TO: **Honorable Mayor and City Council**

FROM: **City Administrator Ron Johnson**

SUBJECT: **Public Hearing to Consider Adoption of Part II Wellhead Protection Plan Update**

MEETING DATE: **August 1, 2017**

BACKGROUND

The City of Cannon Falls has developed a wellhead protection plan for its drinking water supply wells. The wellhead protection plan details the locations of the potential contaminant sources within the wellhead protection area, identifies goals, objections, and action measures to address potential risks to groundwater quality, a plan to evaluate WHP plan implementation efforts by the City of Cannon Falls, and a Water Supply Contingency Plan in the event of a water system disruption.

Consistent with the MN Wellhead Protection Rule (part 4720.5350, subpart 4), a Public Hearing will be held to discuss comments from local units of government, and solicit comments from the public.

MN Rural Water Association and SEH have assisted the city with this updated plan (attached). Jennifer Ronnenberg from the MN Department of Health will be present to answer questions.

REQUESTED COUNCIL ACTION

Conduct and close the public hearing; approve a motion adopting the Part II Wellhead Protection Plan Update.

Attachment(s): Wellhead Protection Plan

Part II Wellhead Protection Plan Update

Potential Contaminant Inventory, Goals and Management Strategy

Cannon Falls, Minnesota

Public Water Supplier No. 1250001
SEH No. CANNO 128201 14.00

May 2017

FOR LOCAL GOVERNMENT UNIT REVIEW

This WHPP Part 2 has been submitted to local government units for review. The next step is a public hearing and receipt of comments. Any comments will be considered and the final plan submitted to MDH.

Glossary of Terms

Data Element. A specific type of information required by the Minnesota Department of Health to prepare a wellhead protection plan.

Drinking Water Supply Management Area (DWSMA). The area delineated using identifiable land marks that reflects the scientifically calculated wellhead protection area boundaries as closely as possible (Minnesota Rules, part 4720.5100, subpart 13).

Drinking Water Supply Management Area Vulnerability. An assessment of the likelihood that the aquifer within the DWSMA is subject to impact from land and water uses within the wellhead protection area. It is based upon criteria that are specified under Minnesota Rules, part 4720.5210, subpart 3.

Emergency Response Area (ERA). The part of the wellhead protection area that is defined by a one-year time of travel within the aquifer that is used by the public water supply well (Minnesota Rules, part 4720.5250, subpart 3). It is used to set priorities for managing potential contamination sources within the DWSMA.

Inner Wellhead Management Zone (IWMZ). The land that is within 200 feet of a public water supply well (Minnesota Rules, part 4720.5100, subpart 19). The public water supplier must manage the IWMZ to help protect it from sources of pathogen or chemical contamination that may cause an acute health effect.

Surface Water Contribution Area (SWCA). In a conjunctive delineation, the geographic area that may provide recharge to the aquifer within the well capture zone, attributed to: 1) the presence of a surface hydraulic feature; and 2) the runoff of precipitation or meltwater.

Wellhead Protection (WHP). A method of preventing well contamination by effectively managing potential contamination sources in all or a portion of the well's recharge area.

Wellhead Protection Area (WHPA). The surface and subsurface area surrounding a well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field (Minnesota Statutes, section 103I.005, subdivision 24).

Well Vulnerability. An assessment of the likelihood that a well is at risk to human-caused contamination, either due to its construction or indicated by criteria that are specified under Minnesota Rules, part 4720.5550, subpart 2.

Acronyms

CWI	County Well Index
DNR	Minnesota Department of Natural Resources
EPA	United States Environmental Protection Agency
IWMZ	Inner Wellhead Protection Management Zone
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MGS	Minnesota Geological Survey
MNDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MPARS	MNDNR Permitting and Reporting System (formerly known as SWUDS)
MPCA	Minnesota Pollution Control Agency
PLS	Public Land Survey
SWCA	Surface Water Contributing Area
SWCD	Soil and Water Conservation District
UMN	University of Minnesota
USGS	United States Geological Survey

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Part II Wellhead Protection Plan Update

Potential Contaminant Inventory, Goals and Management Strategy

Prepared for the City of Cannon Falls, Minnesota

1.0 Introduction

1.1 Background

The wellhead protection (WHP) plan for the City of Cannon Falls was prepared in cooperation with the Minnesota Department of Health (MDH) and the Minnesota Rural Water Association. It contains specific actions that the city will take to fulfill WHP requirements that are specified under Minnesota Rules, part 4720.5100 to 4720.5590. Also, the support that Minnesota state agencies, federal agencies, and Goodhue County will provide is presented to identify their roles in protecting the city's drinking water supply. The plan is effective for 10 years after the approval date specified by MDH and the city is responsible for implementing its WHP plan of action as described in Table 11 of this report. Furthermore, the city will evaluate the status of plan implementation at least every two and one half years to identify whether its WHP plan is being implemented on schedule.

1.2 Report Contents

This report is Part II of a Wellhead Protection Plan for the City of Cannon Falls, and includes the following:

- A review and assessment of the data elements.
- The results of the potential contaminant source inventory.
- A review of changes, issues, problems, and opportunities related to the public water supply and the identified potential contaminant sources.
- A detailed discussion of the potential contaminant source management strategies and corresponding goals, objectives, and action plans.
- A review of the wellhead/source water protection evaluation program
- An alternative water supply contingency strategy.

1.3 Content of Appendices

Much of the technical information that was used to prepare this plan is contained in the appendices but is summarized in the main body of this plan.

Appendix A contains the Scoping Decision Notice No. 2. Part I of the plan was completed in 2016 and is summarized in Section 2 and is included in Appendix B. In Part I of the plan, the Wellhead Protection Area (WHPA) and Drinking Water Supply Management Area (DWSMA) were delineated, and vulnerability assessments of the wells and corresponding DWSMA were amended based on updated data available on the source water aquifer used by the municipal wells.

Appendix C contains data and supporting documentation for the inventory of potential contamination sources that may present a risk to the city's drinking water. This part of the plan is discussed in Section 3 in terms of assigning risk to the city's water supply and is discussed as issues, problems or opportunities summarized in Section 6.

Appendix D contains the contingency strategy to provide for an alternate water supply if there is a disruption caused by contamination or mechanical failure.

1.4 General Information

The municipal water supply wells included in the WHP Plan are listed in Table 1.

Table 1
Water Supply Well Wells Included in WHP

Well No.	Unique Well No.	Well Status
3	433273	Primary
4	596643	Primary
5	596648	Primary

The WHP Plan Manager is Tom Bergerson, Director of Public Works, City of Cannon Falls.

WHP Team Members are Ron Johnson, Administrator, City of Cannon Falls and Robyn Hoerr, Minnesota Rural Water Association.

2.0 Delineation of the Wellhead Protection Area, Drinking Water Supply Management Area and Vulnerability Assessments

2.1 WHPA and DWSMA Delineation

The boundaries of the WHPA and DWSMA and the DWSMA vulnerability are shown in Figure 1 and well vulnerability is listed in the table below. A detailed description of the process used for 1) delineating the WHPA and the DWSMA, and 2) preparing the vulnerability assessments of the city water supply well(s) and DWSMA is presented in the Part I report found in Appendix B.

Table 2

Water Supply Well Data

Well No.	Unique Well No.	Date Constructed	Aquifer	Total Depth (ft)	Casing Depth (ft)	Casing Diameter (in)	Vulnerability
3	433273	1988	Jordan	393	297	24	Not Vulnerable
4	596643	1998	Jordan	400	288	24	Not Vulnerable
5	596648	1998	Jordan	400	281	23	Not Vulnerable

The WHPAs are defined by a 10-year time of travel; the WHPA and DWSMA are shown on Figure 1. Figure 1 shows the emergency response areas (ERAs), which are defined by a 1-year time of travel. The Inner Wellhead Protection Management Zone (IWMZ) is the area within a 200-foot radius around each well. Definitions of rule-specific terms that are used are provided in the "Glossary of Terms."

2.2 DWSMA Vulnerability Assessment

The significance of this assessment relative to the likelihood that a contaminant may move from a potential source to the source water aquifer is summarized below in terms of a travel time. Generally, the higher the vulnerability rating, the greater the risk that a released contaminant may result in contaminated drinking water.

The DWSMA vulnerability is moderate. Moderate vulnerability indicates that vertical recharge to the source water aquifer occurs over a time period of years to several decades. Isotropic data and water chemistry were also considered in the vulnerability assessment.

The vulnerability of the DWSMA is based upon the following information:

1. Water chemistry data from wells located within the DWSMA indicate that the aquifer contains water that has no detectable levels of tritium (<0.8 TU at Well #3 (433273) on 9/5/2008) or human-caused contamination; and
2. Review of the geologic logs contained in the CWI database and geological maps and reports indicate that the aquifer exhibits areas of low geologic sensitivity in the DWSMA that are isolated from the direct vertical recharge of surface water.

3.0 Data Elements and Assessment

3.1 Required Data Elements

The data elements that are included in this plan document the need for the WHP measures that will be implemented to help protect the city's water supply from potential sources of contamination. The city met with representatives from MDH on two occasions to discuss the data elements that are specified in Minnesota Rules, part 4720.5400, for preparing a WHP plan.

The first scoping meeting that was held on December 17, 2012 addressed the data elements that were needed to support the delineation of the WHPA, the DWSMA, and the well and DWSMA vulnerability assessments. The second scoping meeting that was held on July 29, 2015 discussed the data elements required to 1) identify potential risks to the public water supply and 2) develop effective management strategies to protect the public water supply in relation to the well and DWSMA vulnerability. The results of each meeting were communicated to the city by MDH through a formal scoping decision notice.

The Part 2 data elements are based on the determination that the DWSMA has is of moderate vulnerability.

Each data element is required to be assessed for its impact on 1) the use of the public water supply well, 2) delineation of the WHPA, 3) the quality and quantity of water supplying the public water supply wells, and 4) land and groundwater uses within the DWSMA. This information is found in Appendix B.

3.2 Physical Environment

3.2.1 Precipitation

This data element does not apply because there is no direct hydraulic connection between surface waters and the aquifer serving this water supply system.

3.2.2 Geology

Geology is a required data element and was described in Part I in detail and summarized below. Management of the DWSMA must reflect what is known about this data element.

The city of Cannon Falls draws groundwater from the Jordan Sandstone aquifer. A description of the regional hydrogeologic setting of the St. Peter-Prairie du Chien-Jordan aquifer system developed by MDH in support of wellhead protection area delineation is included in the Part I report (Appendix B).

Cannon Falls is in an area of groundwater discharge, evidenced by the aquifer test results, the strong artesian water elevations in the Jordan Sandstone relative to the surface of the Cannon River, and the historic springs in the area. This is corroborated by the non-detect tritium (<0.8 TU) and nitrate (<0.05 mg/L) in the well water, indicating a long residence time (greater than 50 years) for water in the aquifer before it reaches the well. These indicators would lead to a low vulnerability throughout; however, it is possible for human activities to alter the hydrologic system more readily than other situations. For example, high capacity wells installed nearby could shift the flow pattern and induce recharge of young water to the aquifer. Also of note, the overlying dolomite is documented to contain karst features (Appendix B); karst would enhance the potential for vertical movement of surficial

contamination. Therefore, a moderate vulnerability rating was assigned throughout the DWSMA.

In addition to managing the DWSMA based on moderate vulnerability, the presence of karst features makes it necessary to address deficiencies in understanding groundwater and surface water interactions in the DWSMA by mapping karst features. The Karst Features Data Base contains information on 371 sinkholes, nine stream sinks, and 160 springs in Goodhue County (Alexander and others, 2003), but many likely remain to be mapped. A careful karst inventory including sinkholes, springs, and seeps should be conducted by qualified personnel trained in karst hydrogeology during year 3 with particular emphasis in the vicinity of Cannon Falls. Contact the MDH Source Water Hydrologist to develop a mapping strategy during year 2. This recommendation is in Section 9.0 of Part I (Appendix B).

There are no known borehole geophysical studies or records from wells, borings and exploration test holes. There are no known surface geophysical studies pertaining to the Cannon Falls area.

3.2.3 Soils

This data element does not apply for Cannon Falls because there is no direct hydraulic connection between surface waters and the aquifer serving this water supply system.

3.2.4 Water Resources

This data element does not apply because there is no direct hydraulic connection between surface waters and the aquifer serving this water supply system.

3.3 Land Use

3.3.1 Parcels & Boundaries

Figure 1 shows the boundaries of parcels within the DWSMA and the municipal boundaries for the City of Cannon Falls. Part of the DWSMA is located outside of the City's municipal boundaries, falling within the Township of Cannon Falls. Parcels in the Township of Cannon Falls are subject to Goodhue County zoning regulations. Management of the DWSMA must reflect what is known about this data element. Cannon Falls will work with other municipalities, the Township of Cannon Falls and Goodhue County, in managing the DWSMA.

3.3.2 Potential Contaminant Sources

Mapping and an inventory of the current and historical agricultural, residential, commercial, industrial, recreational, and institutional land uses and potential contaminant sources have been completed and are shown on Figure 2.

The wellhead protection team reviewed data from relevant databases and made corrections and additions. The team also considered information provided by MDH via the Old Municipal Well Report. All potential wells identified in the Old Municipal Well Report are located outside of the DWSMA. However, as they still pose a threat to the Cannon Falls water supply, a measure is provided in this plan, to address these wells.

The inventory, mapping and management of land uses and potential sources of contamination for the DWSMA must reflect what is known about these data elements, as described in the table below. The table indicates specific categories of potential contaminant sources that must be inventoried for the moderately vulnerable DWSMA.

Table 3

Potential Contaminant Sources to Inventory

Potential Contaminant Sources	Moderately Vulnerable DWSMA
Above-ground Storage Tanks (greater than 1,100 gallons)	x
Leaking Underground Storage Tanks	x
Class V wells[1]	x
Pipeline Facility	x
Potential Contamination Site[2]	x
Solid Waste Management Site	x
Spills	x
Storage or Preparation Area	x
Suspected Contaminant of Concern	x
Underground Storage Tank	x
Wells	x
Land Use/Land Cover Map and Table	x
Inner Well Management Zone Inventory	x

Notes

[1]Potential Class V wells include: Agricultural Drainage Well, Disposal Well, Industrial Drainage Well, Large Capacity Cesspool, Large Capacity Waste Water Disposal Site, Leaking Underground Storage Tank, Misc. Injection Well, Motor Vehicle Waste Disposal Well, Recharge Well, Reinjection Well, Special Drainage Well, Storm water Injection Well

[2]Potential Contamination Sites (PCS) include the following: *Brownfields (BMS) Delisted State Superfund Sites (DPLP), Federal Superfund Sites (NPL)*

Hazardous Waste Investigative/cleanup (HWIC), No Further Remedial Action Planned (NFRAP), State Superfund Sites (PLP), Suspected Hazardous Waste Site (CERCL), Voluntary Investigative Cleanup (VIC)

Table 4 shows the inventory of potential point contaminant sources by type, status and assigned risk relative to their potential to impact the DWSMA and water supply wells. Some private wells are located within the DWSMA but there are no Potential Class V wells.

There are three active leaking underground storage tank remediation sites within the DWSMA along with a potential contaminant site and suspected contaminant of concern. Several active aboveground and underground storage tanks were identified within the DWSMA. Note that only aboveground storage tanks larger than 1,100 gallons are inventoried.

Table 5 summarizes potential contaminant sources that were identified in the Inner Well Management Zone (IWMZ), a 200-foot radius of each of Cannon Falls' wells. Two of the wells have a gravel pocket or French drain that should be labeled as being for clear water drainage only. The potential for a pollutant or contaminant to drain into the soil and presence of a construction or demolition debris disposal site were also noted.

Table 4

Potential Point Contamination Source Type and Assigned Risk

Potential Contaminant Source Type	Status	Number of Sites Within DWSMA	Assigned Risk
Private Wells	Active	5	High
Private Well	Inactive/Unused	1	High
Municipal Wells	Active	3	High
Aboveground Storage Tanks (> 1,100 gallons)	Active	3	Low
Underground Storage Tanks	Active	1	Moderate
Leaking Underground Storage Tank	Active	3	Moderate
Leaking Underground Storage Tank	Closed/Inactive	1	Low
Potential Contamination Site	Active	1	Low
Suspected Contaminant of Concern	Active	1	Moderate
No sites of the following type were identified within the DWSMA: Class V wells, Pipeline Facility, Solid Waste Management Site, Spills, Storage or Preparation Area			

Table 5

Potential Contamination Sources and Assigned Risk for the IWMZ

Source Type	Total	Level of Risk
Pollutant or contaminant that may drain into the soil (PC1)	1	Moderate
Construction or demolition debris disposal site (CD1)	1	Moderate
Gravel pocket or French drain for clear water drainage only (GP1)	2	Moderate

Additional data for potential contaminant sources, the Old Municipal Well Inventory and the Inner Well Management Zone inventory forms are found in Appendix C.

3.3.3 Land Cover, Zoning and Land Use

Management of the DWSMA must reflect what is known about land use and zoning data elements. Figure 3 shows land cover and the table below provides the proportion of area of the DWSMA of each land use type. Figure 4 shows zoning within the DWSMA for parcels in the City of Cannon Falls and Goodhue County zoning for parcels in Cannon Falls Township. The 2016 Goodhue County Comprehensive Plan is available online at http://www.co.goodhue.mn.us/documentcenter/view/11368 and serves as a guide for land use within the county. The plan does not include a countywide land use map but refers to data available from the county's GIS website. The City of Cannon Falls does not have a current comprehensive plan.

Land use within the DWSMA is tabulated by area and percentage in Table 4. The majority of the DWSMA is fairly evenly distributed among four classifications: Cultivated Land, Deciduous Forest, Urban and Industrial and Grassland. Comparing the land use and zoning maps, no areas of conflict between land use and zoning (or intended land use) were

identified. Current land uses are consistent with the zoning. There are no anticipated land use changes or changes in land use controls within the DWSMA.

Table 6

Land Use within DWSMA

Land Use Type	Area (acres)	Percentage of DWSMA
Cultivated Land	154	28.2%
Deciduous Forest	149	27.4%
Urban and Industrial	119	21.9%
Grassland	106	19.4%
Farmsteads and Rural	9	1.6%
Water	5	0.9%
Grassland-Shrub-Tree	2	0.4%
Other Rural Developments	1	0.1%

3.3.4 Public Utility Services

Management of the DWSMA shall consider the following data elements:

- Transportation routes or corridors
- Storm sewers, sanitary sewers and public water supply systems
- Construction, maintenance and use of public water supply and other wells
- Gas and oil pipelines
- Public drainage systems

Figure 5 shows storm sewer and sanitary sewers along with transportation routes and corridors. Due to security concerns, a map of the public water supply system is not provided.

Several county roads and numerous local streets lie within the DWSMA. State Highway 29 and County Road 29 are located within the DWSMA. Interstate 35 is on the western border of the DWSMA. There are two rail spurs and a rail corridor at the south end of the DWSMA. These transportation corridors may carry hazardous materials through the DWSMA. Therefore, the presence of these transportation facilities will be managed by proactively working with local emergency management entities to make them aware of the DWSMA and consider DWSMA protection should any spills occur.

Storm sewers, sanitary sewers and the public water supply system within the DWSMA are generally in good condition and are maintained by the City of Cannon Falls. The public water supply system is designed to allow isolation of parts of the system if necessary. There are several storm water ponds within the DWSMA that are part of the City's storm sewer system. Based on the DWSMA's moderate vulnerability, these ponds are not of concern as potential contaminant sources. There are no gas or oil pipelines or public drainage systems in the DWSMA.

3.4 Water Quantity

3.4.1 Surface Water Quantity

This data element does not apply because there is no direct hydraulic connection between surface waters and the aquifer serving this water supply system.

3.4.2 Groundwater Quantity

Management of the DWSMA shall consider the following data elements:

- An existing description of known well interference problems and water use conflicts.
- An existing list of state environmental bore holes, including unique well number, aquifer measured, years of record, and average monthly levels.
- Water appropriation permits

Currently there are no other high capacity wells within the DWSMA for which well interference complaints have been identified. There are no water appropriation permits or state environmental borehole data.

3.5 Water Quality

3.5.1 Surface Water Quality

This data element does not apply because there is no direct hydraulic connection between surface waters and the aquifer serving this water supply system.

3.5.2 Groundwater Quality

This data element must be considered in the management of the DWSMA, and shall include:

- Summary of water quality data, including: bacteriological contamination indicators; inorganic chemicals and organic chemicals.
- List of water chemistry and isotopic data from wells, springs, or other groundwater sampling points
- Groundwater tracer studies
- Site study and well water analysis of known areas of groundwater contamination

Generally, the quality of the source water aquifers utilized for the Cannon Falls public water supply is good; the water supply is free of harmful contaminants and pollutants. The public water supply system has always remained in full compliance with all state and federal drinking water regulations.

Water samples were collected from the wells and were analyzed for nitrate and a tritium analysis was conducted from Well 3 (433273) in 2008. No tritium or nitrate was detected in the samples, confirming the non-vulnerable nature of the wells (Alexander and Alexander, 1989).

There are no groundwater tracer studies or studies of known areas of groundwater contamination applicable to the DWSMA.

4.0 Impact of Land and Water Use Changes on the Public Water Supply Wells

The city estimates that the following changes to the physical environment, land use, surface water, and groundwater may occur over the ten-year period that the WHP plan is in effect. This is needed to determine whether new potential sources of contamination may be introduced in the future and to identify future actions for addressing these anticipated sources. Land and water use changes may introduce new contamination sources or result in changes to groundwater use and quality. The anticipated changes may occur within the jurisdictional authority of the City, although some may not due to part of the DWSMA being outside of the City boundaries.

The following table describes the anticipated changes to the physical environment, land use, and surface water or groundwater in relationship to 1) the influence that existing governmental land and water programs and regulations may have on the anticipated change, and 2) the administrative, technical, and financial considerations of the City of Cannon Falls and property owners within the DWSMA.

Table 7

Expected Land and Water Use Changes

Expected Change (Physical Environment, Land Use, Surface Water, Ground Water)	Impact of the Expected Change On the Source Water Aquifer	Influence of Existing Government Programs and Regulations on the Expected Change	Administrative, Technical, and Financial, Considerations due to the Expected Change
No changes to the physical makeup of the aquifer are expected.	No changes, therefore, no impact.	No changes, therefore, existing programs or regulations are adequate.	Because there are no expected changes to the physical makeup of the aquifer no additional administrative, technical or financial considerations required.
No changes are expected in the surface water sources	No changes, therefore, no impact.	No changes, therefore, existing programs or regulations are adequate.	Because there are no expected changes no additional administrative, technical or financial considerations required.
Land use changes within the DWSMA are not anticipated.	No changes, therefore, no impact.	No changes, therefore, existing programs or regulations are adequate.	Because there are no expected changes no additional administrative, technical or financial considerations required.
Construction of private wells within those areas outside of the city limits within the DWSMA is a possible change in groundwater source.	Private wells have the potential to impact existing public wells and can become a source of contamination.	Current City of Cannon Falls regulations address this issue for wells within municipal boundaries. Outside of municipal boundaries, the City does not have jurisdiction.	City will need to monitor data for private wells constructed with the DWSMA, but outside of city municipal boundaries.

5.0 Issues, Problems and Opportunities

5.1 Identification of Issues, Problems and Opportunities

The City of Cannon Falls has identified water and land use issues, problems and opportunities related to 1) the aquifer used by the city water supply wells, 2) the quality of the well water, or 3) land or water use within the DWSMA.

The City assessed 1) input from public meetings and written comments that it received, 2) the data elements identified by MDH during the scoping meetings, and 3) and the status and adequacy of the city's official controls and plans on land use and water uses, as well as those of local, state, and federal government programs. The results of this effort are presented in the following table which defines the nature and magnitude of contaminant source management issues in the city's DWSMA. Identifying the issues, problems and opportunities as well as resource needs enables the city to: 1) take advantage of opportunities that may be available to make effective use of existing resources, 2) set meaningful priorities for source management and 3) solicit support for implementing specific source management strategies.

5.2 Comments Received

There have been several occasions for local governments, state agencies and the general public to identify issues and comment on the city's WHP plan. At the beginning of the planning process, local units of government were notified that the city was going to develop its WHP plan and were given the opportunity to identify issues, as well as to comment. A public information meeting was held to review the results of the delineation of the WHP area, DWSMA, and the vulnerability assessments. Also, a public hearing was held before the completed WHP plan was sent to MDH for state agency review and approval. The following issues were identified during comment periods:

Table 8

Issues, Problems and Opportunities

Issue Identified	Impacted Feature	Problem Associated with the Identified Issue	Opportunity Associated with the Identified Issue	Adequacy of Existing Controls to Address the Issue
Potential contaminant sources were identified within the IWMZ	Aquifer	Potential for contaminants to enter the water supply aquifer	Provide signage or mitigation as appropriate	Not applicable
Potential contaminant sources identified within the DWSMA include ASTs, USTs and potential contaminants of concern	DWSMA	Potential for contaminants to enter the water supply aquifer	Share potential concerns associated with contamination that could impact the water supply aquifer with property owners.	Existing controls are likely adequate; MPCA has jurisdiction
The amended DWSMA extends beyond city boundaries	Aquifer, Well Water Quality, DWSMA	Water is recharging the city's aquifer from lands outside the city limits. The city has no land use controls or authority over these areas.	The city will need to work cooperatively with Goodhue County and Township of Cannon Falls to ensure smart land use decisions are made within the City's DWSMA.	Goodhue County has zoning authority over this area and can provide valuable assistance in land use issues. Cooperation with Township of Cannon Falls is needed.
The Minnesota Department of Health has compiled historical information, the Old Municipal Well Report, for use in the planning process. Old municipal wells and two unused wells at Minnesota Malting are suspected.	Aquifer, Well Water Quality	Wells which have not been sealed according to MDH standards may provide a pathway for pollutants to enter into the aquifer.	With the assistance of MDH the city can locate, assess and seal the wells if they pose a threat to the city's drinking water supply.	MDH Well Management has the ability to require the city to properly address unused improperly sealed wells. The city can utilize the MDH WHP grant program to seal the wells.
The City of Cannon Falls has limited resources and funds to implement the wellhead protection plan.	Aquifer, Well Water Quality, DWSMA	With limited resources implementing the WHP plan will be a challenge for the City of Cannon Falls.	Form partnerships with the Township, County and State agencies who have controls in the DWSMA so they can help with implementation.	Not applicable

Issue Identified	Impacted Feature	Problem Associated with the Identified Issue	Opportunity Associated with the Identified Issue	Adequacy of Existing Controls to Address the Issue
It is always difficult to foresee or plan for every threat or potential contaminant source which may affect Cannon Falls in the future	Aquifer, Well Water Quality, DWSMA	The City may not be prepared technically or financially to address potential threats unknown to them at this time.	If a critical issue or potential contaminant threat becomes an issue in the future for the City, the city can ask for assistance from the various state agencies and MRWA to promptly take action to prevent this contaminant source from contaminating their drinking water supply. Grants dollars may also be available to help cover various cost and equipment.	Not applicable
Cannon Falls is in an area of groundwater discharge but changes in water use and pumping could shift the water flow pattern and induce recharge of younger water to the aquifer.	Aquifer	Younger water may impact potential for contamination of the aquifer.	Work with MDH to assess aquifer condition with monitoring in year 5 for chloride, bromide and tritium.	Not applicable
Karst features are present and there may be unmapped springs and sinkholes in the area that would provide additional information for understanding groundwater-surface water interaction.	Aquifer	Karst features may impact potential for contamination of the aquifer.	Work with MDH to perform Karst Feature Mapping in the vicinity of the DWSMA	Not applicable

6.0 Existing Authority and Support Provided by Local, State and Federal Governments

In addition to its own controls, the City of Cannon Falls will have to rely upon partnerships formed with local units of government, state agencies, and federal agencies with regulatory controls or resource management programs in place to help implement its WHP plan. The level of support that a local, state, and federal agency can provide to help offset the risk that is presented by a potential contamination source will depend up on its legal authority as well as the resources that are available to local governments.

6.1 Existing Controls and Programs of the City of Cannon Falls

The city has identified the following legal controls and/or programs that it has in-place that can be used to support the management of potential contamination sources within the DWSMA.

Table 9

Controls and Programs of the City of Cannon Falls

Type of Control	Program Description
Zoning Ordinance and Conditional Use Permits	Sets standards and orderly growth of various land uses within the City limits and allows the City to apply permit conditions to land uses they deem necessary.
Connection to City Services (Water and Sewer)	City requires residents to connect to city water and sewer where available.
Cross Connection Ordinance	Prevents the cross connection between the City's distribution system and private water sources.

6.2 Local Government Controls and Programs

The following departments or programs within Goodhue County may be able to assist the city with issues relating to potential contamination sources that 1) have been inventoried or 2) may result from changes in land and water use within the DWSMA.

Table 10

Local Agency Controls and Programs

Government Unit or Organization	Name of Control/Program	Program Description
Goodhue County Environmental Services Department	Zoning and Conditional Use Permits	Sets standards and orderly growth of various land uses within the County and allows the County to apply permit conditions to land uses they deem necessary.
	Household Hazardous Waste Collection.	Provides education to landowners and a collection program for disposing of household hazardous waste.
	Water Planning	Establishes countywide goals and priorities towards protecting water resources including setting watershed priorities to protect surface waters and groundwater.
	Delegated County Well Program	Well construction, maintenance permitting and well abandonment
Goodhue County Emergency Management Dept.	Transportation accidents causing contaminant spills	Directs the response and the extent of initial clean-up of fuel, chemical, or other hazardous substances that are released due to transportation accidents.
Goodhue County Soil and Water Conservation District	1) Agricultural BMPs 2) Storm water management 3) Wetland management 4) Feedlots 5) Residential BMPs	The Goodhue SWCD promotes the protection of water and soil resources in the county through educational programs, cost-sharing and collaboration with other local, state and federal agencies.
Cannon River Watershed Partnership	1) Agriculture 2) Engagement 3) Small Community Wastewater	Nonprofit organization that aims to engage people to protect and improve the water quality and natural systems of the Cannon River watershed.
North Cannon River Watershed Organization	Water Planning	The North Cannon River Watershed Management Organization (NCRWMO) is a governmental unit created in 1983 through a joint powers agreement between the eight townships and 3 small cities in Dakota County that are located within in the Cannon River Watershed

6.3 State Agency and Federal Agency Support

MDH will serve as the contact for enlisting the support of other state agencies on a case-by-case basis regarding technical or regulatory support that may be applied to the management of potential contamination sources. Participation by other state agencies and the federal government is based on legal authority granted to them and resource availability.

Furthermore, MDH 1) administers state regulations that affect specific potential sources of contamination and 2) can provide technical assistance for property owners to comply with these regulations.

The following table identifies specific regulatory programs or technical assistance that state and federal agencies may provide to the City of Cannon Falls to support implementation of its WHP plan. It is likely that other opportunities for assistance may be available over the ten-year period that the plan is in effect due to changes in legal authority or increases in funding granted to state and federal agencies. Therefore, the table references opportunities available when the city's WHP plan was first approved by MDH.

Table 11

State and Federal Agency Controls and Programs

Government Unit	Type of Program	Program Description
MN Dept. of Health	State Well Code (MR Section 4725)	MDH has authority over the construction of new wells and sealing of wells. MDH staff in the Well Management Program offers technical assistance for enforcing well construction, maintaining setback distances for certain contamination sources, and well sealing.
MN. Dept. of Health	Wellhead Protection	MDH can provide technical and financial assistance to the city for WHP activities and can help identify technical and financial support that other governmental agencies can provide to assist with managing potential contamination sources.
MN Dept. of Natural Resources	Water Appropriation Permitting (MR Section 6115)	DNR can require that anyone requesting an increase in existing permitted appropriations or to pump groundwater must address concerns of the impacts to drinking water if these concerns are include in a WHP plan.
MN Pollution Control Agency (MPCA)	Registered Storage Tank Program Storm water Program	MPCA administers the programs dealing with storage tank regulations and storm water management.
Environment Protection Agency (EPA)	Shallow Disposal Well Program	EPA has the regulatory authority over Class V Injections Well or also known as Shallow Disposal Wells.

6.4 Support Provided by Nonprofit Organizations

The Minnesota Rural Water Association will assist the City of Cannon Falls with implementing its WHP plan by providing 1) reference education and outreach materials for landowners, 2) technical support for implementing individual WHP action items listed in the plan, and 3) assisting the City with assessing the results of plan implementation.

7.0 Goals

Goals define the overall purpose for the WHP plan as well as the end points for implementing objectives and their corresponding actions. The WHP team identified the following goals after considering the impacts that 1) changing land and water uses, over time, have presented to drinking water quality and 2) future changes have that may need to be addressed to protect the community's drinking water:

The overall goal of the City of Cannon Falls is to promote public health, economic development and community infrastructure by maintaining a potable drinking water supply for all residents of the community, both now and into the future.

8.0 Objectives and Plan of Action

Objectives provide the focus for ensuring that the goals of the WHP plan are met and that priority is given to specific actions that support multiple outcomes of plan implementation.

Both the objectives and the wellhead protection measures (actions) that support them are based on assessing 1) the data elements, 2) the potential contaminant source inventory, 3) the impacts that changes in land and water use present, and 4) issues, problems, and opportunities related to administrative, financial, and technical considerations.

8.1 Objectives

The following objectives have been identified to support the goals of the WHP plan for the City of Cannon Falls:

A. Create awareness and general knowledge about the importance of WHP in the Cannon Falls Community and the City of Cannon Falls DWSMA.

B. Properly inventory and manage potential contaminant sources to protect the drinking water supply for the City of Cannon Falls.

C. Gather additional information within the DWSMA in order to better understand the size and vulnerability of the DWSMA.

D. Effectively track and report the implementation efforts and wellhead protection plan progress to all governing authorities.

E. Manage the Inner Wellhead Management Zone to prevent contamination of the aquifer near the public supply wells.

F. Effectively prepare the City of Cannon Falls for disruptions to the water distribution system.

G. Develop local land use controls and partner with local units of government to better protect the aquifer used by the City of Cannon Falls.

8.2 WHP Measures and Action Plan

The WHP team has identified WHP measures that will be implemented by the city over the 10-year period that its WHP plan is in effect. The objective that each measure supports is noted, as well as 1) the lead party and any cooperators, 2) the anticipated cost for implementing the measure, and 3) the year or years in which it will be implemented.

WHP measures reflect the administrative, financial, and technical requirements needed to address the risk to water quality or quantity presented by each type of potential contamination source. Not all of these measures can be implemented at the same time, so the WHP team assigned priority to each. A number of factors must be considered when WHP action items are selected and prioritized (part 4720.5250, subpart 3):

- Contamination of the public water supply wells by substances that exceed federal drinking water standards
- Quantifiable levels of contamination resulting from human activity
- The location of potential contaminant sources relative to the wells.
- The number of each potential contaminant source identified and the nature of the potential contaminant associated with each source
- The capability of the geologic material to absorb a contaminant
- The effectiveness of existing controls
- The time required to get cooperation from other agencies and cooperators
- The resources needed: staff, money, time, legal, and technical

Based upon the factors listed above, the WHP team has prioritized WHP measures that will be implemented by the city over the 10-year period that this plan is in effect and assigned an appropriate priority ranking.

The objective that each measure supports is noted as well as 1) the lead party and any cooperators, 2) the anticipated cost for implementing the measure and 3) the year or years in which it will be implemented. The following table lists each measure that it will implement over the ten-year period that the city's WHP plan is in effect, as well as the priority that it has assigned to each measure.

Measure	Priority	Measure	Objective Addressed	City Measure Unless Cooperator is Noted	Cost	Implementation time frame									
						2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	High	The City of Cannon Falls will notify the residents and businesses in Cannon Falls that the City has an approved wellhead protection plan and share with them the general themes included in the plan. The City will share this information through their city newsletter or on the website.	A	MDH, MRWA	Staff Time	•									
2	Medium	The City of Cannon Falls will provide WHP educational materials and a copy of the WHP on the City's website and update the page annually. Materials will address general WHP principles and practice and provide best management practices for tanks, private wells and other potential contaminant sources.	A	MRWA	Staff Time	•	•	•	•	•	•	•	•	•	•
3	High	Update potential contaminant source database periodically as tanks are removed and sites are closed or land owners or land use changes. This is also help with the next plan amendment.	B	MPCA MDH	Staff Time				•				•		
4	High	On an annual basis, check the County Well Index for records of new wells constructed within the DWSMA.	B		Staff time	•	•	•	•	•	•	•	•	•	•
5	High	Locate and assess unused wells (private wells, monitoring wells, dug wells identified by MDH) and continue to investigate wells identified by Old Municipal Well Report and those located at Minnesota Malting	B	MDH	Staff Time	•	•	•	•	•	•	•	•	•	•
6	High	If unused well(s) are located, work with property owner to properly seal well(s). This may include seeking grant funding	B	MDH Landowners	$1,500 per well	•	•	•	•	•	•	•	•	•	•

Table 11 – Wellhead Protection Measures

Measure	Priority	Measure	Objective Addressed	City Measure Unless Cooperator is Noted	Cost	Implementation time frame									
						2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
7	High	Work with MDH to develop a sampling program to collect water samples from at least one well for chloride, bromide and tritium	C	MDH	Staff Time					•					
8	Medium	Maintain a "WHP folder" that contains documentation of WHP activities you have completed.	D	MDH, MRWA	Staff Time	•	•	•	•	•	•	•	•	•	•
9	High	Complete an Evaluation Report every 2.5 years that evaluates the "progress of plan of action and the impact of a (any) contaminant release on the aquifer supplying the public water supply well" MN WHP Rule 4720.5270. City may contact MDH Planner to set up a meeting and this evaluation will be provided to the MDH Planner. This evaluation form is available on the MRWA website.	D	MDH, MRWA	Staff Time			•		•		•		•	
10	Medium	Continue to develop and maintain a line of communication between the City and Goodhue County in order to remain abreast of any land use changes which are pending within the City's DWSMA. Send a letter to Goodhue Co. requesting the formal opportunity to provide comments on pending land use changes within the DWSMA	B, G	Township of Cannon Falls, Goodhue County	Staff Time	•	•	•	•	•	•	•	•	•	•

Measure	Priority	Measure	Objective Addressed	City Measure Unless Cooperator is Noted	Cost	Implementation time frame									
						2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
11	High	Work with MDH to perform Karst Feature Mapping in the vicinity of the DWSMA	C	MDH	$5,000						•				
12	High	Assist MDH staff in completing future Inner Wellhead Management Zone Inventories for the public water supply wells.	E	MDH	Staff Time		•					•			
13	High	Contact property owner of agricultural production field within the city's IWMZ to explain wellhead protection and encourage adherence to recommended fertilizer application rates	A, B,E	Property Owner	Staff Time	•		•							
14	Medium	Solid waste dumpsters located within the IWMZ should be located remotely from wells	E		Staff Time		•								
15	High	Post "No Dumping" signs at pumphouses with floor drains that discharge to a gravel pocket or seepage pit	E		$100		•								
17	Low	Notify Goodhue County Emergency Manager and local fire department of WHP and provide map of DWSMA.	C	Goodhue County	Staff Time	•									
18	Medium	Facilitate a meeting with Cannon River Watershed Partnership, North Cannon River Water Management Organization, Goodhue and Dakota County representatives to address drawdown of aquifer and changing groundwater flow.	A, G	Goodhue & Dakota Counties, CRWMO, CRWP			•								

9.0 Evaluation Program

Plan evaluation is specified under Objective D and provides the mechanism for determining whether WHP action items are achieving the intended result or whether they need to be modified to address changing administrative, technical, or financial resource conditions within the DWSMA. Evaluation is used to support plan implementation and is required under Minnesota Rules, part 4720.5270, and prior to amending the city's WHP plan. The city has identified the following procedures that it will use to evaluate the success of implementing its WHP plan:

- An annual update on WHP will be provided to the City Council.
- The WHP team will meet at a minimum every two and one half years to assess the status of plan implementation and to identify issues that impact implementation of action steps throughout the DWSMA.
- The city will assess the results of each action item that has been taken to determine whether the action item has been accomplished to its purpose or whether modification is needed.
- The city will prepare a written report that documents how it has assessed plan implementation and the action items that were carried out. The report will be presented to MDH at the first scoping meeting that it will hold with the city to begin amending the WHP plan.

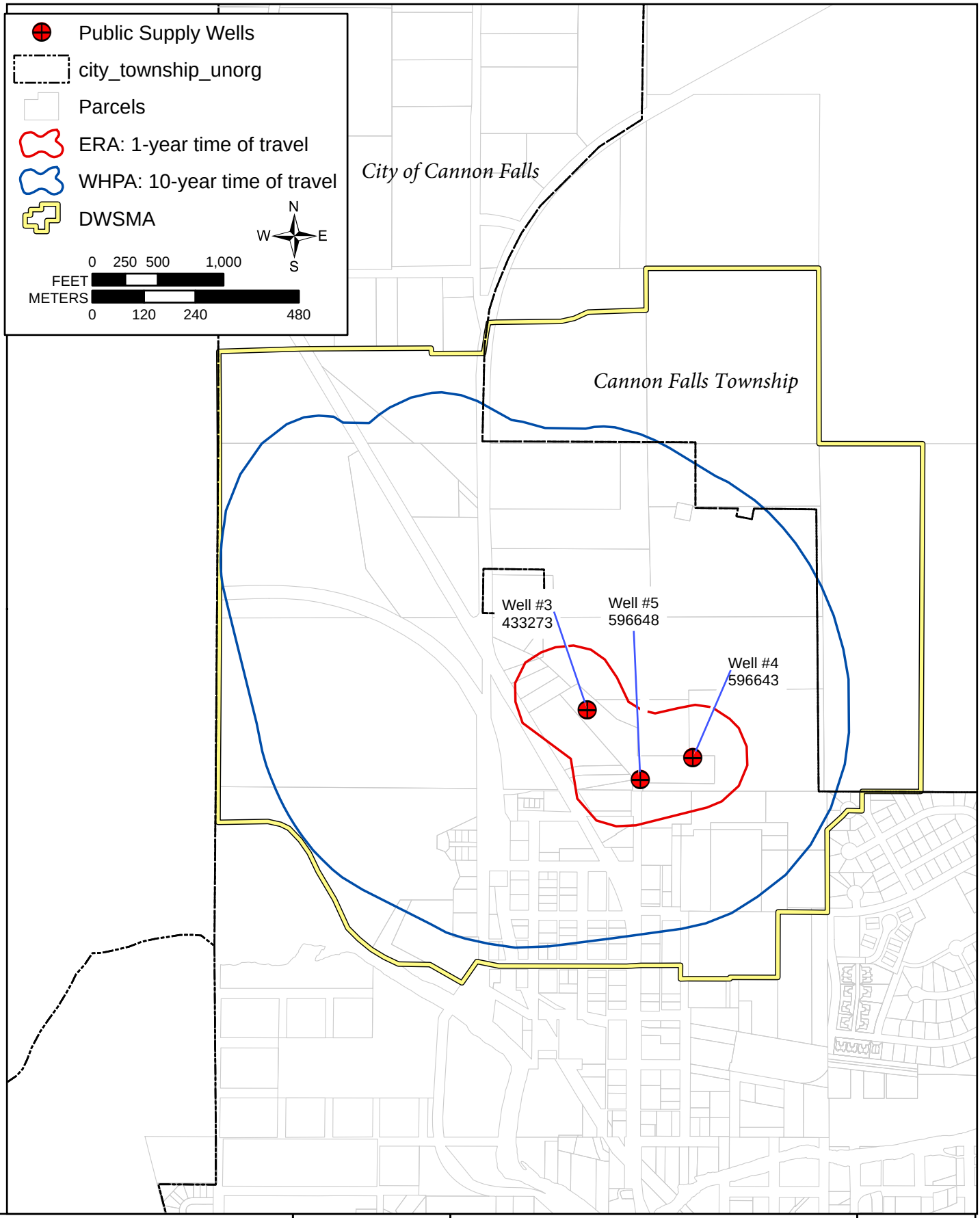
10.0 Contingency Strategy

The WHP plan must include a contingency strategy that addresses disruption of the water supply that is caused either by contamination or mechanical failure. The Water Supply Contingency Plan is found in Appendix D.

Figures

Figure 1 – DWSMA, Parcels and Political Boundaries
Figure 2 – Potential Contaminant Source Inventory
Figure 3 – Land Cover Map
Figure 4 – Zoning
Figure 5 – Public Utility Services and Transportation Corridors

EXPLANATION



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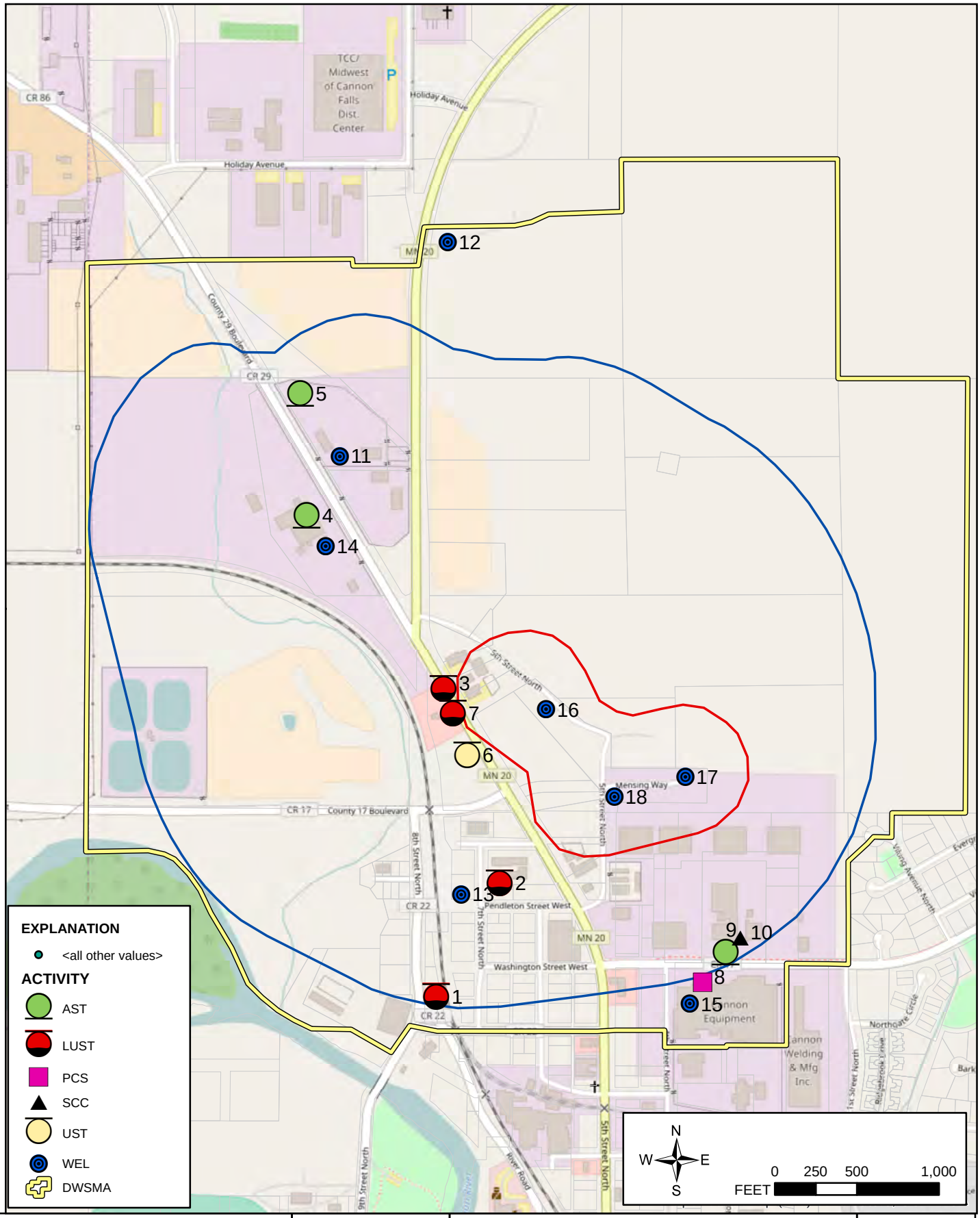
Map by: jmacholl
Projection: NAD 83 UTM Zone 15N
Source: Goodhue County (2015); USDA NAIP (2015)

MAP OF THE WHPA AND DWSMA

WELLHEAD PROTECTION PLAN PART 1
Cannon Falls, Minnesota

Figure 1



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POTENTIAL CONTAMINANT SOURCES

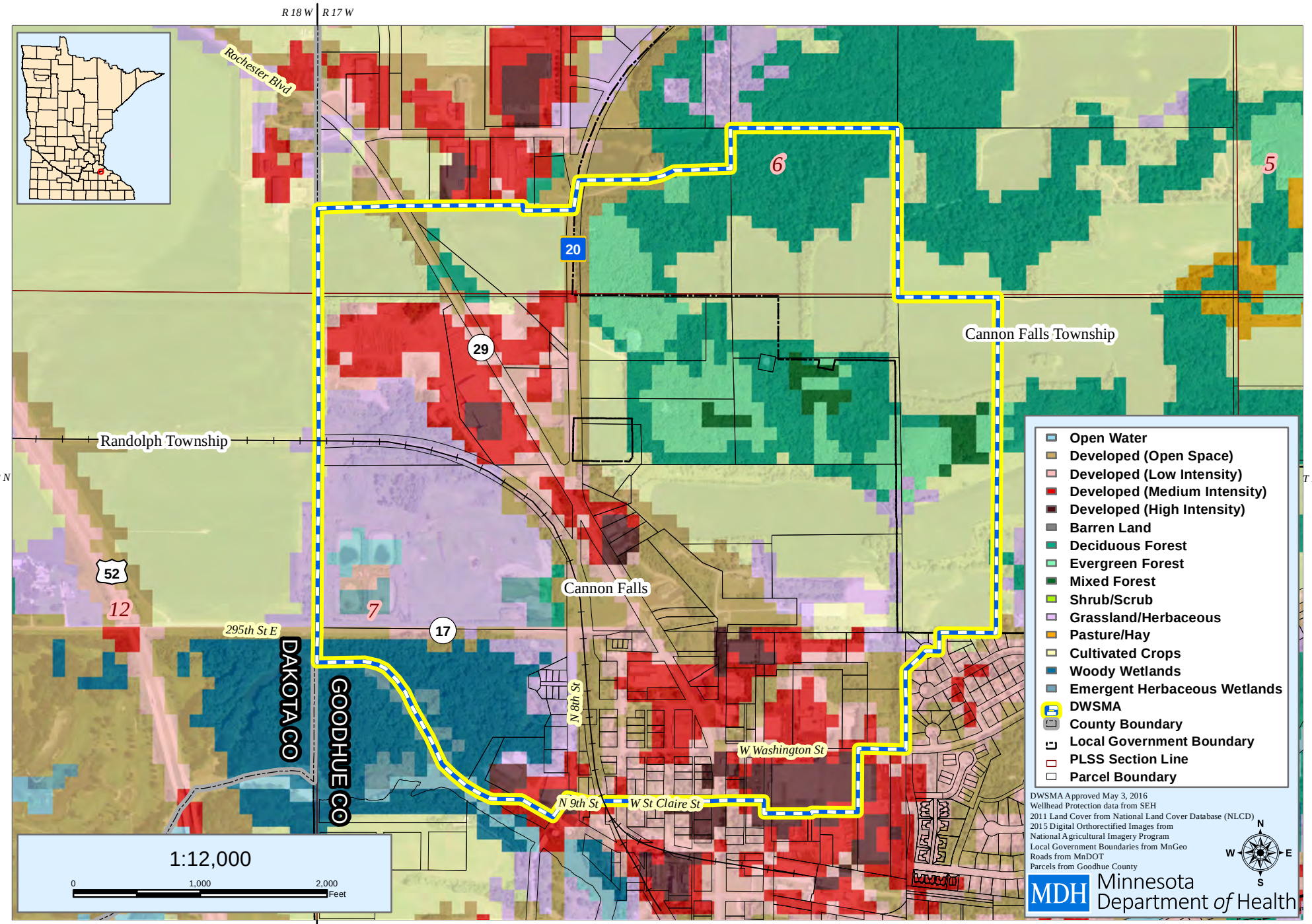
WELLHEAD PROTECTION PLAN PART 2
Cannon Falls, Minnesota

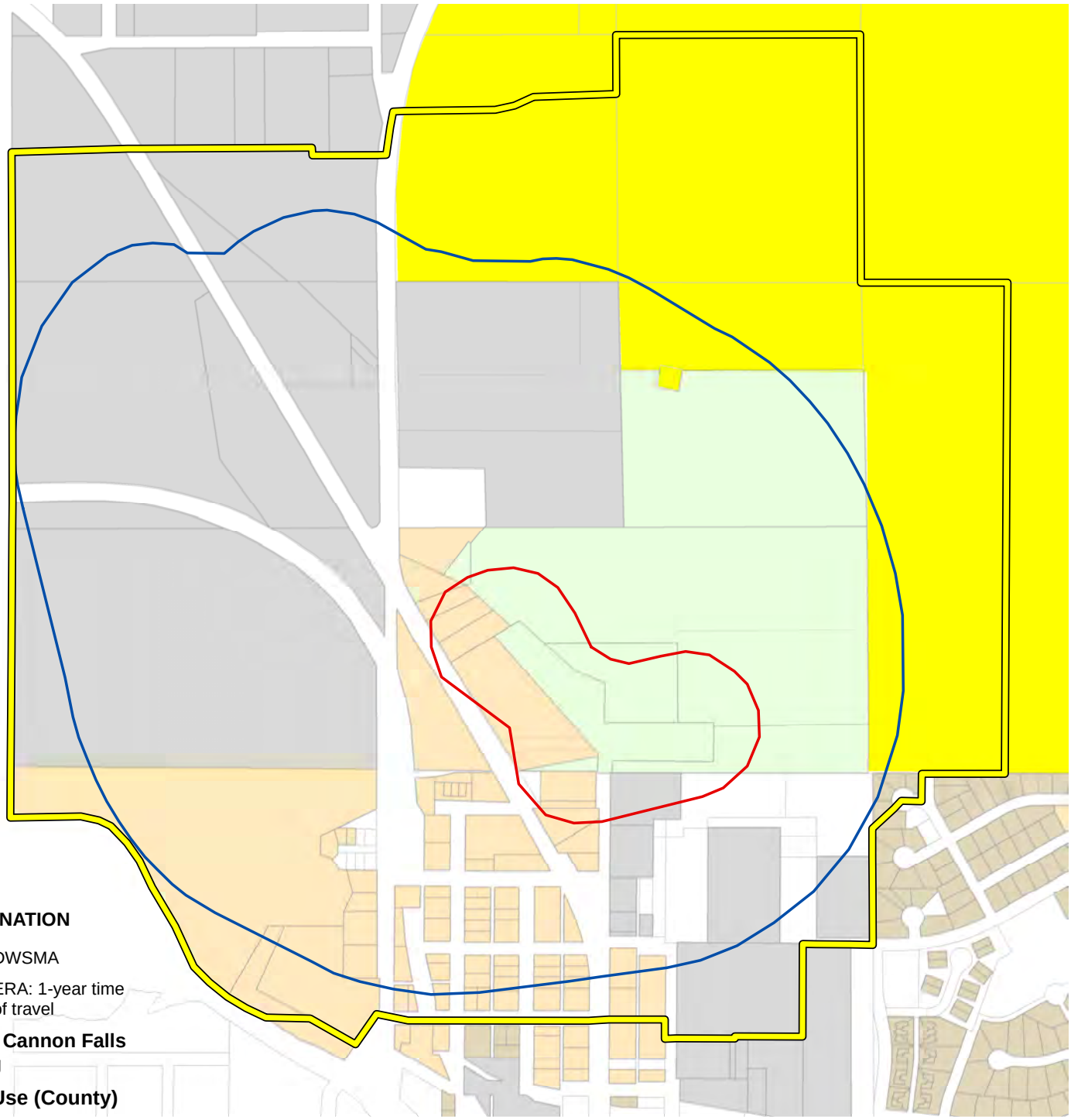
Figure 2

Cannon Falls
Goodhue County
Minnesota

Cannon Falls Drinking Water Supply Management Area (DWSMA) MN-00887 - Land Cover 2011

Minnesota Department of Health
Environmental Health
Source Water Protection Unit





EXPLANATION

- DWSMA
- ERA: 1-year time of travel

City of Cannon Falls Zoning

Land Use (County)

- Single Family Residential
- Urban Reserve
- Residential Business
- Industrial Land and Buildings
- Urban Fringe (Goodhue County Zoning)

N
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S

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FEET

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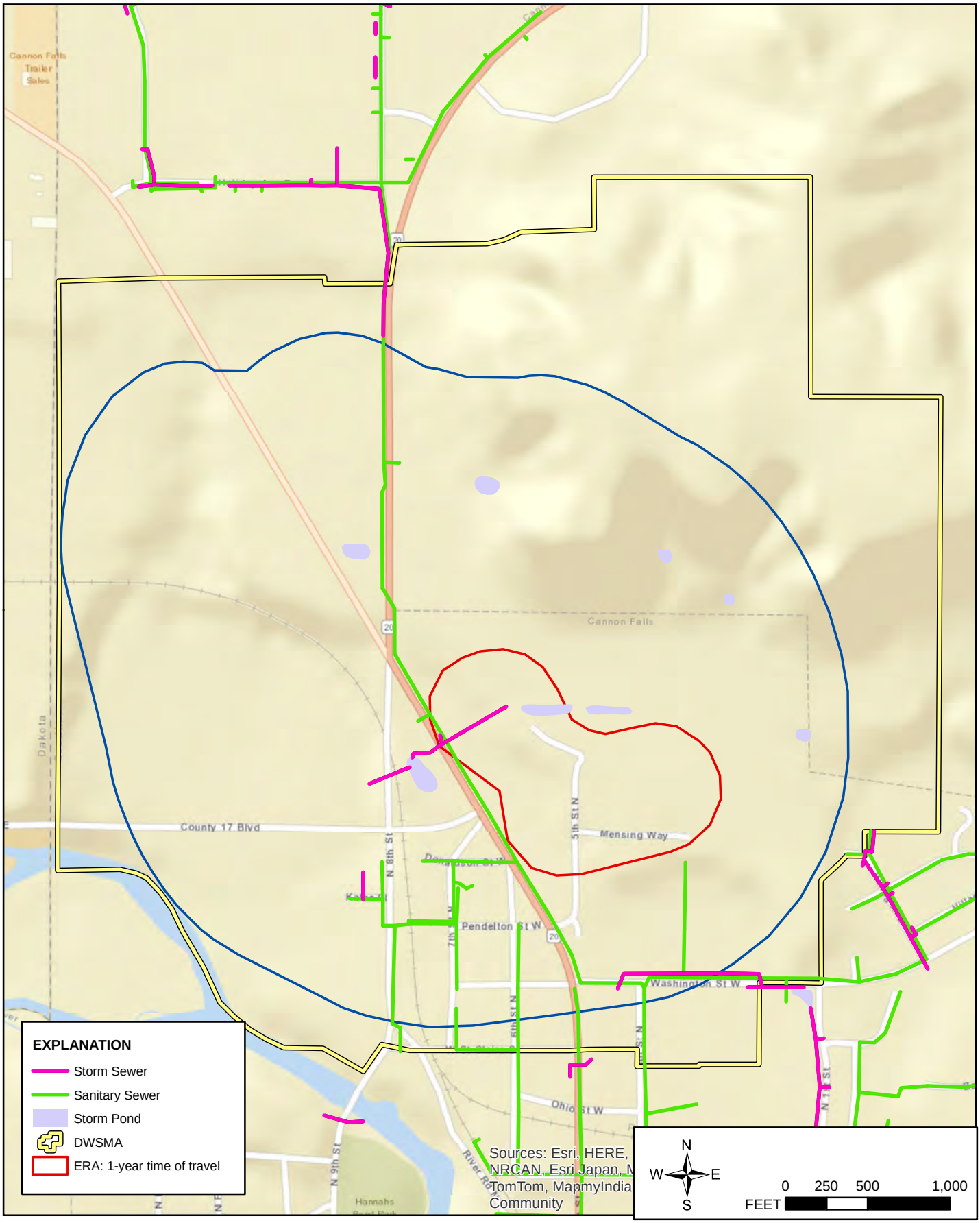
ZONING

WELLHEAD PROTECTION PLAN PART 2
Cannon Falls, Minnesota

Figure 4



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PUBLIC UTILITY SERVICES & TRANSPORTATION CORRIDORS

WELLHEAD PROTECTION PLAN PART 2
Cannon Falls, Minnesota

Figure 5