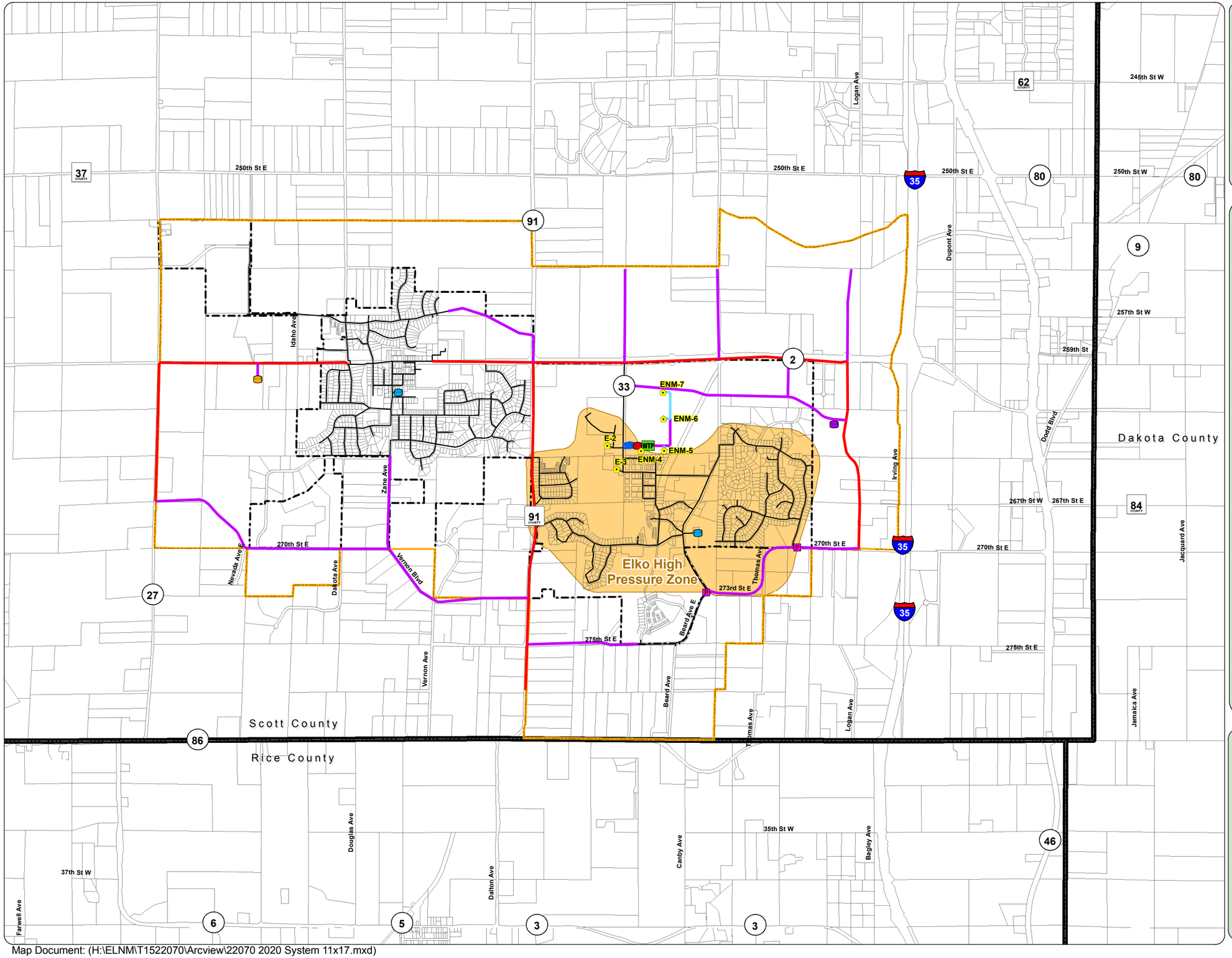
ELKO NEW MARKET WATER DISTRIBUTION PLAN PROPOSED 2020 WATER SYSTEM

FIGURE 6.4
SEPTEMBER, 2007



Legend

- Pressure Reducing Valves

Wells

- Elko Well 2 - 300 gpm
- Elko Well 3 - 650 gpm
- Elko New Market Well 4 - 900 gpm
- Elko New Market Well 5 - 900 gpm
- Elko New Market Well 6 - 900 gpm
- Elko New Market Well 7 - 900 gpm

Water Treatment Plants

- Water Treatment Facility

Storage Tanks

- Proposed West Tower - 500,000 gallons
- East Tower - 1,000,000 gallons
- Ground Resevoir - 500,000 gallons
- Elko Tower 1 - 150,000 gallons
- New Market Tower 1 - 250,000 gallons

Proposed Watermain

- 6"
- 8"
- 10"
- 12"
- 16"
- Existing Watermain
- Elko Pressure Zone
- 2030 Undesignated MUSA Reserve Boundary
- Elko New Market City Limits
- County Boundary
- Lakes

N W E S

0.5 0 0.5 Miles

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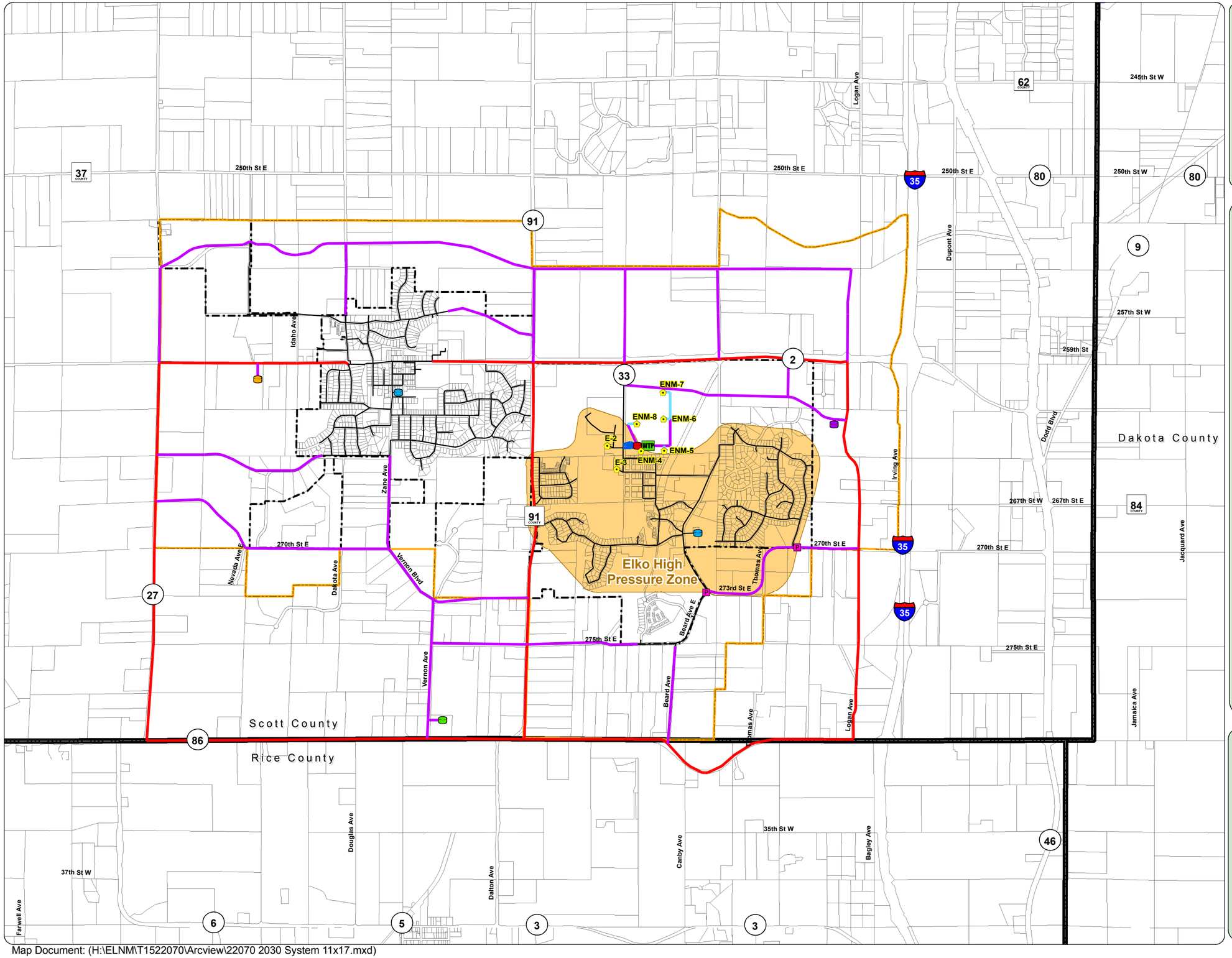
ELKO NEW MARKET WATER DISTRIBUTION PLAN PROPOSED 2030 WATER SYSTEM

FIGURE 6.5
SEPTEMBER, 2007



Legend

- Pressure Reducing Valves

Wells

- Elko Well 2 - 300 gpm
- Elko Well 3 - 650 gpm
- Elko New Market Well 4 - 900 gpm
- Elko New Market Well 5 - 900 gpm
- Elko New Market Well 6 - 900 gpm
- Elko New Market Well 7 - 900 gpm
- Elko New Market Well 8 - 900 gpm

Water Treatment Plants

- Water Treatement Facility

Storage Tanks

- Proposed South Tower - 500,000 gallons
- West Tower - 500,000 gallons
- East Tower - 1,000,000 gallons
- Ground Resevoir - 500,000 gallons
- Elko Tower 1 - 150,000 gallons
- New Market Tower 1 - 250,000 gallons

Proposed Watermain

- 6"
- 8"
- 10"
- 12"
- 16"
- Existing Watermain
- Elko Pressure Zone
- 2030 Undesignated MUSA Reserve Boundary
- Elko New Market City Limits
- County Boundary
- Lakes

N W E S

0.5 0 0.5 Miles

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In accordance with City policy for trunk watermains in new development areas, developers would be required to install at least an 8-inch watermain, while the incremental cost increase to a larger diameter watermain would be paid by the City. The associated construction costs for completing the improvements are summarized in Table 6.3.

TABLE 6.3
MAJOR DISTRIBUTION SYSTEM IMPROVEMENTS

Item	Quantity	Incremental Unit Price	Total Unit Price
2010			
12-inch Watermain (feet)	40,000	$8.00	$320,000
16-inch Watermain (feet)	24,000	$14.00	$340,000
2015			
12-inch Watermain (feet)	34,000	$8.00	$270,000
16-inch Watermain (feet)	14,000	$14.00	$200,000
2030			
12-inch Watermain (feet)	46,000	$8.00	$370,000
16-inch Watermain (feet)	34,000	$14.00	$480,000

SECTION 7 RECOMMENDATION AND IMPLEMENTATION

A. GENERAL

This Section will present the following:

- summary of recommended capital improvements to the water supply, treatment, storage and distribution system;
- funding options; and
- cost estimate and implementation schedule.

B. RECOMMENDED CAPITAL IMPROVEMENTS

All estimated costs presented in this section are based on 2007 costs.

1. Water Supply

A new well field should be developed to accommodate the projected five (5) new wells that will be necessary in the coming years. The well field will also accommodate the centralized treatment facility alternative.

2. Water Treatment

The centralized treatment facility is the recommended alternative to be constructed in two phases. This option is the least expensive to both construct and maintain. The proposed location for the treatment facility is east of France Avenue and north of 265th Street.

3. Water Storage

The proposed water storage improvements schedule is shown in Table 7.1. The first storage reservoir should be constructed at the central treatment facility. The next priority location would be in the industrial zone near Interstate 35. Industrial areas require higher fire flows and locating elevated storage reservoirs nearby provides the necessary flows.

4. Water Distribution System Improvements

We recommend that the City implement the Major Distribution System Improvements shown in Figure 6.2 through 6.5 as a "road-map" to determine the optimal size and location of future major water distribution improvements. Since

the actual location and phasing of these major distribution system improvements may vary depending on development, the Master Plan should be continually referenced and updated to insure that the Master Plan will continue to be a useful tool to meet the needs of the City. The estimated construction costs for the additional work associated with 12 and 16-inch watermain upsizing are shown in Table 7.1

C. FUNDING OPTIONS

Several funding options may be available. These are described in the following paragraphs.

1. Small Cities Development Program (SCDP)

The SCDP provides grants for water supply, treatment, storage and distribution projects which principally benefit persons of low-and-moderate income and target "severe" infrastructure problems. The maximum grant is $600,000 for a single purpose application and $1.4 million for a comprehensive application. The program is very competitive and applications are accepted once per year in October and with grant determinations made by March. Money is provided to local units of government from the Minnesota Department of Trade and Economic Development that receive federal grants from the U.S. Department of Housing and Urban Development (HUD). To use this funding source, Elko New Market must demonstrate a 51% low and moderate-income population is served by the project. Based on need for growth related improvements, it may be unlikely that the City can pursue this funding. However, before the City eliminates this funding source, a community survey should be conducted.

2. Drinking Water Revolving Loan Fund

The State Drinking Water Loan Fund administered through the Public Facilities Authority (PFA) provides financial assistance, primarily in the form of loans, to eligible public drinking water suppliers for construction of water storage, treatment and distribution systems that meet Safe Drinking Water Act standards.

The Authority provides below-market loans with interest rates determined by a Quarterly Set Rate minus discounts based on demographic characteristics of the borrower. The loan period is for 20 years.

To become eligible for funding, projects must be included on the Minnesota Department of Health's (MDH) Project Priority List (PPL) and on the Authority's Intended Use Plan (IUP). An applicant must demonstrate it has the financial capability to repay the loan and must issue a general obligation bond to the Authority as security for the loan.

3. Rural Development (RD)- Water and Waste Disposal Systems for Rural Communities

The objective of the Water and Waste Disposal Systems for Rural Communities program is to provide basic human amenities, alleviate health hazards and promote the orderly growth of the rural areas by providing new and improved rural water and waste disposal facilities. Types of assistance include project grants and loans; the percentage of each being determined by the median household income. Loans are amortized up to a maximum of 40 years. Facilities shall primarily serve rural residents for incorporated communities with populations under 10,000. The applicant must provide evidence of the inability to obtain funding elsewhere. It is very unlikely the City of Elko New Market will be able to qualify for funding from this agency.

D. COST AND IMPLEMENTATION SCHEDULE

Table 7.1 summarizes the proposed implementation schedule and today's estimated construction cost for each project.

TABLE 7.1 CONSTRUCTION PROJECTS COST AND IMPLEMENTATION SCHEDULE		
Item	**Target Completion Date**	**Estimated Construction Cost**
A. Water Supply and Treatment Improvements		
1. ELNM Well No. 4	2010	$300,000
2. ELNM Well No. 5	2015	$300,000
3. ELNM Well No. 6	2020	$300,000
4. ELNM Well No. 7	2030	$300,000
5. ELNM Well No. 8	2030	$300,000
6. 3.0 MG Central Treatment Facility Phase 1 Gravity Concrete Filter Alternative	2010	$6,000,000
7. 3.0 MG Central Treatment Facility Expansion Phase 2 Gravity Concrete Filter Alternative	2020	$6,000,000
B. Water Storage Improvements		
1. 0.5 MG Ground Storage	2010	$650,000
2. 1.0 MG East Tower	2015	$1,800,000
3. 1.0 MG West Tower	2020	$1,800,000
4. 0.5 MG South Tower	2030	$1,300,000
C. Distribution System		
1. 2010 Watermain Upsizing	2010	$660,000
2. 2015 Watermain Upsizing	2015	$470,000
3. 2030 Watermain Upsizing	2030	$850,000
Total 2010 Construction Costs		**$7,610,000**
Total 2015 Construction Costs		**$2,570,000**
Total 2020 Construction Costs		**$8,100,000**
Total 2030 Construction Costs		**$2,750,000**

APPENDIX A

Population and Water Use Projections

		Elko			New Market				
	Days	Gallons Pumped Well 2, GAL	Gallons Pumped Well 3, GAL	Total MGD	Gallons Pumped Well 2, GAL	Gallons Pumped Well 3, GAL	Total MGD	Elko New Market Combined MGD	Usage gpcd
Jan-01	31	646,000		0.021					
Feb-01	28	518,000		0.019					
Mar-01	31	598,000		0.019					
Apr-01	30	759,000		0.025					
May-01	31	987,000		0.032					
Jun-01	30	1,410,000		0.047					
Jul-01	31	2,789,000		0.090					
Aug-01	31	1,786,000		0.058					
Sep-01	30	997,000		0.033					
Oct-01	31	1,007,000		0.032					
Nov-01	30	773,000		0.026					
Dec-01	31	769,000		0.025					
Total		**13,039,000**			**32,100,000**				
Avg.				**0.036**			**0.088**	**0.124**	**94**
Jan-02	31				1,440,000		0.046		
Feb-02	28				1,341,700		0.048		
Mar-02	31				1,616,000		0.052		
Apr-02	30				1,509,000		0.050		
May-02	31				2,687,100		0.087		
Jun-02	30				2,355,900		0.079		
Jul-02	31				4,443,600		0.143		
Aug-02	31				3,129,400		0.101		
Sep-02	30				3,119,300		0.104		
Oct-02	31				2,053,000		0.066		
Nov-02	30				1,877,100		0.063		
Dec-02	31				2,011,700		0.065		
Total		**15,000,000**			**27,583,800**				
Avg.				**0.041**			**0.075**	**0.117**	**64**
Jan-03	31	1,097,000		0.035	2,035,700		0.066	0.10	
Feb-03	28	853,000		0.030	1,732,000		0.062	0.09	
Mar-03	31	976,000		0.031	1,961,600		0.063	0.09	
Apr-03	30	1,843,000		0.061	2,758,000		0.092	0.15	
May-03	31	2,531,000		0.082	3,829,600		0.124	0.21	

		Elko			New Market				
	Days	Gallons Pumped Well 2, GAL	Gallons Pumped Well 3, GAL	Total MGD	Gallons Pumped Well 2, GAL	Gallons Pumped Well 3, GAL	Total MGD	Elko New Market Combined MGD	Usage gpcd
Jun-03	30	3,355,000		0.112	6,130,100		0.204	0.32	
Jul-03	31	3,109,000	1,495,900	0.149	6,287,000		0.203	0.35	
Aug-03	31	4,485,000	2,205,500	0.216	7,827,700		0.253	0.47	
Sep-03	30	1,790,000	952,900	0.091	5,937,700		0.198	0.29	
Oct-03	31	1,366,000	1,085,100	0.079	4,185,100		0.135	0.21	
Nov-03	30	1,320,000	836,600	0.072	2,798,300		0.093	0.17	
Dec-03	31	1,378,000	817,900	0.071	2,327,900		0.075	0.15	
Total		**24,103,000**	**7,393,900**		**47,810,700**				
Avg.				**0.09**			**0.13**	**0.22**	**102**
Jan-04	31	1,262,000	449,000	0.055		2,433,000	0.078	0.13	
Feb-04	28	652,000	548,800	0.043		2,168,600	0.077	0.12	
Mar-04	31	746,000	614,100	0.044		2,454,800	0.079	0.12	
Apr-04	30	1,052,000	905,700	0.065		3,693,700	0.123	0.19	
May-04	31	1,242,000	1,904,800	0.102		3,938,900	0.127	0.23	
Jun-04	30	3,121,000	1,316,600	0.148		5,796,600	0.193	0.34	
Jul-04	31	3,133,000	2,346,500	0.177		7,223,900	0.233	0.41	
Aug-04	31	2,204,000	3,107,200	0.171		6,762,000	0.218	0.39	
Sep-04	30		4,919,600	0.164		6,178,500	0.206	0.37	
Oct-04	31		2,847,200	0.092		3,935,300	0.127	0.22	
Nov-04	30		1,830,300	0.061		3,202,000	0.107	0.17	
Dec-04	31		1,645,200	0.053		2,687,000	0.087	0.14	
Total		**13,412,000**	**22,435,000**		**0**	**50,474,300**			
Avg.				**0.10**			**0.14**	**0.24**	**102**
Jan-05	31		1,603,300	0.052		2,646,000	0.085	0.14	
Feb-05	28		1,459,500	0.052		2,348,000	0.084	0.14	
Mar-05	31		1,731,700	0.056		2,777,000	0.090	0.15	
Apr-05	30	604,000	1,282,200	0.063		4,029,000	0.134	0.20	
May-05	31	1,568,000	1,428,900	0.097		4,113,000	0.133	0.23	
Jun-05	30	2,154,000	7,767,100	0.331		5,379,000	0.179	0.51	
Jul-05	31	2,430,000	2,790,000	0.168		11,395,000	0.368	0.54	
Aug-05	31		3,276,700	0.106	3,598,000	5,817,000	0.304	0.41	
Sep-05	30		3,465,600	0.116	1,344,000	3,506,000	0.162	0.28	
Oct-05	31		2,642,900	0.085	3,075,000	1,210,000	0.138	0.22	
Nov-05	30		2,110,400	0.070	2,723,000	299,000	0.101	0.17	

	Days	Elko Gallons Pumped Well 2, GAL	Elko Gallons Pumped Well 3, GAL	Total MGD	New Market Gallons Pumped Well 2, GAL	New Market Gallons Pumped Well 3, GAL	Total MGD	Elko New Market Combined MGD	Usage gpcd
Dec-05	31		2,003,900	0.065	2,570,000	1,075,000	0.118	0.18	
Total		**6,756,000**	**31,562,200**		**13,310,000**	**44,594,000**			
Avg.				**0.10**			**0.16**	**0.26**	**104**
Jan-06	31		1,764,500	0.057	2,117,000	766,000	0.093	0.15	
Feb-06	28		1,683,600	0.060	2,222,000	594,000	0.101	0.16	
Mar-06	31		1,826,900	0.059	2,325,000	774,000	0.100	0.16	
Apr-06	30		2,684,100	0.089	2,989,000	970,000	0.132	0.22	
May-06	31		4,159,600	0.134	4,719,000	1,897,000	0.213	0.35	
Jun-06	30	3,203,000	4,014,900	0.241	3,997,000	5,887,000	0.329	0.57	
Jul-06	31	5,580,000	4,390,700	0.322	5,783,000	8,461,000	0.459	0.78	
Aug-06	31	2,989,000	2,404,700	0.174	3,736,000	4,247,000	0.258	0.43	
Sep-06	30	1,986,000	1,631,600	0.121	2,389,000	2,758,000	0.172	0.29	
Oct-06	31	1,477,000	1,209,700	0.087	4,209,000	452,000	0.150	0.24	
Nov-06	30	1,228,000	1,017,700	0.075	1,792,000	2,057,000	0.128	0.20	
Dec-06	31	1,495,000	1,034,200	0.082	1,346,000	1,882,000	0.104	0.19	
Total					**37,624,000**	**30,745,000**			
Avg.				**0.12**			**0.19**	**0.31**	**98**

Minnesota Planning Population Projections			
	Elko	New Market	Elko New Market Combined
2001	622	688	1,310
2002	773	1,043	1,816
2003	923	1,196	2,119
2004	1,024	1,297	2,321
2005	1,126	1,399	2,525
2006	1,447	1,720	3,167
2010	2,733	3,006	5,739
2015	4,488	4,761	9,249
2020	6,432	6,705	13,137
2025	8,376	8,649	17,025
2030	10,671	10,944	21,615

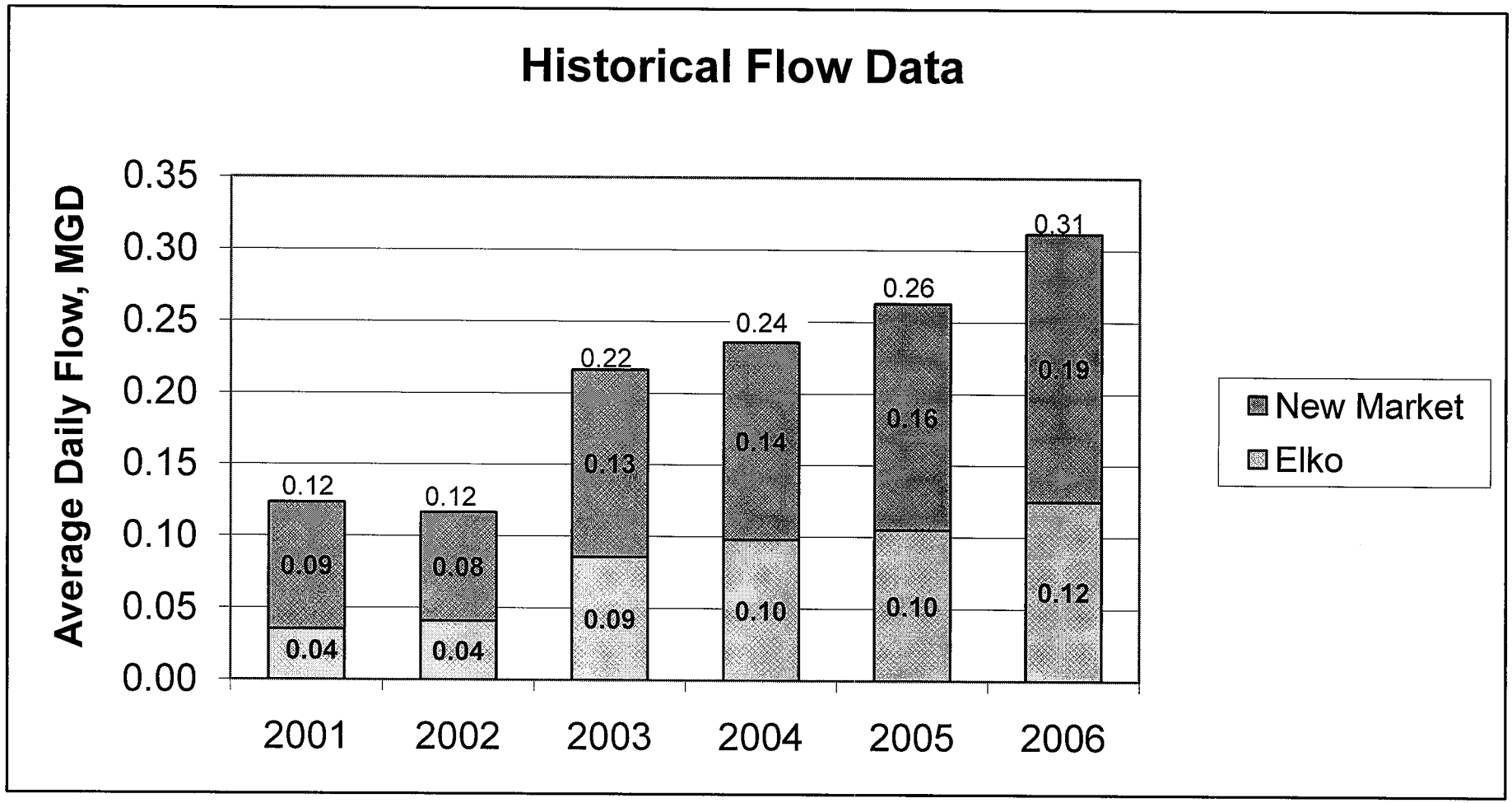
Max Daily Flows				
Date	City	Well No. 2 Flow, GAL	Well No. 3 Flow, GAL	Flow, MGD
6/24/2004	Elko	237000	88640	0.326
6/29/2004	New Market	322000	230960	0.553
Total				**0.879**
7/2/2005	Elko	90000	67200	0.157
7/17/2005	New Market	604000	172000	0.776
Total				**0.933**
7/6/2005	Elko	430000	144160	0.574
7/6/2006	New Market	575000	41600	0.617
Total				**1.191**

Design Usage, gpcd: 110 Peaking Factor: 2.5

3

Design Flows				
	Avg. Daily	Max. Daily	Calculated PF	max daily gpm
2001	0.124			
2002	0.117			
2003	0.22			
2004	0.24	0.879	3.7	
2005	0.26	0.933	3.6	
2006	0.31	1.191	3.8	648
2010	0.631	1.894		1315
2015	1.017	2.543		1766
2020	1.445	3.613		2509
2025	1.873	4.682		3251
2030	2.378	5.944		4128

Southeast Scott County Comprehensive Plan Population Projections					
	Elko	Elko Cum	NM	NM Cum	Total
2000	472	472	332	332	804
2003	451	923	864	1196	2119
2005	203	1126	203	1399	2525
2010	1607	2733	1607	3006	5739
2015	1755	4488	1755	4761	9249
2020	1944	6432	1944	6705	13137
2025	1944	8376	1944	8649	17025
2030	2295	10671	2295	10944	21615


Historical Flow Data
Average Daily Flow, MGD
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.12
0.09
0.04
0.12
0.08
0.04
0.22
0.13
0.09
0.24
0.14
0.10
0.26
0.16
0.10
0.31
0.19
0.12
2001
2002
2003
2004
2005
2006
New Market
Elko

APPENDIX B

Well Logs

Unique No. 00594234

County Name Scott

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2005/03/11

Entry Date 1998/04/29

Township Name	Township	Range	Dir	Section	Subsection
	113	21	W	27	BDDC

Well Name ELKO 2

Contact's Name ELKO 2

ELKO MN 55020

Contact's Name CITY OF ELKO
26518 FRANCE AV
ELKO MN 55020

Well Depth	Depth Completed	Date Well Completed
521 ft.	521 ft.	1997/07/03

Drilling Method Non-specified Rotary

Drilling Fluid Bentonite

Well Hydrofractured? Yes No
Fro ft. to ft.

Use Community Supply (municipal)

Casing Drive Shoe? Yes ✔ N

Hole Diameter
0 in. t 53 ft
0 in. t 326 ft
0 in. t 521 ft

Casing Diameter Weight(lbs/ft)
20 in. t 53 ft
12 in. t 326 ft

Screen N Open Hole From 326 ft. to 521 ft.

Make Type

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
SANDY CLAY	BROW		0	29
CLAY	GRAY		29	41
SAND & GRAVEL	GRAY		41	51
CLAY & ROCKS	GRAY		51	72
CLAY & ROCKS	BROW		72	98
SANDY CLAY	BROW		98	105
CLAY	BROW		105	113
SAND	BROW		113	117
CLAY	BROW		117	140
CLAY	GRAY		140	179
SAND	GRAY		179	186
CLAY	GRAY		186	198
SANDY CLAY	GRAY		198	210
CLAY	GRAY		210	221
SANDY CLAY	GRAY		221	284
CLAY	GRAY		284	314
LIMESTONE	TAN		314	417
SANDSTONE	WHITE		417	464
SANDSTONE	TAN		464	521

Static Water Level 181 ft. from Land surface Date 1997/07/03

PUMPING LEVEL (below land surface)
198 ft. after 24 hrs. pumping 500 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ✔ 12 in. above grade
At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ✔ Yes No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	326	20	Y

Nearest Known Source of Contamination
ft. direction type

Well disinfected upon completion? ✔ Yes No

Pump Not Installed Date Installed Y
Mfr nam INGERSOL-RAND
Model 8L15-4-M6 HP Volts
Drop Pipe Length ft. Capacity 300 g.p.m
Type S

Any not in use and not sealed well(s) on property? Yes ✔ No

Was a variance granted from the MDH for this Well? Yes ✔ No

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 71536
License Business Name
Name of Driller ROBBIE/DAN

USGS Quad New Market Elevation 1143
Aquifer: OPCJ Alt Id: 84-6141

Report Copy

HE-01205-06 (Rev. 9/96)

Unique No. 00680569

County Name Scott

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2005/03/11

Entry Date 2002/12/26

Township Name	Township	Range	Dir	Section	Subsection
	113	21	W	27	CAAADC

Well Depth 525 ft. Depth Completed 525 ft. Date Well Completed 2002/12/23

Well Name ELKO 3

Drilling Method Dual Rotary

Contact's Name CITY OF ELKO
26518 FRANCE AV
ELKO MN 55020

Drilling Fluid
Bentonite

Well Hydrofractured? Yes ✔ No
Fro ft. to ft.

Well Owner's Name ELKO 3

ELKO MN 55020

Use Community Supply (municipal)

Casing Drive Shoe? ✔ Yes N

Hole Diameter
in. t 75 ft
in. t 330 ft
in. t 525 ft

Casing Diameter Weight(lbs/ft)
20 in. t 75 ft
12 in. t 330 ft

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
SAND/GRAVEL	BROW	SOFT	0	20
CLAY/GRAVEL	GRAY	MEDIUM	20	70
CLAY/GRAVEL	BROW	MEDIUM	70	80
CLAY	GRAY	MEDIUM	80	130
SANDY/CLAY	GRAY	MEDIUM	130	160
CLAY/ROCKS	GRAY	HARD	160	190
SANDY/CLAY	GRAY	HARD	190	275
CLAY/GRAVEL	GRAY	HARD	275	290
GRAVEL	BROW	MEDIUM	290	320
LIMESTONE	GRAY	HARD	320	330
LIMESTONE	GRAY	HARD	330	417
SANDSTONE SHALE LAYER	WHITE	MEDIUM	417	422
SANDSTONE SHALE LAYER	WHITE	MEDIUM	422	525

Screen N Open Hole From 330 ft. to 525 ft.

Make Type

Static Water Level 184 ft. from Land surface Date 2002/12/11

PUMPING LEVEL (below land surface)
186 ft. after 1 hrs. pumping 250 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ✔ 12 in. above grade
At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ✔ Yes No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	330	13.25	Y

Nearest Known Source of Contamination
100 ft. direction S type BOW
Well disinfected upon completion? Yes No

Pump ✔ Not Installed Date Installed N
Mfr nam
Model HP Volts
Drop Pipe Length ft. Capacity g.p.m
Type

Any not in use and not sealed well(s) on property? Yes ✔ No

Was a variance granted from the MDH for this Well? Yes ✔ No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

GAMMA LOGGED 2-27-2003. M.G.S. NO. 4216.

USGS Quad New Market Elevation 1151
Aquifer: OPCJ Alt Id: 4216

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 71536
License Business Name
Name of Driller DAN/ED

Report Copy

Unique No. 00451825

County Name Scott

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2006/02/16

Entry Date 1989/07/10

Township Name	Township	Range	Dir	Section	Subsection
	113	21	W	28	BBACC

Well Name NEW MARKET 2

Well Owner's Name NEW MARKET 2

NEW MARKET MN 55054

Contact's Name CITY OF NEW MARKET
601 MAIN ST
NEW MARKET MN 55054

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
FILL	VARIE	SOFT	0	5
TOPSOIL	BLACK	SOFT	5	10
SANDY CLAY	BROW	SOFT	10	25
SANDY CLAY	GRAY	SOFT	25	45
COARSE SANDY & GRAVEL	GRAY	SOFT	45	50
SANDY CLAY & ROCK	GRAY	MEDIUM	50	65
GRAVEL & CLAY LAYERS	GRAY	MEDIUM	65	75
SANDY CLAY	GRAY	MEDIUM	75	100
SANDY CLAY & GRAVEL LA	GRAY	MEDIUM	100	145
SANDY CLAY	GRAY	MEDIUM	145	210
COARSE SAND & GRAVEL	GRAY	MEDIUM	210	214
SANDY CLAY	GRAY	MEDIUM	214	245
DECOMPOSED ROCK & GR	GRY/R	HARD	245	270
LIMESTONE	GRN/G	HARD	270	300
LIMESTONE & SANDSTONE	GRAY	HARD	300	366
JORDAN SANDSTONE	WHITE	SOFT	366	433
ST. LAWRENCE	GRAY	HARD	433	435

Well Depth 435 ft. Depth Completed 435 ft. Date Well Completed 1988/07/29

Drilling Method Non-specified Rotary

Drilling Fluid Bentonite

Well Hydrofractured? Yes No
Fro ft. to ft.

Use Community Supply (municipal)

Casing Drive Shoe? Yes N Hole Diameter

Casing Diameter 12 in. t 290 ft Weight(lbs/ft)

Screen N Open Hole From 290 ft. to 435 ft.

Make Type

Static Water Level 150 ft. from Land surface Date 1988/07/29

PUMPING LEVEL (below land surface)
165 ft. after 12 hrs. pumping 500 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ✔ 12 in. above grade
At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ✔ Yes No

Material	From	To (ft.)	Amount(yds/bags)
G	0	290	260 S

Nearest Known Source of Contamination
300 ft. direction N type
Well disinfected upon completion? ✔ Yes No

Pump ✔ Not Installed Date Installed N
Mfr nam
Model HP Volts
Drop Pipe Length ft. Capacity g.p.m
Type

Any not in use and not sealed well(s) on property? Yes ✔ No

Was a variance granted from the MDH for this Well? Yes No

REMARKS, ELEVATION, SOURCE OF DATA, etc.
M.G.S. NO.2877.

USGS Quad New Market Elevation 1125
Aquifer: OPCJ Alt Id: 85-6121

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 71536
License Business Name
Name of Driller ROB/MAURICE

Report Copy

HE-01205-06 (Rev. 9/96)

Unique No. 00686687

County Name Scott

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2006/02/16

Entry Date 2003/02/19

Township Name	Township	Range	Dir	Section	Subsection
	113	21	W	21	CDAAAB

Well Name NEW MARKET 3

Well Owner's Name NEW MARKET 3
359 JAMES PK
NEW MARKET MN 55045

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
FILL	BLACK	SOFT	0	10
SANDY CLAY	BROW	MEDIUM	25	25
SANDY CLAY	GRAY		25	35
SANDY CLAY/GRAVEL	GRAY	SOFT	35	55
SAND/GRAVEL	GRAY	MEDIUM	55	65
SANDY CLAY	GRAY	SOFT	65	80
SANDY CLAY	GRAY	SOFT	80	145
CLAY/GRAVEL	GRAY	HARD	145	200
SANDY CLAY	GRAY	SOFT	200	240
CLAY	GRAY	HARD	240	245
GRAVEL	GRAY	MEDIUM	245	248
GRAVEL/ROCKS	GRAY	HARD	248	249
DECOMPOSED LIMESTONE	GRAY	MEDIUM	249	285
LIMESTONE	TAN	HARD	285	294
LIMESTONE	TAN	HARD	294	320
SANDSTONE	WHITE	MEDIUM	320	367
SANDSTONE	WHITE	MEDIUM	367	405
SANDSTONE/SHALE	WHT/G	HARD	405	425
SANDSTONE	WHITE	MED-HRD	425	439

REMARKS, ELEVATION, SOURCE OF DATA, etc.

M.G.S. NO. 4223.

USGS Quad New Market Elevation ~~1101~~ 1113 South

Aquifer: OPCJ Alt Id: 85-6121

Report Copy

Well Depth 439 ft. Depth Completed 439 ft. Date Well Completed 2003/02/04

Drilling Method Dual Rotary

Drilling Fluid

Well Hydrofractured? Yes ✔ No

Fro ft. to ft.

Use Community Supply (municipal)

Casing Drive Shoe? ✔ Yes N

Hole Diameter

in. t 192 ft

in. t 294 ft

in. t 439 ft

Casing Diameter Weight(lbs/ft)

20 in. t 192 ft

14 in. t 294 ft

Screen N Open Hole From 294 ft. to 439 ft.

Make Type

Static Water Level 144 ft. from Date 2003/02/05

PUMPING LEVEL (below land surface)

153 ft. after 1 hrs. pumping 400 g.p.m.

Well Head Completion

Pitless adapter mfr PUMP HOUSE Model

Casing Protection ✔ 12 in. above grade

At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ✔ Yes No

Material	From	To (ft.)	Amount(yds/bags)
G	0	294	11 Y

Nearest Known Source of Contamination

120 ft. direction SW type BOW

Well disinfected upon completion? ✔ Yes No

Pump ✔ Not Installed Date Installed N

Mfr nam

Model HP Volts

Drop Pipe Length ft. Capacity g.p.m

Type

Any not in use and not sealed well(s) on property? Yes ✔ No

Was a variance granted from the MDH for this Well? Yes ✔ No

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 73646

License Business Name

Name of Driller POHLKAMP, D.

SOURCE WATER ASSESSMENT FOR
Elko

ID Number: 1700002

Facility Contact:
City Hall
(952) 461-2777
Elko
Elko Water Superintendent
P.O. Box 62
Elko, MN 55020

MDH Contact:
Art Persons
(507) 292-5138
18 Wood Lake Drive Southeast
Rochester, MN 55904
art.persons@health.state.mn.us

Status of the Source Water Protection Plan:

The water supply system is implementing the wellhead protection plan that has been approved by the Minnesota Department of Health under Minnesota Rules 4720.

Source Water Protection Area: - Click Map1 to view SWPA map(s).

Yes - A Source Water Protection Area has been designated for this well.

Description of the source water - The water supply for Elko is obtained from 2 primary wells. Well depth (in feet), well status, aquifer(s) used, and sensitivity of the source(s) of drinking water are listed in the following table.

Unique Well No	Well ID	Depth	Well Use	Aquifer	Aquifer Sensitivity	*Well Sensitivity	SWPA
00594234	Well #2	521.0	Primary	Bedrock	Low	See (2)	Yes
00680569	Well #3	525.0	Primary	Bedrock	Low	See (2)	No

Well construction assessment - The water wells used by the Elko meet current standards for construction and maintenance. These factors do not contribute to the susceptibility of the source water to contamination.

Well Sensitivity - Well sensitivity refers to the integrity of the well due to its construction and maintenance. It is based on the results of the well construction assessment. It can be one of the following:

(1) The well is susceptible to contamination because it does not meet current construction standards or no information about well construction is available, regardless of aquifer sensitivity.
(2) The well is not susceptible because it meets well construction standards and does not present a pathway for contamination to readily enter the water supply.

Aquifer Sensitivity - Aquifer sensitivity refers to the degree of geological protection afforded the aquifer(s) used by the public water supply.

Low - The bedrock aquifer is covered by one or more layers of fine-grained material that probably protect it

SOURCE WATER ASSESSMENT FOR
Freeway Service Center

ID Number: 5700126

Facility Contact:
Dan Zwiers, Manager
(952) 461-2389
Freeway Service Center
G and T Trucking
c/o Mr. Dan Zwiers
11111 Duece Road
Elko, MN 55020

MDH Contact:
Art Persons
(507) 292-5138
18 Wood Lake Drive Southeast
Rochester, MN 55904
art.persons@health.state.mn.us

Status of the Source Water Protection Plan:

The source water protection area for this facility consists of an inner wellhead management zone that is defined by a 200 foot radius around each well that supplies drinking water. The setback distances from potential sources of contamination that are specified in the Minnesota well construction code must be maintained within this area. The owner or operator of this facility is required under Minnesota public water supply rules (MR 4720.5110) to implement management practices for all potential contamination sources within the inner wellhead management zone. Contact either of the persons listed above to obtain more information regarding the wellhead protection measures that are being used by this facility.

Source Water Assessment Area: -

No - A Source Water Assessment Area has yet to be designated for this well.

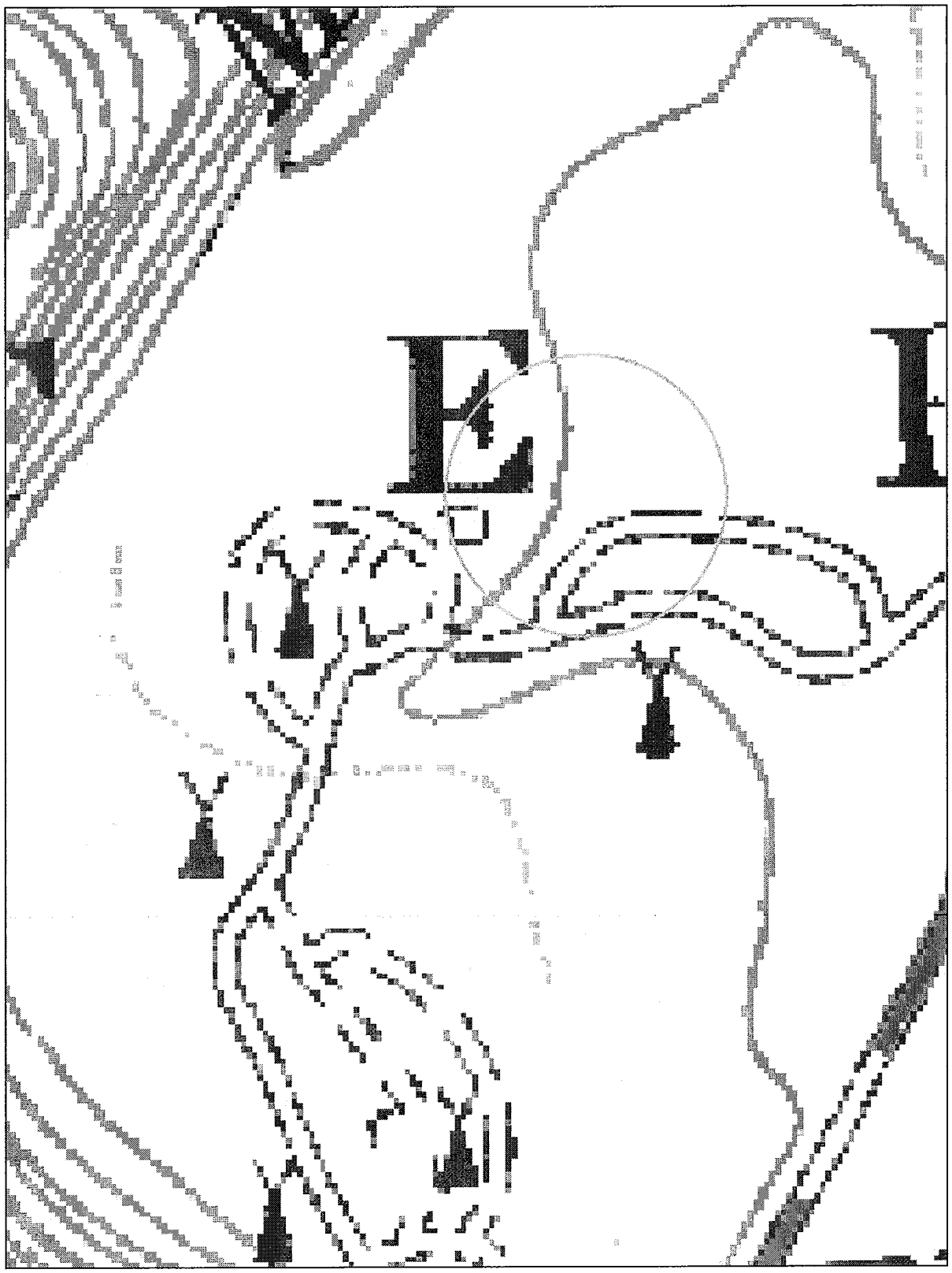
Description of the source water - The water supply for Freeway Service Center is obtained from 1 primary well. Well depth (in feet), well status, aquifer(s) used, and sensitivity of the source(s) of drinking water are listed in the following table.

Unique Well No	Well ID	Depth	Well Use	Aquifer	Aquifer Sensitivity	*Well Sensitivity
00248289	Well #1	286.0	Primary	Bedrock	Low	See (1)

Well construction assessment - The Minnesota Department of Health considers the well potentially vulnerable to contamination because there is insufficient information to document well construction.

Well Sensitivity - Well sensitivity refers to the integrity of the well due to its construction and maintenance. It is based on the results of the well construction assessment. It can be one of the following:

(1) The well is susceptible to contamination because it does not meet current construction standards or no information about well construction is available, regardless of aquifer sensitivity.
(2) The well is not susceptible because it meets well construction standards and does not present a pathway for contamination to readily enter the water supply.



Scale: 1:2568

SOURCE WATER ASSESSMENT FOR
New Market

ID Number: 1700006

Facility Contact:
City Hall
(952) 461-2711
New Market
New Market Water Superintendent
City Hall
601 Main Street, Box 99
New Market, MN 550540099

MDH Contact:
Art Persons
(507) 292-5138
18 Wood Lake Drive Southeast
Rochester, MN 55904
art.persons@health.state.mn.us

Status of the Source Water Protection Plan:

The water supply system is designating its wellhead protection area(s) and preparing assessments of well and aquifer vulnerability as specified under Minnesota Rules Chapter 4720.

Source Water Assessment Area: -

No - A Source Water Assessment Area has yet to be designated for this well.

Description of the source water - The water supply for New Market is obtained from 2 primary wells. Well depth (in feet), well status, aquifer(s) used, and sensitivity of the source(s) of drinking water are listed in the following table.

Unique Well No	Well ID	Depth	Well Use	Aquifer	Aquifer Sensitivity	*Well Sensitivity	SWPA
00451825	Well #2	435.0	Primary	Bedrock	Low	See (2)	No
00686687	Well #3	439.0	Primary	Bedrock	Low	See (2)	No

Well construction assessment - The water wells used by the New Market meet current standards for construction and maintenance. These factors do not contribute to the susceptibility of the source water to contamination.

Well Sensitivity - Well sensitivity refers to the integrity of the well due to its construction and maintenance. It is based on the results of the well construction assessment. It can be one of the following:

(1) The well is susceptible to contamination because it does not meet current construction standards or no information about well construction is available, regardless of aquifer sensitivity.
(2) The well is not susceptible because it meets well construction standards and does not present a pathway for contamination to readily enter the water supply.

Aquifer Sensitivity - Aquifer sensitivity refers to the degree of geological protection afforded the aquifer(s) used by the public water supply.

SOURCE WATER ASSESSMENT FOR
New Market Rest Area MNDOT

ID Number: 5700216

Facility Contact:
David Morisette
(507) 446-5926
New Market Rest Area MNDOT
Minnesota Department of Transportation
c/o Physical Plant Supervisor
1010 - 21st Avenue NW
Owatonna, MN 55060

MDH Contact:
Art Persons
(507) 292-5138
18 Wood Lake Drive Southeast
Rochester, MN 55904
art.persons@health.state.mn.us

Status of the Source Water Protection Plan:

The source water protection area for this facility consists of an inner wellhead management zone that is defined by a 200 foot radius around each well that supplies drinking water. The setback distances from potential sources of contamination that are specified in the Minnesota well construction code must be maintained within this area. The owner or operator of this facility is required under Minnesota public water supply rules (MR 4720.5110) to implement management practices for all potential contamination sources within the inner wellhead management zone. Contact either of the persons listed above to obtain more information regarding the wellhead protection measures that are being used by this facility.

Source Water Assessment Area: -

No - A Source Water Assessment Area has yet to be designated for this well.

Description of the source water - The water supply for New Market Rest Area MNDOT is obtained from 1 primary well. Well depth (in feet), well status, aquifer(s) used, and sensitivity of the source(s) of drinking water are listed in the following table.

Unique Well No	Well ID	Depth	Well Use	Aquifer	Aquifer Sensitivity	*Well Sensitivity
00261431	Well #1	253.0	Primary	Bedrock	Low	See (2)

Well construction assessment - The water well used by the New Market Rest Area MNDOT meets current standards for construction and maintenance. These factors do not contribute to the susceptibility of the source water to contamination.

Well Sensitivity - Well sensitivity refers to the integrity of the well due to its construction and maintenance. It is based on the results of the well construction assessment. It can be one of the following:

(1) The well is susceptible to contamination because it does not meet current construction standards or no information about well construction is available, regardless of aquifer sensitivity.
(2) The well is not susceptible because it meets well construction standards and does not present a pathway for

APPENDIX C

Water Quality Data

Drinking Water Contaminant Candidate List

1,1,2,2-Tetrachloroethane
1,2,4-Trimethylbenzene
1,1-Dichloroethane
1,1-Dichloropropene
1,2-Diphenylhydrazine
1,3-Dichloropropane
1,3-Dichloropropene
2,4,6-Trichlorophenol
2,2-Dichloropropane
2,4-Dichlorophenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
2-methyl-Phenol (o-cresol)
Acetochlor
Alachlor ESA & other acetanilide pesticide degradation products
Aluminum
Boron
Bromobenzene
DCPA mono-acid degradate
DCPA di-acid degradate
DDE
Diazinon
Disulfoton
Diuron
EPTC (s-ethyl-dipropylthiocarbamate)
Fonofos
p-Isopropyltoluene (p-cymene)
Linuron
Methyl bromide
Methyl-t-butyl ether (MTBE)
Metolachlor
Molinate
Nitrobenzene
Organotins
Perchlorate
Prometon
RDX
Terbacil
Terbufos
Triazines & degradation products of triazines
Vanadium

EPA National Primary Drinking Water Standards

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Acrylamide	TT[8]	Nervous system or blood problems;	Added to water during sewage/wastewater increased risk of cancer treatment	zero
OC	Alachlor	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops	zero
R	Alpha particles	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	zero
IOC	Antimony	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	0.006
IOC	Arsenic	0.010 as of 1/23/06	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards, runoff from glass & electronics production wastes	0
IOC	Asbestos (fibers >10 micrometers)	7 million fibers per Liter (MFL)	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits	7 MFL
OC	Atrazine	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops	0.003
IOC	Barium	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	2
OC	Benzene	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills	zero
OC	Benzo(a)pyrene (PAHs)	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines	zero
IOC	Beryllium	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	0.004
R	Beta particles and photon emitters	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation	zero
DBP	Bromate	0.010	Increased risk of cancer	Byproduct of drinking water disinfection	zero
IOC	Cadmium	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	0.005
OC	Carbofuran	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa	0.04
OC	Carbon tetrachloride	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities	zero
D	Chloramines (as Cl_2)	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort, anemia	Water additive used to control microbes	MRDLG=4[1]

LEGEND

D	Dinsinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Chlordane	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide	zero
D	Chlorine (as Cl_2)	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort	Water additive used to control microbes	MRDLG=4[1]
D	Chlorine dioxide (as ClO_2)	MRDL=0.8[1]	Anemia; infants & young children: nervous system effects	Water additive used to control microbes	MRDLG=0.8[1]
DBP	Chlorite	1.0	Anemia; infants & young children: nervous system effects	Byproduct of drinking water disinfection	0.8
OC	Chlorobenzene	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories	0.1
IOC	Chromium (total)	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits	0.1
IOC	Copper	TT[7]; Action Level = 1.3	Short term exposure: Gastrointestinal distress. Long term exposure: Liver or kidney damage. People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits	1.3
M	*Cryptosporidium*	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
IOC	Cyanide (as free cyanide)	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories	0.2
OC	2,4-D	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops	0.07
OC	Dalapon	0.2	Minor kidney changes	Runoff from herbicide used on rights of way	0.2
OC	1,2-Dibromo-3-chloropropane (DBCP)	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards	zero
OC	o-Dichlorobenzene	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories	0.6
OC	p-Dichlorobenzene	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories	0.075
OC	1,2-Dichloroethane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC	1,1-Dichloroethylene	0.007	Liver problems	Discharge from industrial chemical factories	0.007
OC	cis-1,2-Dichloroethylene	0.07	Liver problems	Discharge from industrial chemical factories	0.07
OC	trans-1,2-Dichloroethylene	0.1	Liver problems	Discharge from industrial chemical factories	0.1
OC	Dichloromethane	0.005	Liver problems; increased risk of cancer	Discharge from drug and chemical factories	zero
OC	1,2-Dichloropropane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC	Di(2-ethylhexyl) adipate	0.4	Weight loss, live problems, or possible reproductive difficulties	Discharge from chemical factories	0.4
OC	Di(2-ethylhexyl) phthalate	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories	zero
OC	Dinoseb	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables	0.007
OC	Dioxin (2,3,7,8-TCDD)	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories	zero
OC	Diquat	0.02	Cataracts	Runoff from herbicide use	0.02
OC	Endothall	0.1	Stomach and intestinal problems	Runoff from herbicide use	0.1

LEGEND

D	Dinsinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Endrin	0.002	Liver problems	Residue of banned insecticide	0.002
OC	Epichlorohydrin	TT[8]	Increased cancer risk, and over a long period of time, stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals	zero
OC	Ethylbenzene	0.7	Liver or kidneys problems	Discharge from petroleum refineries	0.7
OC	Ethylene dibromide	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries	zero
IOC	Fluoride	4.0	Bone disease (pain and tenderness of the bones); Children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories	4.0
M	*Giardia lamblia*	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
OC	Glyphosate	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use	0.7
DBP	Haloacetic acids (HAA5)	0.060	Increased risk of cancer	Byproduct of drinking water disinfection	n/a[6]
OC	Heptachlor	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide	zero
OC	Heptachlor epoxide	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor	zero
M	Heterotrophic plate count (HPC)	TT[3]	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment	n/a
OC	Hexachlorobenzene	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories	zero
OC	Hexachlorocyclopentadiene	0.05	Kidney or stomach problems	Discharge from chemical factories	0.05
IOC	Lead	TT[7]; Action Level = 0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities; Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits	zero
M	*Legionella*	TT[3]	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems	zero
OC	Lindane	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens	0.0002
IOC	Mercury (inorganic)	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands	0.002
OC	Methoxychlor	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock	0.04
IOC	Nitrate (measured as Nitrogen)	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	10
IOC	Nitrite (measured as Nitrogen)	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	1

LEGEND

D	Dinsinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Oxamyl (Vydate)	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes	0.2
OC	Pentachlorophenol	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood preserving factories	zero
OC	Picloram	0.5	Liver problems	Herbicide runoff	0.5
OC	Polychlorinated biphenyls (PCBs)	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals	zero
R	Radium 226 and Radium 228 (combined)	5 pCi/L	Increased risk of cancer	Erosion of natural deposits	zero
IOC	Selenium	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines	0.05
OC	Simazine	0.004	Problems with blood	Herbicide runoff	0.004
OC	Styrene	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills	0.1
OC	Tetrachloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners	zero
IOC	Thallium	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories	0.0005
OC	Toluene	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories	1
M	Total Coliforms (including fecal coliform and *E. coli*)	5.0%[4]	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present[5]	Coliforms are naturally present in the environment as well as feces; fecal coliforms and *E. coli* only come from human and animal fecal waste.	zero
DBP	Total Trihalomethanes (TTHMs)	0.10 0.080 after 12/31/03	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	n/a[6]
OC	Toxaphene	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle	zero
OC	2,4,5-TP (Silvex)	0.05	Liver problems	Residue of banned herbicide	0.05
OC	1,2,4-Trichlorobenzene	0.07	Changes in adrenal glands	Discharge from textile finishing factories	0.07
OC	1,1,1-Trichloroethane	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories	0.20
OC	1,1,2-Trichloroethane	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories	0.003
OC	Trichloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories	zero
M	Turbidity	TT[3]	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (e.g., whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing micro-organisms such as viruses, parasites and some bacteria. These organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff	n/a
R	Uranium	30 ug/L as of 12/08/03	Increased risk of cancer, kidney toxicity	Erosion of natural deposits	zero

LEGEND

D	Dinsinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Vinyl chloride	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories	zero
M	Viruses (enteric)	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
OC	Xylenes (total)	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories	10

NOTES

1 Definitions

- Maximum Contaminant Level Goal (MCLG)—The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
- Maximum Contaminant Level (MCL)—The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
- Maximum Residual Disinfectant Level Goal (MRDLG)—The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- Maximum Residual Disinfectant Level (MRDL)—The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- Treatment Technique (TT)—A required process intended to reduce the level of a contaminant in drinking water.

2 Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (ppm).

3 EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- *Cryptosporidium* (as of 1/1/02 for systems serving >10,000 and 1/14/05 for systems serving <10,000) 99% removal.
- *Giardia lamblia*: 99.9% removal/inactivation
- Viruses: 99.99% removal/inactivation
- *Legionella:* No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated, *Legionella* will also be controlled.
- Turbidity: At no time can turbidity (cloudiness of water) go above 5 nephelolometric turbidity units (NTU); systems that filter must ensure that the turbidity go no higher than 1 NTU (0.5 NTU for conventional or direct filtration) in at least 95% of the daily samples in any month. As of January 1, 2002, for systems servicing >10,000, and January 14, 2005, for systems servicing <10,000, turbidity may never exceed 1 NTU, and must not exceed 0.3 NTU in 95% of daily samples in any month.
- HPC: No more than 500 bacterial colonies per milliliter
- Long Term 1 Enhanced Surface Water Treatment (Effective Date: January 14, 2005); Surface water systems or (GWUDI) systems serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (e.g. turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).
- Filter Backwash Recycling: The Filter Backwash Recycling Rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

4 No more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or *E. coli* if two consecutive TC-positive samples, and one is also positive for *E. coli* fecal coliforms, system has an acute MCL violation.

5 Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.

6 Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

- Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.3 mg/L)
- Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L)

7 Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.

8 Each water system must certify, in writing, to the state (using third-party or manufacturers certification) that when it uses acrylamide and/or epichlorohydrin to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows: Acrylamide = 0.05% dosed at 1 mg/L (or equivalent); Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent).

LEGEND

D	Dinsinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

National Secondary Drinking Water Standards

National Secondary Drinking Water Standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards.

Contaminant	Secondary Standard
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

Office of Water (4606M)
EPA 816-F-03-016
www.epa.gov/safewater
June 2003

APPENDIX D

Water Supply Plan

DEPARTMENT OF NATURAL RESOURCES - DIVISION OF WATERS and METROPOLITAN COUNCIL
WATER SUPPLY PLANS

These guidelines are divided into four parts. The first three parts, Water Supply System Description and Evaluation, Emergency Response Procedures and Water Conservation Planning apply statewide. Part IV, relates to comprehensive plan requirements that apply only to communities in the Seven-County Twin Cities Metropolitan Area. If you have questions regarding water supply plans, please call (651) 259-5703 or (651) 259-5647 or e-mail your question to wateruse@dnr.state.mn.us. Metro Communities can also direct questions to the Metropolitan Council at watersupply@metc.state.mn.us or (651) 602-1066.

DNR Water Appropriation Permit Number(s)	1700029
Name of Water Supplier	City of Elko New Market
Address	601 Main Street
Contact Person	Thomas Terry
Title	City Administrator
Phone Number	952-461-2777
E-Mail Address	tterry@ci.enm.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.
The cities of Elko and New Market were combined in 2007. Therefore, the data for 2007 and 2008 is complete data for the combined city. Data prior to 2007 was the combination of the data from the two cities. Some of the required data was not available from both cities prior to 2003.

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
1999													
2000													
2001	1310	1310	451					45.1		0.124			94
2002	1816	1816	626					42.6		0.117			64
2003	2119	2119	730	40.4	11.6	0	52.0	79.3	34.4	0.217		52	103
2004	2321	2321	800	68.5	13.1	0	81.6	86.3	5.5	0.236	0.879	81	102
2005	2525	2525	870	83.6	8.0	0	91.6	96.2	4.8	0.264	0.933	91	104
2006	3167	3167	1085	114.7	4.4	0	119.1	114.0	--	0.312	1.191	99	99
2007	3788	3788	1130	117.7	14.1	0	131.8	135.0	2.4	0.370	0.754	85	98
2008	3817	3817	1181	106.2	6.7	0	112.9	123.7	8.7	0.339	0.600	76	89

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.
The cities water usage is mostly residential usage. Therefore, weather is the major factor that influences water usage for Elko New Market. Usage is highest during the summer months when residents are watering their lawns.

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

Customer	Gallons per year	% of total annual use
Villas of Boulder Pointe Assn.	3,329,900	2.95
Baseball Field Sprinkler	1,042,200	.92
Cornerstone Mgmt.	1,031, 150	.91
Nicole Yender	1,004,420	.89
NP Area Schools	625,000	.55
Townhouses of the Farm	374,110	.33
Firehouse Pizza	353,100	.31
Mark Czywczynski	339,850	.30
Wispering Hills Townhomes	304,790	.27
Dakota Acres Townhomes	296,100	.26

B. TREATMENT AND STORAGE CAPACITY.

TABLE 3(A) Water Treatment

Water Treatment Plant Capacity	180,000 Gallons per day
Describe the treatment process used (i.e., 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.	
Current treatment consists of ion exchange for softening, chlorination, and flouridation at the two New Market wells. The two Elko wells use chlorination and flouridation only.	

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

Total Storage Capacity	**Average Day Demand** (average of last 5 years)
400,000 Gallons	304,000 Gallons per day

Type of Structure	Number of Structures	Gallons
Elevated Storage	2	400,000
Ground Storage	-	-
Other:	-	-

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)

Total Capacity of Sources	1300	Gallons per minute
Firm Capacity (largest pump out of service)	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 Attachment A. If there are more wells than space provided or multiple well fields, please use the List of Wells template (see Resources) and include as Attachment .

Well # or name	Unique Well Number	Year Installed	Well & Casing Depth (ft)	Well Diameter (in)	Capacity (GPM)	Geologic Unit	Status
Elko 2	594234	1997	521/326	20	250	OPCJ	Active
Elko 3	680569	2002	525/330	20	500	OPCJ	Active
New Market 1	211953	1930	410	na	80	OPCJ	Emergency Backup
New Market 2	451825	1988	435/290	12	250	OPCJ	Active
New Market 3	686687	2003	439/294	20	300	OPCJ	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

TABLE 4(C) Surface Water Sources

Intake ID	Resource name	Capacity (GPM/MGD)
None		

GPM – Gallons per Minute MGD – Million Gallons per Day

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
None		

GPM – Gallons per Minute MGD – Million Gallons per Day

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
New Market Well #1	80	Emergency only

GPM – Gallons per Minute MGD – Million Gallons per Day

D. DEMAND PROJECTIONS.

TABLE 5 Ten Year Demand Projections

Year	Population Served	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2010	5700	0.506	1.506	184.7
2011	6440	0.572	1.701	208.7
2012	7180	0.637	1.897	232.7
2013	7920	0.703	2.092	256.7
2014	8660	0.769	2.288	280.7
2015	9400	0.835	2.484	304.6
2016	10140	0.900	2.679	328.6
2017	10880	0.966	2.875	352.6
2018	11620	1.032	3.070	376.6
2019	12360	1.097	3.266	400.6

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).
Future populations were taken from the MET Council population projections. Average day demand was estimated with the past five years average of 98 GPCD. Maximum day demand was estimated with the past five years average peaking factor of 2.98.

E. RESOURCE SUSTAINABILITY

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 (See Water Level Data Comments).**

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.)
None			

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.
See Attachment A for static water level data. The city proposes to begin monitoring water levels in all production wells yearly, beginning next spring. **Attachment: 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) 259-5700.

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.

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:	August 2008
Date for Next WHP Update:	2018
SWP Plan:	☐ In Process ☒ Completed ☐ Not Applicable

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 (CIP Attachment Water Well and Treatment for high iron and manganese).
Elko New Market will see a significant increase in population over the next twenty years and therefore will require added capacity to their water supply system. It is estimated that the city will require an additional 6 MGD treatment capacity and 3MG storage capacity by 2030. The city will also need to upgrade its distribution system to accommodate new developments and continue to replace old water mains during road reconstruction.

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.
Five new 900 gpm wells would be required by 2030 to meet the future water demands. These wells would be located in the Prairie du Chein-Jordan Aquifer system.

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.
No alternative water sources were available and there were no feasible connections with neighboring communities.

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 two formerly separate systems have been interconnected to provide flexability and redundancy and consist of relatively new watermain. Pump houses and plants are inspected daily. Hydrants are flushed semi-annually and valves are exercised annually. The SCADA system is being updated to provide remote access and more data to enhance operations.

PART II. EMERGENCY RESPONSE PROCEDURES

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

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	Marty Deutsch	952-461-2777
Alternate Emergency Response Lead	Corey Schweich	952-461-2777
Emergency Response Plan Certification Date		

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 must be included as Attachment B to the plan (complete template or use your own list). The list should include key utility and community personnel, contacts in adjacent communities, and appropriate local, state and federal emergency contacts. Please be sure to verify and update the contacts on the emergency telephone list on a regular basis (once each year recommended). 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. Responsibilities and services for each contact should be 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. 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.

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

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

Name	Capacity (GPM/MGD)	Note any limitations on use
New Market Well #1	80 gpm	

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	200,000	0
Institutional	2	10,000	0
Commercial	3	10,000	0
Industrial	4	10, 000	0
Irrigation	5	100, 000	100, 000
Wholesale	6	0	0
Non-essential	7	0	0
	TOTALS	330,000	100,000

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)

Table 9 Demand Reduction Procedures

Condition	Trigger(s)	Actions
Stage 1 (Mild)	Wells in operation run 18 hours, 5 out of 7 days.	Request voluntary reduction measures.
Stage 2 (Moderate)	Above condition plus unable to maintain at least 20 ft. in water tower	Implement sprinkling ban.
Stage 3 (Severe)	Above conditions plus unable to maintain at least 15 ft. in water tower.	Consider water allocation to protect domestic requirements over economic needs.
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.
Public announcements and press releases.

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.

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. 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	5,835,000 gallons
Average percent unaccounted water for the last 5 years	5.3 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%.	

Residential Gallons Per Capita Demand (GPCD)	
Average residential GPCD use for the last 5 years (use data from Table 1)	86 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.	
The city will continue to educate the public on water conservation strategies as they have seen success from past efforts. Since the cities of Elko New Market have joined the GPCD day has dropped from 99 in 2006 to 85 in 2007 and again to 76 in 2008.	

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.

Peak Demands (calculate average ratio for last five years using data from Table 1)	
Average maximum day to average day ratio	2.98

If peak demands exceed a ratio of 2.6, describe the goals for lowering peak demands.
Although the average over the past five years is higher than 2.6, the peak demands have been greatly reduced since the two cities have joined. From 2004-2006 the average peaking factor was 3.7 when the cities were separate. Over the past two year when the two cities were joined the average peaking factor has dropped to 1.9. The city will continue to enforce watering restrictions to help minimize peak demands.

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.

TABLE 10 (A) Customer Meters

	Number of Connections	Number of Metered Connections	Meter testing schedule (years)	Average age/meter replacement schedule (years)
Residential	1153	1153		/
Institutional				/
Commercial	28	28		/
Industrial				/
Public Facilities				/
Other				/
TOTALS				

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.
There are currently no unmetered customers.

TABLE 10 (B) Water Source Meters

	Number of Meters	Meter testing schedule (years)	Average age/meter replacement schedule (years)
Water Source (wells/intakes)	5	None	7 years /
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:

Leak detection and survey: ☐every year ☐ every years ☒ periodic as needed
Year last leak detection survey completed:

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.
Distribution system maintenance (hydrant flushing) is likely a large contributor to unaccounted for water. Efforts will be made to document water usage during system maintenance. All water meters were also recently replaced with radio read meters.

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: 0 gallons

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

Conservation Neutral Rate Structure
☐ Uniform rate: rate per unit is the same regardless of volume

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:

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.

Current Water Rates. Include a copy of the actual rate structure in Attachment or list current water rates including base/service fees and volume charges below.
Base fee of $5.18 and $2.07/1000 gal up to 10,000 gallons. $4.26/1000 gal above 10,000 gallons.

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.

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 C 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 11:00 a.m. am/pm and 6:00 p.m. am/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):

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? ☒ Yes ☐ No If yes, indicate how ordinances are enforced along with any penalties for non-compliance.
Ordaninances are enforced on a complaint basis.

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.

Current Education Programs	**Times/Year**
Billing inserts or tips printed on the actual bill	-
Consumer Confidence Reports	1
Local news papers	-
Community news letters	12
Direct mailings (water audit/retrofit kits, showerheads, brochures)	-
Information at utility and public buildings	-
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: www.ci.enm.mn.us)	Continuous
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 Attachment D 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).
The city proposes to compose two conservation articles each year that will be mailed out to water users in the monthly newsletters. The conservation articles would be included in the May newsletter to promote water conservation as the irrigation season begins. A second conservation article would be included in the July newsletter to remind water users on methods and benefits of water conservation.

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 651/259-5703 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 Supply 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 has been the practice of the city to provide water which meets the national drinking water standards at the lowest possible 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.
This water supply plan does not affect the local comprehensive plan as water supply is not the limiting factor on growth of the city.

Demand Projections

Year	Total Community Population	Population Served	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2010	5700	5700	0.506	1.506	184.7
2020	13,100	13, 100	1.163	3.461	424.5
2030	20, 800	20, 800	1.847	5.495	674.1
Ultimate	80,000	80,000	7.103	21.136	2592.6

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 (i.e., 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 390 Robert St, St. Paul, MN 55101	electronically to: watersupply@metc.state.mn.us

Unique No. 00686687

County Name Scott

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2006/02/16

Entry Date 2003/02/19

Township Name	Township	Range	Dir	Section	Subsection
	113	21	W	21	CDAAAB

Well Name NEW MARKET 3

Well Owner's Name NEW MARKET 3
359 JAMES PK
NEW MARKET MN 55045

Well Depth	Depth Completed	Date Well Completed
439 ft.	439 ft.	2003/02/04

Drilling Method Dual Rotary

Drilling Fluid

Well Hydrofractured? Yes ✔ No

Fro ft. to ft.

Use Community Supply (municipal)

Casing Drive Shoe? ✔ Yes N

Hole Diameter

in. t 192 ft

in. t 294 ft

in. t 439 ft

Casing Diameter Weight(lbs/ft)

20 in. t 192 ft

14 in. t 294 ft

Screen N

Open Hole From 294 ft. to 439 ft.

Make Type

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
FILL	BLACK	SOFT	0	10
SANDY CLAY	BROW	MEDIUM	25	25
SANDY CLAY	GRAY		25	35
SANDY CLAY/GRAVEL	GRAY	SOFT	35	55
SAND/GRAVEL	GRAY	MEDIUM	55	65
SANDY CLAY	GRAY	SOFT	65	80
SANDY CLAY	GRAY	SOFT	80	145
CLAY/GRAVEL	GRAY	HARD	145	200
SANDY CLAY	GRAY	SOFT	200	240
CLAY	GRAY	HARD	240	245
GRAVEL	GRAY	MEDIUM	245	248
GRAVEL/ROCKS	GRAY	HARD	248	249
DECOMPOSED LIMESTONE	GRAY	MEDIUM	249	285
LIMESTONE	TAN	HARD	285	294
LIMESTONE	TAN	HARD	294	320
SANDSTONE	WHITE	MEDIUM	320	367
SANDSTONE	WHITE	MEDIUM	367	405
SANDSTONE/SHALE	WHT/G	HARD	405	425
SANDSTONE	WHITE	MED-HRD	425	439

Static Water Level 144 ft. from Date 2003/02/05

PUMPING LEVEL (below land surface)

153 ft. after 1 hrs. pumping 400 g.p.m.

Well Head Completion

Pitless adapter mfr PUMP HOUSE Model

Casing Protection ✔ 12 in. above grade

At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ✔ Yes No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	294	11	Y

Nearest Known Source of Contamination

120 ft. direction SW type BOW

Well disinfected upon completion? ✔ Yes No

Pump ✔ Not Installed Date Installed N

Mfr nam

Model HP Volts

Drop Pipe Length ft. Capacity g.p.m

Type

Any not in use and not sealed well(s) on property? Yes ✔ No

Was a variance granted from the MDH for this Well? Yes ✔ No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

M.G.S. NO. 4223.

USGS Quad New Market Elevation ~~1101~~ 1113

Aquifer: OPCJ Alt Id: 85-6121

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 73646

License Business Name

Name of Driller POHLKAMP, D.

Report Copy

Unique No. 00451825

County Name Scott

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2006/02/16

Entry Date 1989/07/10

Township Name	Township	Range	Dir	Section	Subsection
	113	21	W	28	BBACC

Well Name NEW MARKET 2

Well Owner's Name NEW MARKET 2

NEW MARKET MN 55054

Contact's Name CITY OF NEW MARKET
601 MAIN ST
NEW MARKET MN 55054

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
FILL	VARIE	SOFT	0	5
TOPSOIL	BLACK	SOFT	5	10
SANDY CLAY	BROW	SOFT	10	25
SANDY CLAY	GRAY	SOFT	25	45
COARSE SANDY & GRAVEL	GRAY	SOFT	45	50
SANDY CLAY & ROCK	GRAY	MEDIUM	50	65
GRAVEL & CLAY LAYERS	GRAY	MEDIUM	65	75
SANDY CLAY	GRAY	MEDIUM	75	100
SANDY CLAY & GRAVEL LA	GRAY	MEDIUM	100	145
SANDY CLAY	GRAY	MEDIUM	145	210
COARSE SAND & GRAVEL	GRAY	MEDIUM	210	214
SANDY CLAY	GRAY	MEDIUM	214	245
DECOMPOSED ROCK & GR	GRY/R	HARD	245	270
LIMESTONE	GRN/G	HARD	270	300
LIMESTONE & SANDSTONE	GRAY	HARD	300	366
JORDAN SANDSTONE	WHITE	SOFT	366	433
ST. LAWRENCE	GRAY	HARD	433	435

REMARKS, ELEVATION, SOURCE OF DATA, etc.

M.G.S. NO.2877.

USGS Quad New Market Elevation 1125
Aquifer: OPCJ Alt Id: 85-6121

Report Copy

Well Depth 435 ft. Depth Completed 435 ft. Date Well Completed 1988/07/29

Drilling Method Non-specified Rotary

Drilling Fluid Bentonite

Well Hydrofractured? Yes No
Fro ft. to ft.

Use Community Supply (municipal)

Casing Drive Shoe? Yes N Hole Diameter

Casing Diameter 12 in. t 290 ft Weight(lbs/ft)

Screen N Open Hole From 290 ft. to 435 ft.

Make Type

Static Water Level 150 ft. from Land surface Date 1988/07/29

PUMPING LEVEL (below land surface)
165 ft. after 12 hrs. pumping 500 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ✔ 12 in. above grade
At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ✔ Yes No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	290	260	S

Nearest Known Source of Contamination
300 ft. direction N type
Well disinfected upon completion? ✔ Yes No

Pump ✔ Not Installed Date Installed N
Mfr nam
Model HP Volts
Drop Pipe Length ft. Capacity g.p.m
Type

Any not in use and not sealed well(s) on property? Yes ✔ No

Was a variance granted from the MDH for this Well? Yes No

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 71536
License Business Name
Name of Driller ROB/MAURICE

HE-01205-06 (Rev. 9/96)

Unique No. 00680569

County Name Scott

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2005/03/11

Entry Date 2002/12/26

Township Name	Township	Range	Dir	Section	Subsection
	113	21	W	27	CAAADC

Well Name ELKO 3

Contact's Name CITY OF ELKO
26518 FRANCE AV
ELKO MN 55020

Well Owner's Name ELKO 3

ELKO MN 55020

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
SAND/GRAVEL	BROW	SOFT	0	20
CLAY/GRAVEL	GRAY	MEDIUM	20	70
CLAY/GRAVEL	BROW	MEDIUM	70	80
CLAY	GRAY	MEDIUM	80	130
SANDY/CLAY	GRAY	MEDIUM	130	160
CLAY/ROCKS	GRAY	HARD	160	190
SANDY/CLAY	GRAY	HARD	190	275
CLAY/GRAVEL	GRAY	HARD	275	290
GRAVEL	BROW	MEDIUM	290	320
LIMESTONE	GRAY	HARD	320	330
LIMESTONE	GRAY	HARD	330	417
SANDSTONE SHALE LAYER	WHITE	MEDIUM	417	422
SANDSTONE SHALE LAYER	WHITE	MEDIUM	422	525

REMARKS, ELEVATION, SOURCE OF DATA, etc.

GAMMA LOGGED 2-27-2003. M.G.S. NO. 4216.

USGS Quad New Market Elevation 1151

Aquifer: OPCJ Alt Id: 4216

Report Copy

Well Depth 525 ft. Depth Completed 525 ft. Date Well Completed 2002/12/23

Drilling Method Dual Rotary

Drilling Fluid Bentonite

Well Hydrofractured? Yes ✔ No

Fro ft. to ft.

Use Community Supply (municipal)

Casing Drive Shoe? ✔ Yes N

Casing Diameter Weight(lbs/ft)

20 in. t 75 ft

12 in. t 330 ft

Hole Diameter

in. t 75 ft

in. t 330 ft

in. t 525 ft

Screen N Open Hole From 330 ft. to 525 ft.

Make Type

Static Water Level 184 ft. from Land surface Date 2002/12/11

PUMPING LEVEL (below land surface)

186 ft. after 1 hrs. pumping 250 g.p.m.

Well Head Completion

Pitless adapter mfr Model

Casing Protection ✔ 12 in. above grade

At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ✔ Yes No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	330	13.25	Y

Nearest Known Source of Contamination

100 ft. direction S type BOW

Well disinfected upon completion? Yes No

Pump ✔ Not Installed Date Installed N

Mfr nam

Model HP Volts

Drop Pipe Length ft. Capacity g.p.m

Type

Any not in use and not sealed well(s) on property? Yes ✔ No

Was a variance granted from the MDH for this Well? Yes ✔ No

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 71536

License Business Name

Name of Driller DAN/ED

HE-01205-06 (Rev. 9/96)

Unique No. 00594234

County Name Scott

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2005/03/11

Entry Date 1998/04/29

Township Name	Township	Range	Dir	Section	Subsection
	113	21	W	27	BDDC

Well Depth 521 ft. Depth Completed 521 ft. Date Well Completed 1997/07/03

Well Name ELKO 2

Drilling Method Non-specified Rotary

Contact's Name ELKO 2

ELKO MN 55020

Drilling Fluid Bentonite

Well Hydrofractured? Yes No

Fro ft. to ft.

Use Community Supply (municipal)

Contact's Name CITY OF ELKO
26518 FRANCE AV
ELKO MN 55020

Casing Drive Shoe? Yes ✔ N

Hole Diameter
0 in. t 53 ft
0 in. t 326 ft
0 in. t 521 ft

Casing Diameter Weight(lbs/ft)
20 in. t 53 ft
12 in. t 326 ft

Screen N Open Hole From 326 ft. to 521 ft.

Make Type

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
SANDY CLAY	BROW		0	29
CLAY	GRAY		29	41
SAND & GRAVEL	GRAY		41	51
CLAY & ROCKS	GRAY		51	72
CLAY & ROCKS	BROW		72	98
SANDY CLAY	BROW		98	105
CLAY	BROW		105	113
SAND	BROW		113	117
CLAY	BROW		117	140
CLAY	GRAY		140	179
SAND	GRAY		179	186
CLAY	GRAY		186	198
SANDY CLAY	GRAY		198	210
CLAY	GRAY		210	221
SANDY CLAY	GRAY		221	284
CLAY	GRAY		284	314
LIMESTONE	TAN		314	417
SANDSTONE	WHITE		417	464
SANDSTONE	TAN		464	521

Static Water Level 181 ft. from Land surface Date 1997/07/03

PUMPING LEVEL (below land surface)
198 ft. after 24 hrs. pumping 500 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ✔ 12 in. above grade
At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ✔ Yes No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	326	20	Y

Nearest Known Source of Contamination
ft. direction type

Well disinfected upon completion? ✔ Yes No

Pump Not Installed Date Installed Y
Mfr nam INGERSOL-RAND
Model 8L15-4-M6 HP Volts
Drop Pipe Length ft. Capacity 300 g.p.m
Type S

Any not in use and not sealed well(s) on property? Yes ✔ No

Was a variance granted from the MDH for this Well? Yes ✔ No

USGS Quad New Market Elevation 1143
Aquifer: OPCJ Alt Id: 84-6141

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 71536
License Business Name
Name of Driller ROBBIE/DAN

Report Copy

HE-01205-06 (Rev. 9/96)

Plumber	Dick Thompson	612-750-4188	Elko New Market
Backhoe	Dick Thompson	612-750-4188	Elko New Market
Chemical Feed	Hawkins Chemical	612-331-9100	Minneapolis
Meter Repair	US Filter	800-752-8112	Eden Prairie
Generator	Interstate Power Systems	800-222-6060	Minneapolis
Valves, Pipes, Fittings	Minnesota Pipe & Equipment	651-463-6090	Farmington

F. NOTIFICATION PROCEDURES

Table F-1 - Emergency Contact Telephone Listing

Table F-2 - Incident Assessment Team

Position	Name	Home Telephone	Work Telephone
Mayor	Kent Hartzler	651-465-4152	651-465-0505
Council Member	Jason Ponsonsby		
Council Member	Carolyn Miller		
Council Member	Josh Storlie		
Council Member	Dennis Melgaard		
Clerk-Treasurer	Patricia Nutt		
State Incident Duty Officer			800-422-0798
County Emergency Director	Dave Menden		952-496-8181
Police Chief	Richard Jensen		952-461-2777
Fire Chief	Todd Friedges		
Sheriff	Kevin Studnicka	952-496-8318	911
Water System Operator	Martin Deutsch		952-461-2777
Alternate Water System Operator	Cory Schweich		
School Superintendent	Jim Rouse		952-758-1701
Ambulance	Northfield		911
Hospital	Northfield	507- 646-1000	911
Power Company	Xcel Energy		1-800-481-4700
Highway Department	Lezlie Vermillion		952- 496-8346
Telephone Company	Integra		952-226-7000
MPCA Groundwater Division			651-296-7333
MRWA Technical Services	Water System Coord.	1-800-367-6792	1-800-367-6792
Minnesota Dept. of Health (Community Engineer)	Chad Kolstad	651-643-2103	651-215-0770

Public Information Plan —
During what has been determined to be a water system emergency by the City Council or designee (Mayor), notification of the personnel identified in tables F-1 and F-2 will be notified by telephone. Following notification, the situation will be analyzed by the Incident Assessment Team, and the next course of action will be determined based on the available information. While the City is working to reinstate the water service, the public shall be notified by the media spokesperson or alternate as to:

- The basis for the Water Emergency/Cause (if known)

Elko

52.12 Emergency Regulations, Conservation.

(A) *Odd-even restriction.* Use of the city water supply system for lawn or garden sprinkling or other irrigation shall be limited to an odd-even schedule corresponding to property address effective each year from May 1 to September 30.

(B) *Exception.* The watering of new seed or sod for a period of two weeks from the date of seeding or sodding shall be excepted from the odd-even water use restrictions provided under division (A). This exception for seeded or sodded areas shall not apply to previously established areas of the same lot.

(C) *Emergency Restrictions.* Whenever the City Council determines it is in the public interest, the City Council may, by resolution, further limit the use, times and hours during which water may be used from the city water supply system, by giving notice by posting in the City Hall and at such public places as the City Council may direct.
(Ord. 89, passed 2-5-2001; Am. Ord. 141, passed 5-11-2004)

New Market

6-3-9: Conservation and Emergency Measures:

A. Conservation Measures:

1. Odd-Even Restriction: Use of the city water supply system for lawn or garden sprinkling or other irrigation shall be limited to an odd-even schedule corresponding to property address effective each year from May 1 to September.
(Ord. 165, 7-9-2003; amd. 2004 Code)

2. Exception: The watering of new seed or sod for a period of two (2) weeks from the date of seeding of sodding shall be excepted from the odd-even water use restrictions provided under subsection A1 of this section, but not the restriction on hours of sprinkling or irrigation. This exception for seeded or sodded areas shall not apply to previously established areas of the same lot.

B. Emergency Restrictions: Whenever the city council determines it in the public interest, the city council may, by resolution, further limit the use, times and hours during which water may be used from the city water supply system, by giving notice by publication or by posting in the city hall and at such public places as the city council may direct.
(Ord. 165, 7-9-2003)

Volume 8, Issue 5

May 2008

City of Elko New Market

May Newsletter

"A community has to have the capacity to envision a future they want, and not just the one they are likely to get."-- Unknown

Elko/New Market Fire Rescue Days
June 28th and 29th

Make sure you mark your calendars for this year's Fire Rescue Days June 28th and 29th.

Saturday, June 28th will consist of the Kiddie Parade followed by the Community Parade. There will be fun, food and games at Wagner Park for the whole family.

Saturday evening the Fireman's Dance will be held at the fire hall, featuring live music by Smokescreen!

On Sunday June 29th, bring your appetite to the N.E.W. Lions pancake/sausage breakfast at the fire hall.

Times of the events will be posted around town and on the website in the near future.

We hope you can join us for the fun-filled weekend!

If you are interested in being in the parade, please contact Jodi at jomlken@aol.com

ANIMAL CONTROL ISSUES
Call

MN Critter Getters

at

952-873-6611

If you have lost an animal, check out MN Critter Getters Website at:

www.mncrittergetter.com

for information on animals currently impounded.

Scott County Historical Society

Scott County Historical Society will be having a traveling exhibit focusing on Scott County's Main Streets and their contribution to Minnesota's history.

The traveling exhibit will be at the Elko New Market Area Hall, 601 Main Street, Elko New Market from June 23rd to June 30th.

All residents are invited to attend this exhibit.

Any questions regarding the exhibit should be directed to the Scott County Historical Society.

Yard Clean Up Day and Spring Clean Up Day

Lakeville Sanitation and Waste Management will be doing a FREE pick up **FOR Lakeville Sanitation and Waste Management CUSTOMERS ONLY** of:

- Leaves
- Grass clippings
- Branches in 3 ft. lengths bundled

Use compostable brown paper bags for leaves and grass clippings. Please -no plastic bags.

Bags must be at curbside by 7:00 a.m. on Saturday, May 31, 2008 for pick up.

SPRING CLEAN UP DAY

When: Saturday, June 7, 2008 8:00 a.m. to 12:00 noon
Where: Elko New Market Area Hall, 601 Main Street

Charge: $30/car $40/pickup or trailer (8' or less)

Who: Open to residents of Elko New Market Community

Things you can bring include:

- Furniture
- Household garbage including house wares, toys, clothing, bedding
- Scrap Metal
- Air Conditioners, Refrigerators, Microwave Ovens, Other Household Appliances
- Mattress and Box Springs
- Tires with or without rims **(no tractor tires are allowed)**
- Consumer Electronics: Computers, computer Monitors, Peripherals (keyboards, mice speakers, etc.), Printers, Cell Phones, DVD & VCR Players, Fax Machines, Televisions and Console TVs.
- **ABSOLUTELY NO PROPANE TANKS OR HAZARDOUS WASTE** (i.e. batteries, used motor oil, pesticides, paints, etc.) **CONSTRUCTION DEBRIS OR YARD WASTE WILL NOT BE ACCEPTED.**

Fire and Police Department Calls

The City of Elko New Market Fire Department consists of 27 volunteer fire fighters and the Police Department consists of a full-time Police Chief and 6 part-time police officers serving the community. Scott County Sheriff's Department also serves the community during the time the City's part-time Police Department is not on duty. The following charts shows the number of times and types of incidents the Elko New Market Fire Department, Police Department and Scott County Sheriff's department have responded to in the community through March 31, 2008.

Fire Department

Month	Accident	Fire	Medical	Total
Jan 08	5	5	9	19
Feb 08	7	3	7	17
Mar 08	5	7	6	18
Total	22	13	19	54

Scott County Sheriff's Department

Year-to-date	Number of Calls
Thru 3/31/08	105

Police Department

Type of Offense Thru 3/31/08	Number of occurrences
Alarms	5
Assist to other agencies	25
Assist to public	23
Crashes	21
Damage to property	0
DWI's	10
Domestics	6
Forfeited vehicles	3
Medicals	10
Traffic stops/miscellaneous activity	227

Elko New Market Parks Department News

May, 2008

It's going to be a busy summer for the Parks Department!

Here are some of the programs and projects that the Parks Commission has approved:

- New playground equipment for Wagner Park – Installation to begin in mid-May
- A new, 62-space paved parking lot at Wagner Park – Completion date is June 26th
- A new paved bike/hike trail near Windrose Park
- A new baseball backstop and seating at Wagner Park
- Expanded Sports Camps, along with the return of the popular SkateBoard Camp from 3rd Lair – See registration form on the City's Website.
- A soccer program, through New Prague Schools Community Education, has been added starting this August – Watch for details!
- Bringing the Scott County Historical Society's Sesquicentennial traveling exhibit, "From Main Street to Statehood" to ENM Area Hall the Week of June 23rd – Watch for information!
- Watch for new, expanded adult sports programming in the future through our new agreement with New Prague Schools Community Education!

However, the main focus this summer will be the completion of the new Elko New Market Parks and Trails Plan, which will be the blueprint for development of the City's parks and trails system. The plan will identify areas for new parks, the activities for those parks, and the estimated costs to develop those parks.

If you would like more information, or a presentation to your neighborhood group, please call City Hall at 952-461-2777 or e-mail Assistant City Administrator Mark Nagel at

mnagel@ci.enm.mn.us.

Take time to enjoy YOUR city parks and trails this summer!

Post Office News - Mailbox Improvement Week

Each year, the Postal Service designates the third full week of May as Mailbox Improvement Week recommending customers to examine and where necessary, improve the appearances and function of the mailboxes (this includes but not limited to water proofing the mail box). If you have any questions, please contact New Market Post Office at 952 461-2150.

Watering Ban

The City of Elko New Market's Watering Ban Ordinance states there is an odd-even restriction on use of the city water supply system for lawn or garden sprinkling or other irrigation. This ordinance states watering restriction shall be limited to an odd-even schedule corresponding to property address effective every year from May 1 to September 30. Lawn or garden sprinkling or other irrigation is not permitted between the hours of 11:00 am and 6:00 p.m. For a copy of complete ordinance, please contact the Elko New Market Area Hall at 952-461-2777.

Weed Ordinance

The City of Elko New Market would like to remind our residents that the City has a Weed Control Ordinance. City code states in summary no property owner within city limits shall permit any weed to grow to a height exceeding twelve inches (12").

Any resident not complying with this City ordinance shall be in violation of city code and subject to a petty misdemeanor.

For a complete copy of Weed control Ordinance please contact the Elko New Market Area Hall at 952-461-2777.

Burning Permits Required

Recreational fires and commercial fire pits require a Burning Permit issued by the City. There is no charge for the permit, but a Burning Permit Application must be completed and submitted to the City for approval prior to any burn

A recreational fire is an area of no more than a three foot (3') diameter circle (measured from the inside of the fire ring or border).

Contact City Hall at 461-2777 for any questions concerning recreational fires.

Any fire that **DOES NOT MEET** the requirements of a recreational fire pit will be required to obtain a General Open Burning Permit Application. This Open Burning Permit can be obtained by contacting the Elko New Market Fire Chief at 612-290-0430.

Any person violating any provision of this ordinance may be found guilty of a misdemeanor.

To receive a complete copy of the Open Burning Ordinance, please contact the New Market Area Hall, 601 Main Street, Elko New Market, MN at 952-461-2777.

Skate Park Update

In 2006, with the support of local residents, the City installed a skate park in Wagner Park. The skate park was built to give the adolescents and teenagers in the community a place to enjoy outdoor skateboard activities. Since the opening of the skate park, it has been a popular attraction for skateboarders. In fact, the City has received numerous compliments regarding the skate park. However, there have been ongoing issues at the skate park since its opening. These include vandalism, littering, behavior issues and disregard for skate park rules.

Since the skate park opened for the season on May 2, it has been vandalized and litter has already become a problem. The City is taking steps to address these issues and protect the facility. Due to the lack of respect for the facility, the skate park will be closed through Memorial Day. Violators of the closing notice will be prosecuted. Any additional vandalism, litter or disregard for facility rules will result in an extension of the closing. Ongoing issues will result in closing the facility for the entire season. The skate park needs to be policed by the people who use it. Failure of skaters to demonstrate that they can respect the facility may jeopardize its future.

If anyone has information regarding the most recent vandalism at the skate park, please contact the Elko New Market Police Department at 952-461-6068.

Putting In A Sprinkler System Or Deck

Building permits are required on sprinkler systems and decks. Building Permit Applications and handouts on sprinkler systems and decks are available on Municipal Inspections website at www.minspections.com.

The completed application can be returned to the Building Inspections Department any of the following ways:

- Put in drop box located in front of Elko New Market Area Hall.
- Put in drop box located in front of library .
- Put in drop box located in front of Elko Post Office.
- Mail using the regular US Postal System.
- Drop off in person at the Area Hall.

Questions contact Municipal Inspections at 952-461-4777.

Park Pavilions Available To Rent

The Wagner & Elko Baseball Park Pavilion buildings are available for rent during the summer months.

For further details or to rent the pavilion, please contact:

Elko New Market Area Hall
601 Main Street
Email: info@ci.enm.mn.us
Voice: 952-461-2777
Fax: 952-461-2782

City of Elko New Market

Elko New Market Area Hall
601 Main Street
P.O. Box 99
New Market, MN 55054

Phone: 952-461-2777
Fax: 952-461-2782
E-mail: info@ci.enm.mn.us

WE'RE ON THE WEB
www.ci.elko.mn.us

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Postal Patron

If you are willing to help with the June 7 Spring Clean Up, please contact Mark Nagel, Assistant City Administrator at 952-461-2777.

MAY 2008

22	City Council Workshop City Council Business Meeting	6:30 pm 7:30 pm
26	Memorial Day Observed	City Offices Closed
31	Free Grass/leaves/branch pick up	

JUNE 2008

3	Planning Commission	7:00 pm
7	Spring Clean Up Day	8:00 am to Noon
12	City Council Workshop City Council Business Meeting	6:30 pm 7:30 pm
10	Parks Commission	5:00 pm
26	City Council Workshop City Council Business Meeting	6:30 pm 7:30 pm

City of Elko New Market

Volume 6, Issue 7

July 2008

July Newsletter

2008 ELECTIONS

In Fall 2008, the City of Elko New Market will hold our City Elections. This year there will be four positions open for re-election. These include: one mayor and three council members positions. The mayor position is for a two-year term. One (1) council position will be a two (2) year term to fulfill a four (4) year term. Two (2) council positions will be four (4) year terms.

If you are interested in running for any of the above city offices, please contact the Area Hall at 952-461-2777 for further details.

ELECTION OFFICIALS

The City of Elko New Market is looking for individuals interested in becoming election officials.

If you have any questions concerning becoming an election official or if you would like to sign up, contact City Hall at 952-461-2777.

Using the 911 System

911 is the emergency number for Elko New Market. You can call this number 24 hours a day for police, fire or emergency medical services. It can save you valuable time in an emergency. We want you to know how and when to call 911 in case you have an emergency.

Call 911 when...

- police, fire and medical response is needed.
- you see fire or smoke.
- life and/or property are in danger.
- a crime is being committed.
- an ambulance is necessary.

Anyone can call 911

Children should be taught to call 911 for police, fire or medical help. A preprogrammed speed dial button may be helpful for those with vision impairments. The hearing-impaired can use a TDD machine.

How to call 911

To call 911 from a home phone or a simple business phone, pick up the phone and press the numbers, 911.To call 9-1-1 from a Centrex or PBX business extension, obtain an outside line (usually with "9"), and then press the numbers, 911. To call 911 from a pay phone, no money is needed; simply press the numbers 911. To call 911 from a cellular phone or mobile phone, press the numbers 911. No location information will be displayed.

Providing information to the 911 dispatcher

Try to remain calm when explaining the emergency and speak clearly. Tell the 911 dispatcher:

- your name
- the location of the emergency
- the type of emergency

The 911 dispatcher will then ask you more questions. Provide the answers as best you can. Stay on the telephone until the dispatcher says it is okay to hang up.

Remember, don't call 911 to ask questions or to play a joke.

Post your address and phone number by each telephone so anyone will be able to give the vital information needed for a quick response.

Make sure your house number is visible from the street.

AFTER HOURS EMERGENCIES

Any Elko New Market resident experiencing an emergency, after Elko New Market City Offices have closed, should contact 911 immediately. Scott County Dispatch will contact the appropriate city personnel. Some examples of emergencies are:

- **no water**
- **sewer backup**
- **flooding**

City Office Hours are: 8:00 am to 4:30 pm Monday through Friday. If you have an emergency during regular City Office hours, contact City Hall at 952-461-2777.

MINNESOTA FIREWORKS LAWS

- Sale, possession and use of some *nonexplosive* and *nonaerial* consumer fireworks is now permitted in Minnesota. Examples of fireworks that are now legal per MN statute 624.20:
- Wire or wood sparklers (not more than 100 gms. of mixture per item)
- Other sparkling items which are nonexplosive and nonaerial and contain 75 grams or less of chemical mixture per tube or a total of 200 grams or less for multiple tubes and include: Cylindrical fountain/Cone fountain/Illuminating Torch/ Wheel/Ground spinner/Flitter sparkler or Flash/Strobe.

Illegal fireworks:

Any fireworks that are explosive and any fireworks that are aerial
Firecrackers – any size/Ladyfingers/Sky rockets/Bottle rockets/Missile type rockets/
Helicopters, aerial spinners, planes, UFO's/Roman Candles/Mines or shells/Chasers/Parachutes/
1.3G Display (special or class B) Fireworks/Aerial shells/
Theatrical pyrotechnics (see MN Stat. 624.20 to 624.25)

Operating outside MN Stat. 624.20 is a violation of the law and is subject to not more than 90 days in jail or not more than $700.00, or both.

If the violation involves more than 35 pounds of gross container weight, you are subject to not more than one year in jail, and not more than $3,000.00 fine, or both.

YOU MUST BE 18 YEARS OLD TO PURCHASE FIREWORKS
For more information and a detailed list of fireworks contact the State Fire Marshal by email at firecode@state.mn.us or website www.fire.state.mn.us

Water Use Restrictions Will Be ENFORCED

The City of Elko New Market has water use restrictions limiting the use of city water supply. Residents are restricted to an odd-even schedule corresponding to property address effective each year from May 1 to September 30. Please follow the watering rules.

The City of Elko New Market will be actively enforcing the water use restrictions within city limits. Residents are reminded that violation of the water use restrictions is a misdemeanor offense.

Any person violating any provision of this ordinance may be found guilty of a misdemeanor. Each day shall be a separate offense.

If you have questions regarding the water use restrictions or would like a copy of the complete ordinance, contact City Hall at 952-461-2777.

Once again the Fire Rescue Days was a great success. Each year the celebration gets bigger and better. Be sure to go the city's website for more pictures of the Fire Cruz and Parade.

FIRE RESCUE DAYS
CRUZ NIGHT

2008 Fire Rescue Days Parade

Residents found lots of fun, food and activities at Wagner Park following the parade.

CITY OF ELKO NEW MARKET

601 Main Street
PO Box 99
Elko New Market, MN 55054

Phone: 952-461-2777
Fax:952-461-2782
E-mail: info@ci.enm.mn.us

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Post Office News
Hunting and Conservation Stamp (Federal Duck Stamp) Available at New Market Post Office 55054.
Happy Independence Day.

Postal Patron

JULY 2008

1	Planning Commission	7:00 pm
4	Independence Day	City Offices Closed
9	Parks Commission Meeting	5:00 pm
10	City Council Workshop	6:30 pm
	City Council Business Meeting	7:30 pm
24	City Council Workshop	6:30 pm
	City Council Business Meeting	7:30 pm

AUGUST 2008

5	Planning Commission	7:00 pm
13	Parks Commission Meeting	5:00 pm
14	City Council Workshop	6:30 pm
	City Council Business Meeting	7:30 pm
28	City Council Workshop	6:30 pm
	City Council Business Meeting	7:30 pm

Elko New Market Drinking Water Survey

(Review each question and complete all information requested or mark an "x" in the appropriate response.)

Household Information

1. What street do you live on?

2. How many persons live in your house? Choose the number that, on average, sleep at the house 4 or more nights each week.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 or more

3. Please indicate which of the following you have at your home.

☐ Swimming Pool (not plastic kiddie pools) ☐ Automated irrigation system - spray type (not hoses and sprinklers)

☐ Automated irrigation system - drip type ☐ Hot tub (not jetted bathtub)

4. How often would you prefer to receive your water bill?

☐ Monthly ☐ Quarterly

Water Quality Issues

1. Please indicate your family's general level of satisfaction with the quality of Elko New Market tap water. Please rate the water as you would if you had no in-home treatment or filtration system. Please disregard cost issues for now, we'll come back to that later.

☐ Very satisfied – water tastes and performs great ☐ Fairly satisfied – water tastes and performs fine

☐ Just satisfied – water is so-so ☐ Dissatisfied – water tastes and/or performs poorly

☐ Very dissatisfied – water tastes and/or performs badly

2. If you are dissatisfied, please choose all responses that show what your family does not like about the water (again, as if you had no in-home treatment)

☐ Taste and/or odor ☐ Appearance (color, cloudiness, sediment, etc.) ☐ Stains plumbing fixtures

☐ Discolors laundry ☐ Uses up a lot of soap

Other (please specify)

3. If dissatisfied, check all measures you take to manage things you don't like about the water

- ☐ We use a water filter
- ☐ We have a water softener
- ☐ We buy bottled water or other substitute for the tap water
- ☐ Other measures

Other (please specify)

4. How much do you estimate you spend each month to deal with any taste, odor, and/or color dissatisfaction with the tap water? Include filter replacements, bottled water or other, etc., but do not include softener purchase, repairs, or salt?

- ☐ $0 to $10
- ☐ $10 to $25
- ☐ $25 to $40
- ☐ More than $40

5. What INCREASE in monthly water bills (over your current average) would your family be willing to pay to improve tap water taste, odor, and appearance and reduce staining? Assume you wouldn't need to filter or buy bottled water. If you have a softener, answer assuming you would still use your softener.

- ☐ $0 per month
- ☐ $10 per month
- ☐ $20 per month
- ☐ $30 per month
- ☐ $40 per month
- ☐ $50 per month

Water Pressure (Quantity)Issues

1. Rate your level of satisfaction with the QUANTITY (pressure) of your water

- ☐ Pressure is too high – pipes hammers, faucet sprays or splashes
- ☐ Pressure is good – shower, faucets and sprinklers work great
- ☐ Pressure is low – takes too long to fill the tub, shower is weak

RETURN THIS FORM TO:

Drop in any of the City drop boxes located at:

In front of City Hall, 601 Main Street
In front of New Market Library
In front of Elko Post Office

Mail to: City of Elko New Market
PO Box 99
Elko New Market, MN 55054

Fax to: 952-461-2782
Email: info@ci.enm.mn.us

2008 Certification Form

Name of System: Elko New Market **PWSID:** 1700029

The information in the attached Consumer Confidence Report (CCR) is accurate and has been distributed to customers in the following manner. You must choose at least one of the following option(s):

☒ Published the **entire** CCR in one or more local community newspapers with a comment that the CCR is not being directly mailed to all customers but that a copy is available upon request (provided name and number of a contact person for customers to call and request a copy of the CCR).

Return a copy or newspaper clipping of the CCR to MDH. List newspaper(s) and date(s) of publication: New Prague Times - May 7, 2009

☐ Individually distributed to all customers. If the distribution of the CCR was included with a water bill, efforts must have been made to reach customers who do not receive water bills, (such as apartment tenants, nursing home residents, etc.). This can be done by publicizing the availability of the CCR in the media, posting in public places, delivering multiple copies of the CCR for distribution by single-biller customers, delivering CCR to community organizations, posting on the internet, and/or including within the CCR a request for recipients to share information with non-billing customers.

If posted on the Internet, list Web Site Address _____

COMPLETE THE FOLLOWING:

Signature: Patricia Nutt Date: 5-7-09

Name Printed: Patricia Nutt

Title: City Clerk Phone Number: (952) 461-2777

Return this form, along with a copy or newspaper clipping of the CCR (Consumer Confidence Report), **by July 1, 2009**. Use the enclosed envelope or mail them to Kathy Russell at this address:

Or Fax
651/201-4701

Minnesota Department of Health
Drinking Water Protection Section
P. O. Box 64975
St. Paul, Minnesota 55164-0975

PLEASE NOTE: Although MDH sent a CCR to your system, we need a **"final"** copy of your CCR for our records. This way we know your system distributed it to your customers – whether you reformatted the CCR, or if you simply added a contact name/phone number for your system on the CCR – you must return a copy of both the CCR and this form to MDH.

Failure to produce and distribute an annual Consumer Confidence Report and submit a copy of the report and Certification Form to the MDH by July 1, 2009, will result in enforcement actions, which may include fines, from the U.S. Environmental Protection Agency and/or the MDH.

If you need another copy of the report provided to you by the Minnesota Department of Health, call the Drinking Water Message Center: 651/201-4650 in the Twin Cities Metropolitan Area or toll-free at 1/800/818-9318.

CONSUMER CONFIDENCE REPORT

PWSID: 1700029

City of Elko New Market
2008 Drinking Water Report

The City of Elko New Market is issuing the results of monitoring done on its drinking water for the period from January 1 to December 31, 2008. The purpose of this report is to advance consumers' understanding of drinking water and heighten awareness of the need to protect precious water resources.

Source of Water

The City of Elko New Market provides drinking water to its residents from a groundwater source: four wells, ranging from 435 to 525 feet deep, that draw water from the Prairie Du Chien-Jordan aquifer.

The Minnesota Department of Health has determined that the source(s) used to supply your drinking water is not particularly susceptible to contamination. If you wish to obtain the entire source water assessment regarding your drinking water, please call 651-201-4700 or 1-800-818-9318 (and press 5) during normal business hours. Also, you can view it on line at www.health.state.mn.us/divs/eh/water/swp/swa.

Call 952/461-2777 if you have questions about the City of Elko New Market drinking water or would like information about opportunities for public participation in decisions that may affect the quality of the water.

Results of Monitoring

This report contains information that there was an exceedance of a federal standard during the year 2008 for radiochemicals. Some other contaminants were detected in trace amounts that were below legal limits. The table that follows shows the contaminants that were detected in trace amounts last year. (Some contaminants are sampled less frequently than once a year; as a result, not all contaminants were sampled for in 2008. If any of these contaminants were detected the last time they were sampled for, they are included in the table along with the date that the detection occurred.)

Key to abbreviations:
MCLG—Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MCL—Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MRDL—Maximum Residual Disinfectant Level.

MRDLG—Maximum Residual Disinfectant Level Goal.

PWSID: 1700029

AL—Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirement which a water system must follow.

90th Percentile Level—This is the value obtained after disregarding 10 percent of the samples taken that had the highest levels. (For example, in a situation in which 10 samples were taken, the 90th percentile level is determined by disregarding the highest result, which represents 10 percent of the samples.) Note: In situations in which only 5 samples are taken, the average of the two with the highest levels is taken to determine the 90th percentile level.

pCi/l—PicoCuries per liter (a measure of radioactivity).

ppb—Parts per billion, which can also be expressed as micrograms per liter (µg/l).

ppm—Parts per million, which can also be expressed as milligrams per liter (mg/l).

N/A—Not Applicable (does not apply).

Contaminant (units)	MCLG	MCL	Level Found		Typical Source of Contaminant
			Range (2008)	Average /Result*	
Fluoride (ppm)	4	4	.26-1.7	.96	State of Minnesota requires all municipal water systems to add fluoride to the drinking water to promote strong teeth; Erosion of natural deposits; Discharge from fertilizer and aluminum factories.
TTHM (Total trihalomethanes) (ppb) (08/21/2007)	0	80	N/A	1.7	By-product of drinking water disinfection.

During the year 2008, we had ongoing violations for Alpha Emitters and Combined Radium, however, results for both contaminants from samples collected at the treatment plants on November 17, 2008, were not detected. Our system has returned to compliance for alpha emitters and combined radium.

- Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
- Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.

PWSID: 1700029

Contaminant (units)	Level Found		Typical Source of Contaminant
	Range (2008)	Average/ Result*	
Radon (pCi/l) (04/27/2005)	N/A	432	Erosion of natural deposits.

*This is the value used to determine compliance with federal standards. It sometimes is the highest value detected and sometimes is an average of all the detected values. If it is an average, it may contain sampling results from the previous year.

Radon is a radioactive gas which is naturally occurring in some groundwater. It poses a lung cancer risk when gas is released from water into air (as occurs during showering, bathing, or washing dishes or clothes) and a stomach cancer risk when it is ingested. Because radon in indoor air poses a much greater health risk than radon in drinking water, an Alternative Maximum Contaminant Level (AMCL) of 4,000 picoCuries per liter may apply in states that have adopted an Indoor Air Program, which compels citizens, homeowners, schools, and communities to reduce the radon threat from indoor air. For states without such a program, the Maximum Contaminant Level (MCL) of 300 pCi/l may apply. Minnesota plans to adopt an Indoor Air Program once the Radon Rule is finalized.

Contaminant (units)	MRDLG	MRDL	****	*****	Typical Source of Contaminant
Chlorine (ppm)	4	4	.01-1	.29	Water additive used to control microbes.

****Highest and Lowest Monthly Average.
*****Highest Quarterly Average.

Contaminant (units)	MCLG	AL	90% Level	# sites over AL	Typical Source of Contaminant
Copper (ppm)	N/A	1.3	.24	0 out of 10	Corrosion of household plumbing systems; Erosion of natural deposits.
Lead (ppb)	N/A	15	3	0 out of 10	Corrosion of household plumbing systems; Erosion of natural deposits.

If present, infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. City of Elko New Market is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

PWSID: 1700029

Some contaminants do not have Maximum Contaminant Levels established for them. These unregulated contaminants are assessed using state standards known as health risk limits to determine if they pose a threat to human health. If unacceptable levels of an unregulated contaminant are found, the response is the same as if an MCL has been exceeded; the water system must inform its customers and take other corrective actions. In the table that follows are the unregulated contaminants that were detected:

Contaminant (units)	Level Found		Typical Source of Contaminant
	Range (2008)	Average/ Result	
Sodium (ppm)	24-230	230	Erosion of natural deposits.
Sulfate (ppm)	28.1-28.3	28.3	Erosion of natural deposits.

Compliance with National Primary Drinking Water Regulations

During the year, we failed to take a sample and/or submit information on Total Coliform Bacteria during the required testing period(s) of May 1, 2008 to May 31, 2008. Because we did not monitor or failed to monitor completely during the compliance period(s), we did not know whether Total Coliform Bacteria were present in your drinking water, and we are unable to tell you whether your health was at risk during that time.

During the year, we failed to take a sample and/or submit information on Chlorine during the required testing period(s) of May 1, 2008 to May 31, 2008. Because we did not monitor or failed to monitor completely during the compliance period(s), we did not know whether Chlorine were present in your drinking water, and we are unable to tell you whether your health was at risk during that time.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

PWSID: 1700029

In order to ensure that tap water is safe to drink, the U. S. Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium are available from the Safe Drinking Water Hotline at 1-800-426-4791.

PRINTERS AFFIDAVIT OF PUBLICATION

STATE OF MINNESOTA
ss.
COUNTY OF LE SUEUR

E. Charles Wann, being duly sworn, on oath says that he is the publisher or authorized agent and employee of the publisher of the newspaper known as the **The New Prague Times,** and has full knowledge of the facts which are stated below:

(a) The newspaper has complied with all of the requirements constituting qualification as a qualified newspaper, as provided by Minnesota Statute 331A.02, 331A.07, and other applicable laws, as amended.

(b) The printed Legal Notice T701: City of Elko New Market 2008 Drinking Water Report, which is attached was cut from the columns of said newspaper, and was printed out and published once (1) on Thursday, May 7, 2009. Printed below is a copy of the lower case alphabet from A to Z, both inclusive, which is hereby acknowledged as being the size and kind of type used in the composition and publication of the notice:

abcdefghijklmnopqrstuvwxyz

By E Charles Wann

Title: Publisher

Subscribed and sworn to before me on May 7, 2009.

Nina Catherine Gould

Notary Public

NINA CATHERINE GOULD
Notary Public-Minnesota
My Commission Expires Jan 31, 2011

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