WELLHEAD PROTECTION PLAN
FOR THE

City of Avon

Nonvulnerable Setting

Effective Dates:
10/23/2014 to 10/23/2024

Forward

This document presents the wellhead protection (WHP) plan for the City of Avon that will help provide for an adequate and safe drinking water supply for community residents. It contains the following components:

- Assessment of the data elements used to prepare the plan;
- Delineation of the wellhead protection area;
- Delineation of the drinking water supply management area;
- Assessments of well and drinking water supply management area vulnerability;
- Impact of land and water use changes on the public water supply well(s) used by the water supplier;
- Issues, problems, and opportunities affecting the well(s), well water, and the drinking water supply management area;
- Wellhead protection goals for this plan;
- Objectives and plan of action for achieving the wellhead protection goals;
- Evaluation program for assessing the effectiveness of this plan; and
- Contingency strategy to address an interruption of the water supply.

Water Supply Wells Included in This Plan

Unique Number	Well Name or Number	Use/Status
696861	Well #4	Active
696862	Well #5	Active
242069	Well #3	Emergency

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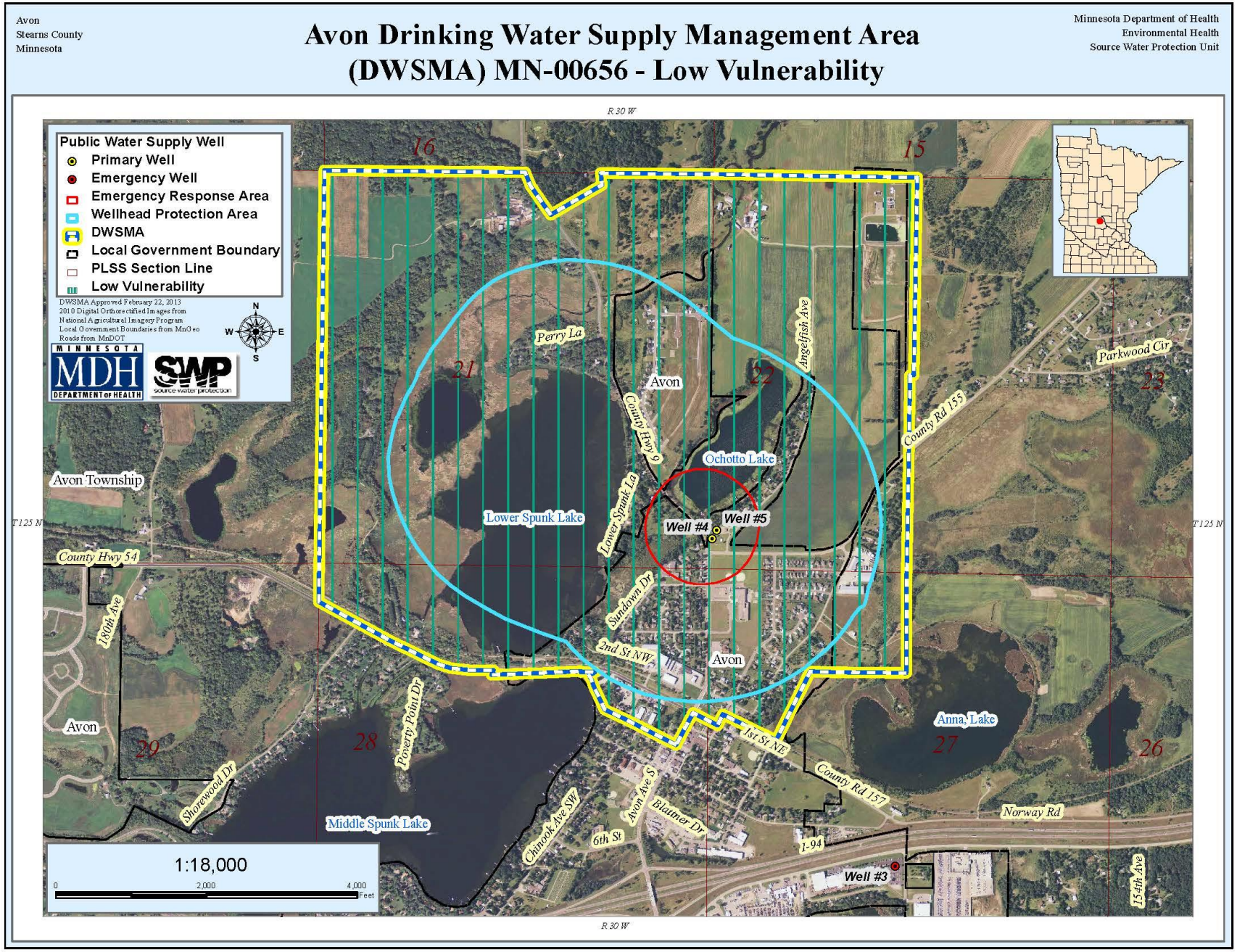
Figure 1 –Drinking Water Supply Management Area Map



Chapter 1 - Introduction

1.1 Background

The wellhead protection (WHP) plan for the City of Avon was prepared in cooperation with the Minnesota Department of Health (MDH). It contains specific actions that the city will take to fulfill WHP requirements that are specified under Minnesota Rules, part 4720.5510 to 4720.5590. Also, the support that Minnesota state agencies, federal agencies, Stearns County, and others 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 9 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 Plan 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. In particular:

- Appendix I contain the first part of the plan, consisting of the delineation of the wellhead protection area (WHPA), the drinking water supply management area (DWSMA), and the vulnerability assessments for the public water supply well(s) and the DWSMA. This part of the plan is summarized in Chapter 3.
- Appendix II contains the map of the drinking water supply of the area.
- Appendix IIIa and IIIb contain Parcel Map within the WHPA and DWSMA Delineations and Avon WHP Parcel Inventory.
- Appendix IVa and IVb contain the Inventory of Potential Contamination Sources. This inventory is discussed in Chapter 4 in terms of assigning risk to the city's water supply and is also discussed in Chapter 6, relating to issues, problems or opportunities.
- Appendix Va and Vb contain Hazardous Waste Sites and Inventory of Hazardous Waste Sites.
- Appendix VI contains the Contingency Strategy as discussed in Chapter 11.
- Appendix VII contains Inner Wellhead Management Zone (IWMZ) Potential Contaminant Source Inventory Well #3.
- Appendix VIII contains Inner Wellhead Management Zone (IWMZ) Potential Contaminant Source Inventory Well #4.
- Appendix IX contains Inner Wellhead Management Zone (IWMZ) Potential Contaminant Source Inventory Well #5.
- Appendix X and XI contain the Part One and Part Two WHPP Scoping Documents outlining the requirements for the respective plan.
- Appendix XII and XIII contains the Old Muni Well Report and Well Sealing Records.
- Appendix XIV contains the 2013 Consumer Confidence Report. This contains the drinking water quality information required annually from the MDH and is summarized and discussed in Chapter 4.
- Appendix XV: Implementation Schedule
- Appendix XVI contains the Glossary of Terms
- Appendix XVII contains the List of Acronyms.

Chapter 2 - Identification and Assessment of the Data Elements Used to Prepare the Plan

The data elements that are included in this plan were used to 1) delineate the WHPA and the DWSMA and to assess DWSMA and well vulnerability and 2) 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 data elements that are specified in Minnesota Rules, part 4720.5400, for preparing a WHP plan.

The first scoping meeting, held on February 24, 2011, addressed the data elements that were needed to support the delineation of the WHPA, the DWSMA, and the well(s) and DWSMA vulnerability assessments. The second scoping meeting, held on May 3, 2013, 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 well and DWSMA vulnerability. The results of each meeting were communicated to the city by MDH through a formal scoping decision notice. Not all of the data elements listed in the WHP rule had to be addressed in the WHP plan because of the non-vulnerable nature of the city's source of drinking water.

The following table presents the data element assessment results relative to the overall impact that each data element has on the four items listed.

Table 1 is the assessment of the present and future implications of the data elements on the four planning activities. The data elements that are marked high (H) are considered to have a direct implication or impact on the activity. Data elements that have an indirect or marginal impact on an activity are shown as moderate (M). A data element that has little if any impact is shown as low (L). The source of the data is shown under "Data Source." The "Availability of Data" is "Yes" if planning needs are met and "No" if they are not.

Table 1 - Assessment Results for the Data Elements

Data Element	Present and Future Implications				Data Source
	Use of the Well (s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Geology					
Maps and geologic descriptions	M	H	M	H	MGS, DNR, USGS, Consultant Reports
Subsurface data	H	H	H	H	MGS, MDH, MPCA, DNR, MDA
Borehole geophysics	H	H	L	H	MGS, Consultant Reports
Surface geophysics	M	M	L	M	DNR, MPCA, Consultant Reports

Assessment Results for the Data Elements, continued

Data Element	Present and Future Implications				Data Source
	Use of the Well (s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Land Use					
Parcel boundaries map	L	H	L	H	Stearns County
Political boundaries map	L	H	L	L	Stearns County, City of Avon
PLS map	L	H	L	L	City of Avon, MGEO
Land use map and inventory	H	L	H	H	City of Avon, Records, Stearns County
Comprehensive land use map	M	L	H	H	City of Avon, Stearns County
Zoning map	M	L	H	H	City of Avon, Stearns County, Avon Township
Public Utility Services					
Transportation routes and corridors					
Records of well construction, maintenance, and use	H	H	H	M	City of Avon, CWI, MDH files
Groundwater Quantity					
Permitted withdrawals	H	H	H	H	DNR
Groundwater use conflicts	M	M	H	H	DNR
Water levels	H	H	H	M	DNR, MDH, City of Avon
Groundwater Quality					
Monitoring data	H	H	H	H	MPCA, MDH
Isotopic data	M	M	M	M	MDH
Tracer studies	M	M	M	M	Not Available
Contamination site data					MPCA, MDA
Property audit data from contamination sites					City of Avon, MPCA

Figure Two – Land Use Map

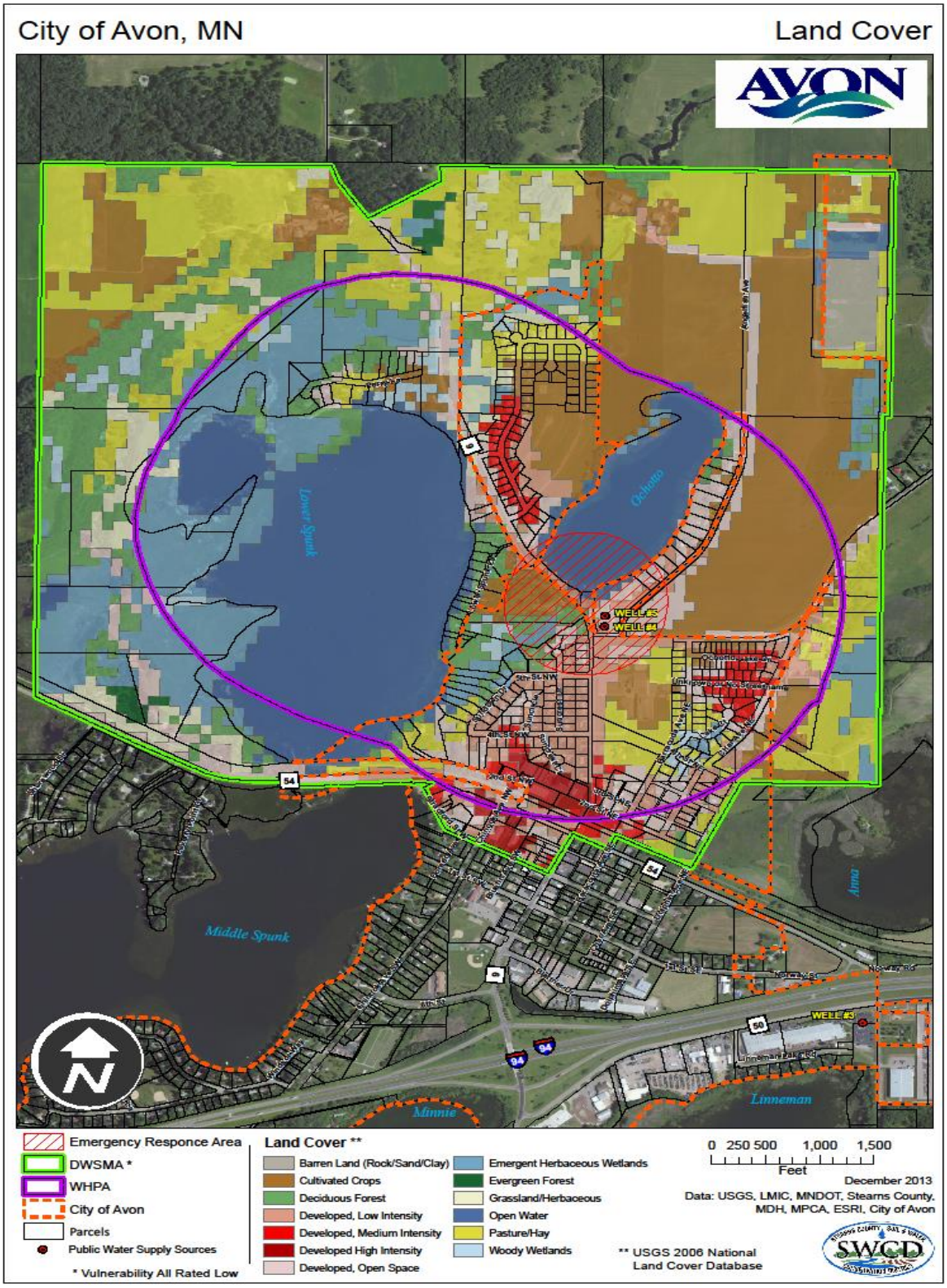


Figure Three – Zoning within the City of Avon DWSMA

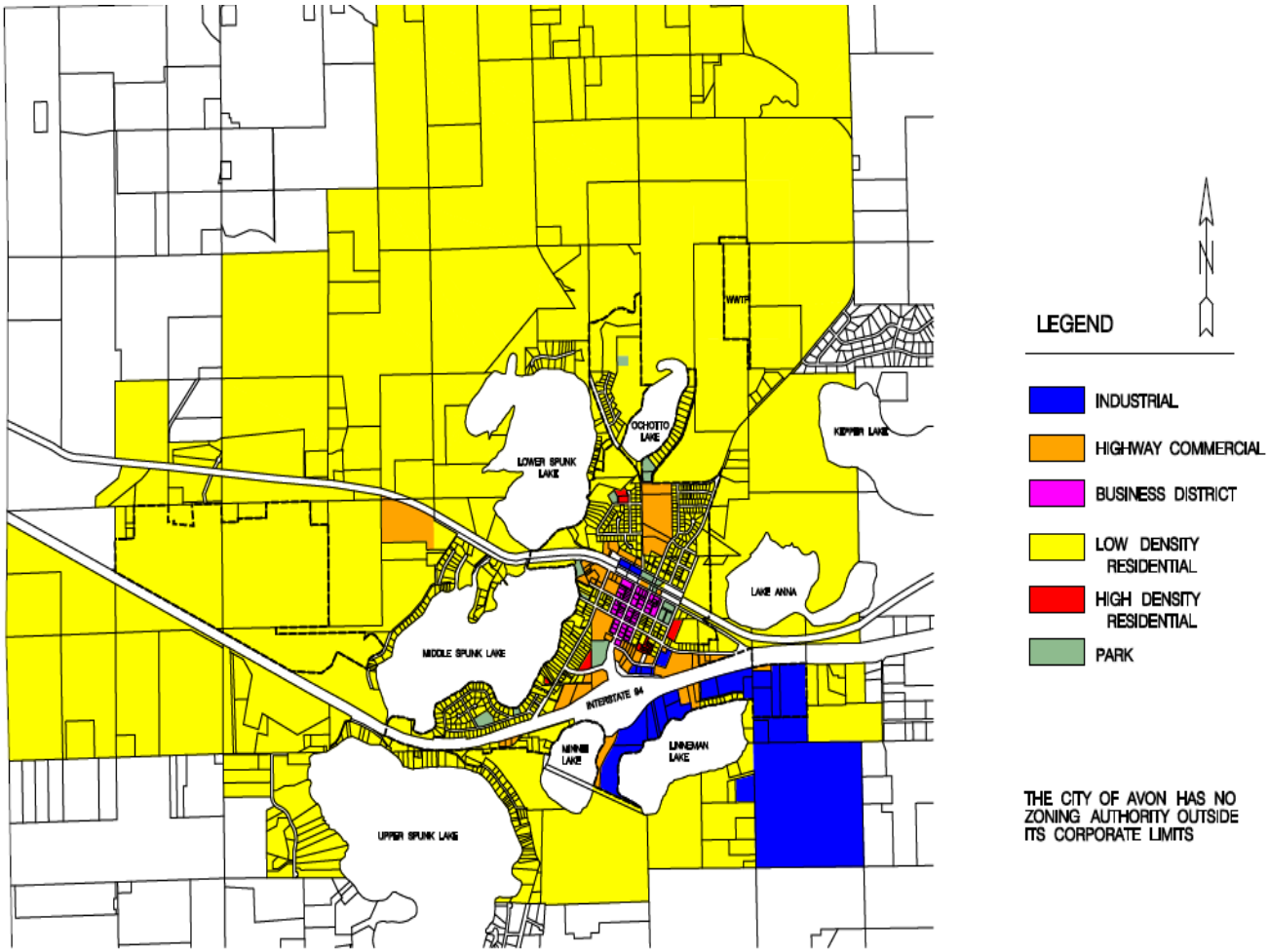


Figure Four: Zoning within the Avon Township

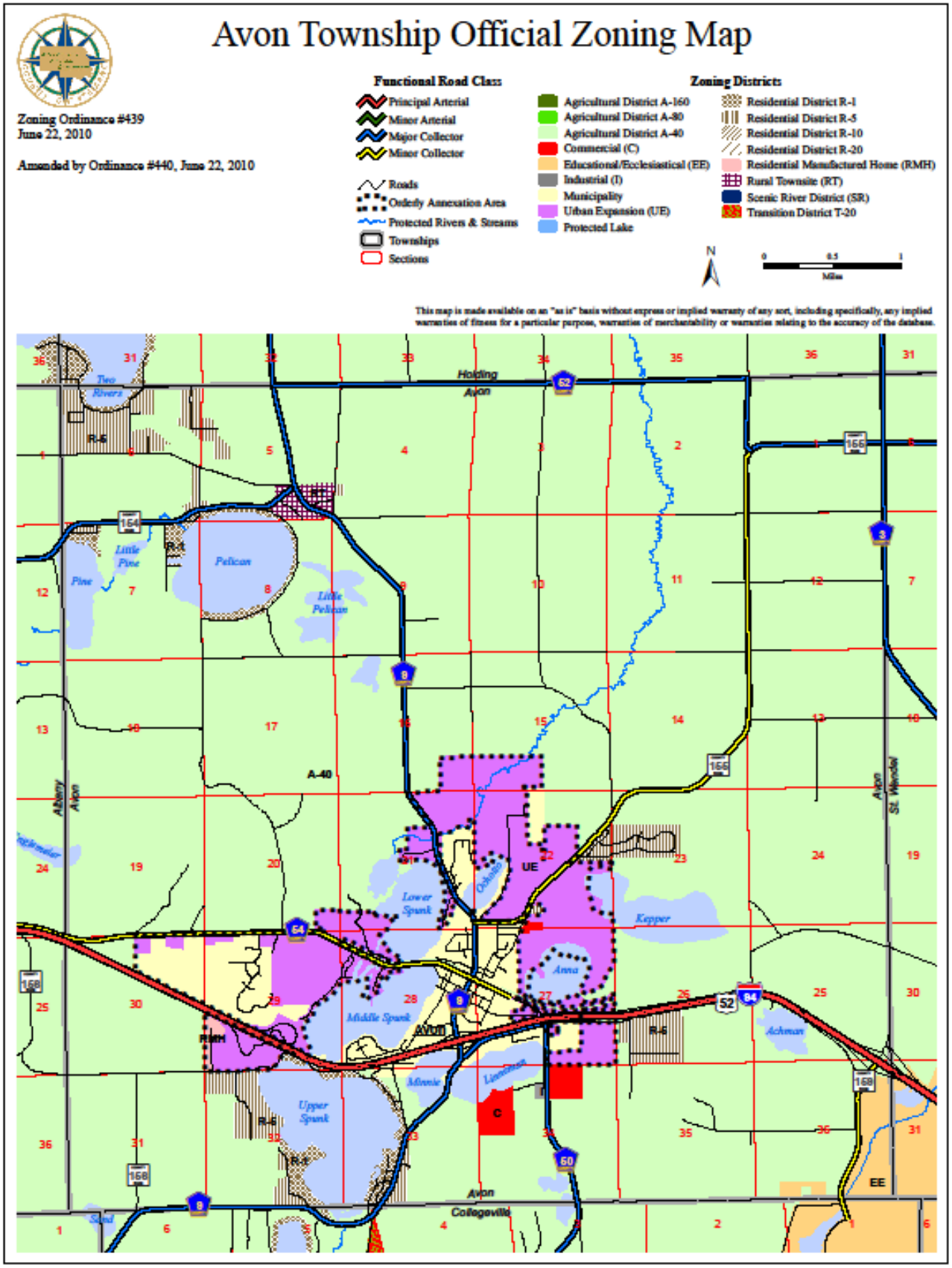


Figure Five – Potential Contaminant Sources within the City of Avon DWSMA

Chapter 3 - Delineation of the Wellhead Protection Area, Drinking Water Supply Management Area and Vulnerability Assessments

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 Appendix I. The Public Water Supplier requested that MDH do this work and it was performed by Tracy J. Lund and Joy E. Loughry, who are licensed as geoscientists by the State of Minnesota.

3.1 WHPA and DWSMA Delineation

Figure 1 shows the boundaries of the WHPA and the DWSMA. The WHPA was delineated using computer simulations of groundwater movement to generate the underground capture zones for city Wells 4 (Unique No 696861), Well 5 (Unique No. 696862). The WHPA for these water supply wells is shown in Figure 1.

The WHPA for Well 3 (242069) is defined by a using a circular area with a 200-foot radius that is called the inner wellhead management zone (IWMZ). This well does not have a formal capture zone because it is pumped for emergency use only. However, the IWMZ is used to protect the well from potential contamination sources that may cause an acute health impact should the well become operational. The map showing the IWMZ for this well is shown in Figure 1.

The DWSMA boundaries were designated using the following criteria:

- Center-lines of highways, streets, roads, or railroad rights-of-ways;
- Public Land Survey coordinates;
- Property or fence lines, and
- Political boundaries.

3.2 Well Vulnerability Assessment

The construction and water quality obtained from each primary and emergency backup well used by the City of Avon Public Water Supplier is included in the assessment of well vulnerability. The vulnerability of the city wells is considered low because they are constructed so that each well is adequately sealed into the borehole and does not pump water that contains human-caused contaminants.

3.3 DWSMA Vulnerability Assessment

The low vulnerability assigned to the DWSMA (Appendix I) was determined using geologic, soils, and groundwater chemistry information and indicates that at least 10 feet of clay-rich geological material covers the source water aquifer. .

Chapter 4 - Establishing Priorities and Assigning Risk to Potential Contamination Sources

The types of potential contamination sources that may exist within the DWSMA were derived from the information collected to satisfy the data element requirements (Chapter 2). The impact assigned to each data element as part of the assessment process (Table 1) was used to assess the types of potential contamination sources that may present a risk to the city's drinking water supply. The low vulnerability assessment for the DWSMA indicates that, generally, only wells, other types of boreholes, excavations that may reach the aquifer and certain types of Environmental Protection Agency Class V Wells are likely to impact the city wells.

4.1 Contaminants of Concern

None of the human-caused contaminants regulated under the federal Safe Drinking Water Act have been detected at levels indicating that any well itself serves to draw contaminants into the aquifer as a result of pumping.

4.2 Inventory Results and Risk Assessment

A description of the locations of potential contamination sources is presented in Appendix II. A summary of the results for the IWMZ is listed in Table 2 and Table 3 presents these results for the remainder of the DWSMA. The priority assigned to each type of potential contamination source addresses 1) the number inventoried, 2) its proximity to a city well, 3) the capability of local geologic conditions to absorb a contaminant, 4) the effectiveness of existing regulatory controls, 5) the time required for the Public Water Supplier to obtain cooperation from governmental agencies that regulate it, and 6) the administrative, legal, technical, and financial resources needed. A **high (H)** risk potential implies that the potential source type has the greatest likelihood to negatively impact the city's water supply and should receive highest priority for management. A **low (L)** risk potential implies that a lower priority for implementing management measures is assigned.

Table 2 - Potential Contamination Sources and Assigned Risk for the IWMZ

Source Type	Total	Level of Risk
Domestic Well (Rausch)	1	L
SSTS (Rausch)	1	H
City Test Well (689565)	1	H

Table 3 - Potential Contamination Sources and Assigned Risk for the Rest of the DWSMA

Potential Source Type	Total Number	Number Within Emergency Response Area and Level of Risk		Number Within Remainder of the DWSMA and Level of Risk	
Domestic Well >115 feet deep	7	1	H	6	H
Class V's (If found)	0	0	0	0	H
Domestic Wells - unknown depth	40	1	M	39	M

Chapter 5 - Impact of Land and Water Use Changes on the Public Water Supply Well(s)

The city estimates that the following changes to the physical environment; land use, surface water, and groundwater-may occur over the 10-year period that the WHP plan is in effect (Table 4). 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. Table 4 describes the anticipated changes to the physical environment, land use, and surface water or groundwater in relationship to the 1) influence that existing governmental land and water programs and regulations may have on the anticipated change, and 2) administrative, technical, and financial considerations of the Public Water Supplier and property owners within the DWSMA.

Table 4 - Expected Land and Water Use Changes

Expected Change (Physical Environment, Land Use, Surface Water, Groundwater)	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
Physical Environment: No change is anticipated	Does not apply	Does not apply	Does not apply
Land Use: • Anticipated increase in number of households. • Potential for annexing part of adjacent township which could include	• May need new wells. • Township wells would contribute few changes in the contamination zone, but irrigation practices could change static water levels.	The City of Avon administers the re-zoning and permitting of buildings within the city limits.	Reevaluation of water usage and maintenance over time.
Groundwater: • Increased residences anticipated. • Potential crop irrigation	This may alter current DWSMA boundaries	Groundwater appropriations permit from the DNR.	The City of Avon will request notification of all new applications within the DWSMA boundaries.

Chapter 6 - Issues, Problems, and Opportunities

6.1 Identification of Issues, Problems and Opportunities

The City of Avon has identified water and land use issues and 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 it received, 2) the data elements identified by MDH during the scoping meetings, and 3) the status and adequacy of the city's official controls and plans on land and water uses, in addition to those of local, state, and federal government programs. T

he 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 issues, problems and opportunities, including 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.

6.2 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 and comment. A public information meeting was held to review the results of the delineation of the wellhead protection area, DWSMA, and the vulnerability assessments. The meetings of the city's wellhead protection team were open to the public. 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:

- The public gave no comments.

Table 5 - 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
DWSMA is located within both city limits and township making it rest under multiple governmental jurisdictions.	Aquifer Well water quality DWSMA	Management and implementation of WHP may be delayed due to shared responsibility.	Increased communication and education of DWSMA and WHP between City of Avon and The Joint Planning Board (JPB)	Controls are adequate to address issue of intergovernmental jurisdiction of DWSMA.
Future Development, Annexation	Aquifer DWSMA Well water quality	Finding of unsealed wells and/or Class V wells	Increase of effective communication between City, Township and County.	Controls are adequate to address issues of annexation and future development

It is difficult to foresee or plan for the future. The City of Avon will use its planning and management capabilities within this plan to respond to any new/unknown source water protection issues that may impact the quality or quantity of its drinking water in the future.

Chapter 7 - Existing Authority and Support Provided by Local, State, and Federal Governments

In addition to its own controls, the City of Avon will 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 depends on its legal authority, as well as the resources available to local governments.

7.1 Existing Controls and Programs of the Public Water Supplier

The WHP committee feels adequate protection of the DWSMA is available through existing land use ordinances in the City of Avon, Avon Township, Stearns County and State for well and groundwater appropriation permits.

7.2 Local Government Controls and Programs

The following departments or programs within *Stearns* 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 6 - Local Agency Controls and Programs

Government Unit	Name of Control/Program	Program Description
Stearns County	Environmental Service & Water Planning	Zoning & Land use Ordinances, Comprehensive Land Use & Water Management Plan
City of Avon	Public Works & Zoning Administration.	Establishes countywide goals and priorities towards protecting water resources.
Stearns Co. Soil & Water Conservation District (SWCD)	Natural resources planning	Well Sealing Program & Urban Conservationist services.

7.3 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 to property owners to comply with these regulations.

The following table identifies the specific regulatory programs or technical assistance that state and federal agencies may provide to the Public Water Supplier to support implementation of the WHP plan. It is likely that other opportunities for assistance may be available over the 10-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 7- State and Federal Agency Controls and Programs

Government Unit	Type of Program	Program Description
MDH	State Well Code Minnesota Rules, Chapter 4725)	MDH has authority over the construction of new wells and the sealing of wells. MDH staff in the Well Management Program offer technical assistance for enforcing well construction codes, maintaining setback distances for certain contamination sources, and well sealing.
MDH	WHP	MDH has staff that will help the city identify technical or financial support that other governmental agencies can provide to assist with managing potential contamination sources.
DNR	Water Appropriation Permitting (Minnesota Rules, Chapter 6115)	DNR can require that anyone requesting an increase in existing permitted appropriations, or to pump groundwater, must address concerns regarding the impacts to drinking water if these concerns are included in a
EPA	Class V Program	EPA has primacy for all Class V's. Owners of Class V's are reqired to notify the EPA.

7.4 Support Provided by Nonprofit Organizations

The Stearns County Soil and Water Conservation District has been an important partner in this project.

Chapter 8 - 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 have presented to drinking water quality over time and 2) future changes that need to be addressed to protect the community's drinking water:

- Maintain the current level of water quality, which meets all state and federal standards.
- Increase awareness among public officials, land owners, and the general public about the importance of WHP in protecting the drinking water supply.
- Support ongoing data collection efforts to enhance future WHP activities.
- Provide sustainable funding for WHP activities as a budget item.
- Pursue other funding options for WHP activities

Chapter 9 - 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 (Chapter 2), 2) the potential contaminant source inventory (Chapter 4), 3) the impacts that changes in land and water use present (Chapter 5) and 4) issues, problems, and opportunities referenced to administrative, financial, and technical considerations (Chapter 6).

9.1 Objectives

The following objectives have been identified to support the goals of the WHP plan for the Public Water Supplier:

1. Create public awareness and general knowledge about the importance of WHP for maintaining an adequate and safe drinking water supply;
2. Identify, inventory and seal unused wells in an effort to eliminate any potential contamination threat to aquifer and wells.
3. Educate and inform residents with active wells on their property about proper well management.
4. Gather new information on potential contaminants, specifically wells.
5. Collect additional data to substantiate information contained within this Plan, and to provide more detail for future Plan amendments
6. Conduct regular evaluations of Plan implementation and effectiveness.

9.2 WHP Measures and Action Plan

Based upon the factors, 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.

- Data Collection
- IWMZ Management
- Land Use Management
- Potential Contamination Source Management
- Public Education and Outreach
- Reporting and Evaluation
- Water Use and Contingency Strategy

9.3 Establishing Priorities

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 a 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 needed to acquire cooperation from other agencies and cooperators.
- The resources needed, i.e., staff, money, time, legal, and technical resources.

The City of Avon defines a priority for implementing a WHP measure for the quality and high quantity drinking water they have come to expect. The following table lists each measure that will be implemented over the 10-year period that the city's WHP plan is in effect, including the priority assigned to each measure.

Table 8 - WHP Plan of Action

Category 1. Monitoring, Data Collection and Assessment

Well Inventory & Prioritization	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#1): Update the well inventory (spreadsheet and map) as new information is collected. Review the status of existing wells and add new wells identified in the DWSMA.	2	H	City, MDH	Staff time	Ongoing									
WHP Measure (#2): Update information about any known or suspected Class V wells in the DWSMA. Contact MDH Planner for assistance working with a suspected owner of a Class V well.	2	H	City, MDH	Staff time	Ongoing									
WHP Measure (#3): Prioritize unused wells for sealing based on their construction, condition, distance, depth and threat to the aquifer and public water supply wells. Pursue State and local grant funds to seal priority wells.	2	H	SWCD, MDH, City	Staff time	Ongoing									
WHP Measure (#4): Work with MDH to review old municipal well and boring information to help locate and determine efforts needed to address former city wells or borings without sealing records.	2	H	City, MDH	Staff time	Ongoing									
WHP Measure (#5): Complete a historical review of land uses and areas in the DWSMA suspected to have unused unsealed wells using Sanborn Fire Maps or local resources.	2	H	City, MDH	Staff time	X									

Category 2. Well Management

Municipal Well Management Practices	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#6): Monitor setbacks for all new potential sources of contamination within the IWMZ.	2	H	City, MDH	Staff time						X				
WHP Measure (#7): Monitor any non-conforming potential contaminant sources identified in the IWMZ.	2	H	City, MDH	Staff time	Ongoing									
WHP Measure (#8): Work with MDH Hydrologist to determine whether the recorded spill at Casey's Gas station or other future spills may present a risk to community well(s) and drinking water quality.	2	M	City, MDH	Staff time		X								
WHP Measure (#9: Provide a map of the DWSMA to the local Fire Dept., local Street Dept., County, and the MPCA State Emergency Response Coordinator, Walt Haas, as applicable pointing out the specific location of city wells near County Roads 9, 54 and 155. Request their awareness and prompt response to accidents, spills and clean-up efforts near the PWS wells.	1	M	City, Stearns County Highway Dept, MPCA	Staff time	X									

Category 2: Well Management, continued

Old Municipal Wells	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#10): Establish a budget to properly seal any newly identified or currently unlocated former municipal well(s). Obtain a cost estimate from local well driller. Apply for MDH SWP Grant funds to have the well properly sealed.	2	H	City, MDH	Staff time, sealing costs	X									
WHP Measure (#11): Obtain sealing records from the well driller to substantiate proper sealing of a former old Muni well and submit records to MDH.	2	H	City, MDH	Staff time	X									

Private Well Management	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#12): Provide information on the proper management and sealing of wells to landowners located in the DWSMA and why this is important.	1, 3	H	City, MDH, MRWA, SWCD, Avon Township	Staff time, $500		X					X			
WHP Measure (#13): Contact the County SWCD for information on the availability of well sealing cost share funds and provide this information to landowners in the DWSMA. Apply for a MDH SWP Grant to seal the high priority unused unsealed wells identified in the DWSMA.	2	H	City, SWCD, MDH	Staff time		X					X			

Category 2: Well Management, continued

Class V Wells	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#14): If a Class V Well is identified, work with MDH Planner to provide the property owner with management or and permitting options.	2	H	City, MDH, EPA	Staff time	Ongoing									

High Capacity Well Management	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#15): Identify any new high-capacity wells that are proposed for construction in or within one mile of the DWSMA.	4	M	City, MDH, DNR	Staff time	Ongoing									
WHP Measure (#16): If a new high capacity well is identified, contact MDH Hydrologist to evaluate the effect that proposed pumping may have on the boundaries of the delineated WHPA or DWSMA.	4	M	City, MDH, DNR	Staff time	Ongoing									

Category 3. Education and Outreach

WHP and Drinking Water Protection Education	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#17): Distribute the MN Rural Water Association's "Where Does My Drinking Water Come From?" or similar brochure to landowners in the DWSMA.	1	H	City, MDH, MRWA	Staff time, $500	X							X		
WHP Measure (#18): Post and highlight WHP education information on your city website or newsletter.	1	H	City, MDH, MRWA	Staff time, $1000		X				X				X
WHP Measure (#19): Select wellhead protection education items from the MN Rural Water Association source water protection website to use to educate the public about WHP in your community.	1	H	City, MDH, MRWA	Staff time		X				X				X
WHP Measure (#20): Annually offer a MRWA Water Week poster contest for the local 4th Grade School Teacher and ask their participation.	1	M	City, MRWA	Staff time	X	X	X	X	X	X	X	X	X	X
WHP Measure (#21): Contact the Sauk River Watershed District and request involvement in the Middle Sauk Water Festival. Request that groundwater and drinking water sessions be included.	1	M	City, SRWD	Staff time	X			X			X			X
WHP Measure (#22): Help sponsor the Middle Sauk Water Festival as grant funds become available.	1	M	City, MDH, SRWD	Staff time, $1000		X				X				X

Category 3: Education and Outreach, continued

Well Education	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#23): Provide information to property owners about the hazards of unused wells and options for correctly managing them by having them properly sealed or returning them to operating condition.	1, 3	H	City, MDH, MRWA	Staff time, $500		X								
WHP Measure (#24): Brief the mayor and city council about the potential for unused wells in the DWSMA and status of well sealing efforts. Describe resources needed and available to complete this effort.	1, 6	H	City	Staff time	Ongoing									
WHP Measure (#25): The City will explore the need to implement a cross connection control program.	4	M	City, MDH	Staff time, $1000			X							

Category 4. Land Use Planning

Water Use Management	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#26): Review and update the Emergency / Contingency Strategy Plan portion of the city's WHP plan to ensure that it reflects current personnel information and any changes in the water supply system to coincide with city elections.	5	H	City	Staff time	X	X	X	X	X	X	X	X	X	X
WHP Measure (#27): The City will use its newsletter and explore the possibility of a video presentation to educate the public on water conservation practices they can implement to reduce water use.	1	L	City	Staff time, $500		X				X				X

County Water Management Plans	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#28): Send a letter in support of the County Water Plan Coordinator including the DWSMA Map and identified local WHP issues and activities when the County Water Management Plan is updated.	1	H	City, SCESD	Staff time	X									

Category 4: Land Use Planning, continued

General Land Use & Water Resource Planning	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#29): Request to be notified by all jurisdictions with land use authority in the DWSMA about proposed zoning, rezoning, conditional use permits in the DWSMA.	1	M	City, Township, SCESD	Staff time	X									
WHP Measure (#30): Work with City's Planning Commission to address potential risks to the water supply wells & aquifer.	1	M	City	Staff time	Ongoing									
WHP Measure (#31): Work with local planning staff to explore and adopt a policy that property owners in a DWSMA can be requested or required to identify the location and status of any wells on their property as part of new building or land use permits issued.	1	M	City	Staff time	Ongoing									

Comprehensive Land Use Planning	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#32): Work with local planning & zoning staff to update their comprehensive plan to reflect existing WHP issues and identify changes to local controls that can be made to help protect the community water supply wells and aquifer.	1, 5	M	City	Staff time, $1500					X					

Category 5. WHP Coordination, Reporting and Evaluation

WHP Coordination	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#33): Annually coordinate an internal meeting with the city clerk, administrator, public works director, mayor or appropriate staff to discuss WHP Plan implementation and coordination. Discuss funding needs and pursuit of SWP Grant funds to help implement activities identified in the WHP Plan.	6	H	City	Staff time	X	X	X	X	X	X	X	X	X	X

Annual Implementation, Tracking and Reporting Activities	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#34): Complete and submit an annual year end report on completed WHP activities to your city council or utility board.	1, 6	H	City	Staff time	X	X	X	X	X	X	X	X	X	X
WHP Measure (#35): Maintain a "WHP folder" that contains documentation of WHP activities you have completed and a date that it was done.	6	H	City	Staff time	X	X	X	X	X	X	X	X	X	X
WHP Measure (#36): Develop a spreadsheet that coincides with measures found in your plan to track and monitor plan implementation activities and completion dates.	6	H	City, SWCD	Staff time	X									

Category 5: WHP Coordination, Reporting and Evaluation, continued

WHP Program Evaluation Plan Reporting	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WHP Measure (#37): 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.	**5, 6**	**H**	**City, MDH**	**Staff time**			X		X			X		

9.4 Commitments From Cooperators

The agencies listed in Table 9 have indicated they will support the City of Avon, with implementing the WHP measure(s) in which they are identified.

Table 9 - Cooperating Agencies List

Agency	Measure
MDH	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 25, 37
MPCA	9
EPA	14
DNR	15, 16
SWCD	3, 12, 13, 36
Stearns County Highway Department	9
SCESD	28, 29
SRWD	21, 22
MRWA	12, 17, 18, 19, 20, 23,
Avon Township	12, 29

Chapter 10 - Evaluation Program

Evaluation is used to support plan implementation and is required under Minnesota Rules, part 4720.5270, prior to amending the city's WHP plan. Plan evaluation is specified under Objective VI 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. The city has identified the following procedures that it will use to evaluate the success with implementing its WHP plan:

1. An annual briefing to the city council will provide the basis for documenting whether each action step for that year was implemented.
2. 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 the implementation of action steps throughout the DWSMA;
3. The city will assess the results of each action item that has been taken annually to determine whether the action item has accomplished its purpose or whether modification is needed. Assessment results will be presented in the annual report to the city council.
4. 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 held with the city to begin amending the WHP plan.

Chapter 11 - Contingency Strategy

The WHP plan includes a contingency strategy that addresses disruption of the water supply caused by either contamination or mechanical failure. The city prepared this strategy using a template provided by MDH and presented in Appendix III of this plan. A copy of this plan is available for public review during regular business hours at the city offices and is referenced in this section.

Appendices

Appendix I: Well Head Protection Plan – Part I

Wellhead Protection Plan

Part I

Wellhead Protection Area Delineation
Drinking Water Supply Management Area Delineation
Well and Drinking Water Supply Management Area Vulnerability Assessments

For

City of Avon

November 2012

Tracy J. Lund
Joy E. Loughry

Minnesota Department of Health

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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.

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

FSA - Farm Security Administration

MDA - Minnesota Department of Agriculture

MDH - Minnesota Department of Health

MGS - Minnesota Geological Survey

MnDOT - Minnesota Department of Transportation

MnGEO - Minnesota Geospatial Information Office

MPCA - Minnesota Pollution Control Agency

NRCS - Natural Resource Conservation Service

SWCD - Soil and Water Conservation District

UMN - University of Minnesota

USDA - United States Department of Agriculture

USGS - United States Geological Survey

1. Introduction

The Minnesota Department of Health (MDH) developed Part I of the wellhead protection (WHP) plan at the request of the city of Avon (PWSID 1730002). The work was performed in accordance with the Minnesota Wellhead Protection Rule, parts 4720.5100 to 4720.5590.

This report presents delineations of the wellhead protection area (WHPA) and drinking water supply management area (DWSMA), and the vulnerability assessments for the city wells and DWSMA. Figure 1 shows the boundaries for the WHPA and the DWSMA. The WHPA is defined by a 10-year time of travel. Figure 1 also shows the emergency response area (ERA), which is defined by a 1-year time of travel. An inner wellhead management zone (IWMZ), which is the area within a 200-foot radius around the well, serves as the wellhead protection area for emergency wells and is not displayed in this report. Definitions of rule-specific terms that are used are provided in the "Glossary of Terms."

This report also documents the technical information that was required to prepare this portion of the WHP plan in accordance with the Minnesota Wellhead Protection Rule. Additional technical information is available from MDH.

The wells included in the WHP plan are listed in Table 1.

Table 1 - Water Supply Well Information

Local Well ID	Unique Number	Use/ Status[1]	Casing Diameter (inches)	Casing Depth (feet)	Well Depth (feet)	Date Constructed/ Reconstructed	Aquifer[2]	Well Vulnerability
3	242069	E	12	50	70	1979	QWTA	Vulnerable
4	696861	A, P	12	231	251	2003	QBAA	Not Vulnerable
5	696862	A, P	12	220	240	2003	QBAA	Not Vulnerable

Note: 1. Active (A), Primary (P), Emergency Backup (E)

2. QWTA: Quaternary water table aquifer, i.e. shallow sand and gravel materials; QBAA: Quaternary buried artesian aquifer, i.e. deep confined sand and gravel materials

2. Assessment of the Data Elements

MDH staff met with representatives of the city of Avon on February 24, 2011, for a scoping meeting that identified the data elements required to prepare Part I of the WHP plan. Table 2 presents the assessment of these data elements relative to the present and future implications of planning items that are specified in Minnesota Rules, part 4720.5210.

Table 2 - Assessment of Data Elements

Data Element	Present and Future Implications				Data Source
	Use of the Well (s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Precipitation					
Geology					
Maps and geologic descriptions	M	H	H	H	MGS, DNR, USGS, Consultant Reports
Subsurface data	M	H	H	H	MGS, MDH, DNR
Borehole geophysics	M	H	H	H	None Available
Surface geophysics	L	L	L	L	DNR, MPCA
Maps and soil descriptions					
Eroding lands					
Water Resources					
Watershed units					
List of public waters					
Shoreland classifications					
Wetlands map					
Floodplain map					
Land Use					
Parcel boundaries map	L	H	L	L	Stearns County
Political boundaries map	L	H	L	L	MnGEO
PLS map	L	H	L	L	MnGEO
Land use map and inventory	M	H	M	M	None Available
Comprehensive land use map	L	L	L	L	None Available
Zoning map	L	L	L	L	None Available
Public Utility Services					
Transportation routes and corridors					
Storm/sanitary sewers and PWS system map					
Oil and gas pipelines map					
Public drainage systems map or list					
Records of well construction, maintenance, and use	H	H	H	H	City of Avon, CWI, MDH files
Surface Water Quantity					
Stream flow data					
Ordinary high water mark data					
Permitted withdrawals					
Protected levels/flows					
Water use conflicts					
Groundwater Quantity					
Permitted withdrawals	H	H	H	H	DNR
Groundwater use conflicts	H	H	H	H	DNR
Water levels	H	H	H	H	DNR, MDH

Data Element	Present and Future Implications				Data Source
	Use of the Well (s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Surface Water Quality					
Stream and lake water quality management classification					
Monitoring data summary					
Groundwater Quality					
Monitoring data	H	H	H	H	MDH
Isotopic data	H	H	H	H	MDH
Tracer studies	H	H	H	H	None Available
Contamination site data	M	M	M	M	MPCA, MDA
Property audit data from contamination sites					
MPCA and MDA spills/release reports					

Definitions Used for Assessing Data Elements:

High (H) - the data element has a direct impact

Moderate (M) - the data element has an indirect or marginal impact

Low (L) - the data element has little if any impact

Shaded - the data element was not required by MDH for preparing the WHP plan

Acronyms used in this report are listed on page ii, after the "Glossary of Terms."

3. General Descriptions

3.1 Description of the Water Supply System

The city of Avon obtains its drinking water supply from two primary wells; Table 1 summarizes information regarding them.

3.2 Description of the Hydrogeologic Setting

The description of the hydrologic setting for the primary aquifer used to supply drinking water is presented in Table 3.

Table 3 - Description of the Hydrogeologic Setting

Attribute	Descriptor	Data Source
Aquifer Material	Unconsolidated sand and gravel materials	CWI
Porosity Type and Value	Primary: 25%	Fetter, 2001
Aquifer Thickness	Aquifer thickness in the city well field is 27 to 30 feet. Lateral extent of the aquifer unit is unknown, as underlying bedrock topography is highly irregular in the Avon area and no other wells within 6 miles penetrate the same deep aquifer.	CWI; geologic cross sections (Figures 4, 5 and 6) and area well logs
Stratigraphic Top Elevation	Varies between 919 and 924 feet, MSL, in the well field area.	CWI; geologic cross sections (Figures 4, 5 and 6) and area well logs
Stratigraphic Bottom Elevation	Varies between 889 and 897 feet, MSL, in the well field area.	CWI; geologic cross sections (Figures 4, 5 and 6) and area well logs
Hydraulic Confinement	Confined	CWI; geologic cross sections (Figures 4, 5 and 6) and area well logs
Transmissivity	Range of Values: 50 – 6,900 $ft^{2/}$day	A range of transmissivity values was used to reflect changes in aquifer composition and thickness as well as uncertainties related to the quality of existing aquifer test data. See Table 4 for the reference value.
Hydraulic Conductivity	Range of Values: 3.9 – 810 ft/day	The range of values was derived using specific capacity data obtained from area well records.
Groundwater Flow Field	See Figure 2 - Ambient Groundwater Flow Field	Defined by using static water level elevations from well records in the CWI database and documents listed in the "Selected References" section of this report.

Figures 3, 4, 5, and 6 show the distribution of the aquifer and its stratigraphic relationships with adjacent geologic materials. They were prepared using well record data that is contained in the CWI database. The geological maps and studies that were used to further define local hydrogeologic conditions are provided in the "Selected References" section of this report.

4. Delineation of the Wellhead Protection Area

4.1 Delineation Criteria

The boundaries of the WHPA for the city of Avon are shown in Figure 1. Table 4 describes how the delineation criteria that are specified under Minnesota Rules, part 4720.5510, were addressed.

Table 4 - Description of WHPA Delineation Criteria

Criterion	Descriptor	How the Criterion was Addressed
Flow Boundary	None	There are no known flow boundaries close enough to the Avon city wells to have an impact on their capture areas.
Flow Boundary	Other High-Capacity Wells	There are no high-capacity wells other than the city's water supply wells within 3 miles of Avon.
Daily Volume of Water Pumped	See Table 5	Pumping information was obtained from the DNR, Appropriations Permit 1962-0203, and was converted to a daily volume pumped by a well.
Groundwater Flow Field	See Figure 2	The model calibration process addressed the relationship between the calculated versus observed groundwater flow field.
Aquifer Transmissivity (T)	Reference Value: 3,615 ft^2/day	The aquifer test plan was approved on August 17, 2012 and T was determined from a specific capacity test conducted on Avon 5 (696862) on July 7, 2003. Uncertainty regarding aquifer transmissivity was addressed as described in Section 4.4.
Time of Travel	10 years	The public water supplier selected a 10 year time of travel.

Information provided by the city was used to identify the maximum volume of water pumped annually by each well over the previous five-year period, as shown in Table 5. Also, the estimated maximum pumping for the next five years is shown. Previous pumping values have been reported to the DNR, as required by the city's Groundwater Appropriation Permit No. 1962-0203. The maximum daily volume of discharge used as an input parameter in the model was calculated by dividing the greatest annual pumping volume by 365 days.

Table 5 - Annual Volume of Water Discharged from Water Supply Wells

Well Name	Unique No.	2007	2008	2009	2010	2011	Future Maximum Pumping	Daily Volume
4	696861	5,800,000	8,700,000	**45,200,000**	43,759,000	31,002,000	45,200,000	123,836
5	696862	**46,600,000**	36,600,000	700,000	0	15,078,000	46,600,000	127,671

(Expressed as gallons. Bolding indicates greatest annual pumping volume.)

4.2 Method Used to Delineate the Wellhead Protection Area

The WHPA for the city of Avon's wells was determined using a combination of two methods. The first involved calculating the groundwater capture zones deterministically using representative aquifer parameters that were input into MLAEM, a groundwater modeling code (Strack, 1989). The second approach used the stochastic analytical groundwater flow method Oneka (Barnes and Soule, 2002). The results of these separate analyses are presented in Figure 6. The resulting WHPA boundaries are a composite of the capture zones calculated using these two approaches (Figure 1). The input files for both models are available at MDH upon request.

The MLAEM Code was selected because it is a semi-quantitative method capable of simulating the influence of vertical infiltration and the pumping influence of multiple high-capacity wells, if necessary. It produces a conservative estimate because aquifer recharge is not used as an input parameter. It is appropriate to use MLAEM for these particular delineations because no flow boundaries were directly observed in drillers' logs in the area around the primary city wells, at least in the areas defined by a 1-year and 10-year time of travel.

The second code, using the analytical groundwater flow method named Oneka (Barnes and Soule, 2003), was used to assess the probability of impacts that local variations in hydrogeologic conditions may have on a well capture zone. This model treats the aquifer properties and the available water level measurements as variable input parameters. The locations of wells, water levels, and the aquifer geometry were evaluated using information from the CWI database. For the solution, Oneka finds the flow field that best fits the network of water level elevations by varying the values of the aquifer thickness and transmissivity. Oneka then evaluates the probability of the capture of a given point based on the number of times it is included in the capture areas generated by the total number of solutions. The output from the model is a capture zone probability map for the specified time of travel (10 years).

4.3 Results of Model Calibration and Sensitivity Analysis

Model calibration is a procedure that compares the results of a model based on estimated input values to measured or known values. This procedure can be used to define model validity over a range of input values, or it helps determine the level of confidence with which model results may be used. As a matter of practice, groundwater flow models are usually calibrated using static water elevations.

However, owing to the limited amount of water elevation data for the aquifer used by the city of Avon, a flowpath model based on available hydraulic head observations was calculated and a model uncertainty analysis was conducted in place of a traditional model calibration. Flowpath lines were calculated in the MLAEM Model using equations that reflected 1) a constant pumping rate, 2) direction of groundwater flow, 3) hydraulic gradient, 4) aquifer thickness, 5) aquifer permeability, and 6) aquifer porosity. As such, it is a simple calculation of the portion of the aquifer that contributes water, based on the width of the flow field that is affected by pumping.

The Oneka Model is used to support the MLAEM model results by using an iterative process which provides the best fit for the ranges of values assigned to its input parameters. This helps to define the subset of values for which the delineation results are most likely to reflect local hydrogeologic conditions and, therefore, provide the best calibration results.

Model sensitivity is the amount of change in model results caused by the variation of a particular input parameter. Because of the simplicity of the MLAEM model used, the direction and extent of the modeled capture zone may be very sensitive to any of the input parameters:

- The <u>pumping rate</u> directly affects the volume of the aquifer that contributes water to the well. An increase in pumping rate leads to an equivalent increase in the volume of aquifer within the capture zone, proportional to the porosity of the aquifer materials. However, the pumping rate is based on the results presented in Table 5 and, therefore, is not a variable factor that will influence the delineation of the WHPA.

- The direction of groundwater flow determines the orientation of the capture area. Variations in the direction of groundwater flow will not affect the size of the capture zone but are important for defining the areas that are the source of water to the well. The ambient groundwater flow field that is defined in Figure 2 provides the basis for determining the extent to which each model run reflects the conceptual understanding of the orientation of the capture area for a well.
- An hydraulic gradient of zero produces a circular capture zone, centered on the well. As the hydraulic gradient increases, the capture zone changes into an elliptical shape, with the well centered on the down-gradient focal point. The hydraulic gradient was determined by using water level elevations that were taken from wells that have verified locations (Figure 2) and were screened within deep Quaternary sand and gravel aquifer units of similar depth to the aquifer used by the Avon city wells. Generally, the accuracy of the hydraulic gradient determination is directly proportional to the amount of available data that describes the distribution of hydraulic head in the aquifer.
- The aquifer thickness, permeability, and porosity influence the size and shape of the capture zone. A decrease in either thickness or porosity causes a linear, proportional increase in the areal extent of the capture zone; whereas permeability defines the relative proportions of the capture zone width to length. A decrease in permeability decreases the length of the capture zone and increases the distance to the stagnation point, making the capture zone more circular in shape and centered around the well.

4.4 Addressing Model Uncertainty

Using computer models to simulate groundwater flow necessarily involves representing a complicated natural system in a simplified manner. Local geologic conditions may vary within the capture area of the Avon city wells, but the amount of existing information that is needed to accurately define this degree of variability is often not available for portions of the WHPA. In addition, the current capabilities of groundwater flow models may not be sufficient to represent the natural flow system exactly. However, the results are valid within a range defined by the reasonable variation of input parameters for this delineation setting.

The MLAEM Code, used as it was in this delineation, has limited capabilities in addressing these kinds of uncertainties, other than by using multiple runs in which the following six input parameters are varied: 1) constant pumping rate, 2) hydraulic gradient, 3) direction of ambient flow, 4) aquifer thickness, 5) aquifer permeability, and 6) porosity. The uncertainty associated with the MLAEM model results from 1) the model deficiencies mentioned above, and 2) the fact that the model cannot be calibrated. The steps employed for this delineation to address model uncertainty were:

1) Pumping Rate - For each well, a maximum historical (five-year) pumping rate or an engineering estimate of future pumping, whichever is greater (Minnesota Rules, part 4720.5510, subpart 4).
2) Ambient Flow Field - A composite of capture zones created from angles of flow that are 10 degrees greater and 10 degrees lesser than the representative angle of ambient flow (Minnesota Rules, part 4720.5510, subpart 5, B(2).
3) Probability Analysis - The Oneka Model was used to estimate capture zone probability.

Capture areas were developed for a range of groundwater flow directions, aquifer permeabilities, and times of travel of one and ten years (Figure 7). As the model code uses constant input values for each

run, several runs were required to include all variations in input parameters. Table 6 documents the variables used to address MLAEM model uncertainty.

Table 6 - Model Parameters Used in MLAEM Model Runs

File Name	Well Name	Discharge (m^3/day)	Transmissivity (m^2/day)	Gradient	Flow Angle	Porosity (%)	Aquifer Thickness (meters)	Remarks
Avon_base .txt	4 (696861)	468.8	334.6	0.0014	N 122°E	25	8.2	Base flow direction
	5 (696862)	483.3						
Avon_ minus10.txt	4 (696861)	468.8	334.6	0.0014	N 132°E	25	8.2	Base flow direction minus 10 degrees
	5 (696862)	483.3						
Avon_ plus10.txt	4 (696861)	468.8	334.6	0.0014	N 112°E	25	8.2	Base flow direction plus 10 degrees
	5 (696862)	483.3						

Oneka Model - Uncertainty related to water levels reported on well records is based on the accuracy of the ground elevation assigned to the well using topographic maps and the transient variability of the water levels in the aquifer over time. Water levels that are probably inaccurate were identified using data from 1) the CWI database, and 2) DNR observation well measurements. Only water levels that fit the flow field (Figure 2) were used for the Oneka analysis.

The Oneka Model helps to address uncertainties related to aquifer parameters as variations of the flow field. A 10-year capture zone probability map (Figure 7) was generated for the city of Avon's wells; the values used for the Oneka Model are shown in Table 7. The Oneka results fit well with the capture zones calculated from the MLAEM model. The probability map for the city's wells shows that uncertainty of the capture zone increases as the distance from the wells increases (Figure 7).

Table 7 - Range of Values Used for the Oneka Model

File Name	Well Number	Hydraulic Conductivity (meters/day)	Thickness (meters)	Porosity (%)
Avon_4.one	4 (696861)	1.18 - 247	8.7	25
Avon_5.one	5 (696862)	1.18 - 247	8.7	25

5. Delineation of the Drinking Water Supply Management Area

The boundaries of the Drinking Water Supply Management Area (DWSMA) were defined by the public water supplier using the following features (Figure 1):

- Center-lines of highways, streets, or roads;
- Public Land Survey coordinates;
- Property or fence lines; and
- Political boundaries.

6. Vulnerability Assessments

The Part I wellhead protection plan includes the vulnerability assessments for the city of Avon's wells and DWSMA. These vulnerability assessments are used to help define potential contamination sources within the DWSMA and select appropriate measures for reducing the risk that they present to the public water supply.

6.1 Assessment of Well Vulnerability

The vulnerability assessment for each well used by the city of Avon is listed in Table 1 and is based upon the following conditions:

1) Well construction meets current State Well Code specifications (Minnesota Rules, part 4725) and the well itself does not provide a pathway for contaminants to enter the aquifer used by the public water supplier;
2) The geologic conditions at the well site include a cover of clay-rich geologic materials over the aquifer that is sufficient to retard or prevent the vertical movement of contaminants; and
3) None of the human-caused contaminants regulated under the federal Safe Drinking Water Act have been detected at levels indicating that the well itself serves to draw contaminants into the aquifer as a result of pumping.

6.2 Assessment of Drinking Water Supply Management Area Vulnerability

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

1) Isotopic and water chemistry data from wells located within the DWSMA indicate that the aquifer contains water that has no detectable levels of tritium 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 a low geologic sensitivity throughout the DWSMA and is isolated from the direct vertical recharge of surface water.
3) Arsenic, which is a naturally-occurring contaminant, has been detected in the water from Avon city wells 4 (696861) and 5 (696862). However, the presence of a naturally-occurring contaminant does not indicate that there is a direct pathway between the aquifer and potential contamination sources that occur at or near the land surface.

7. Selected References

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Figures

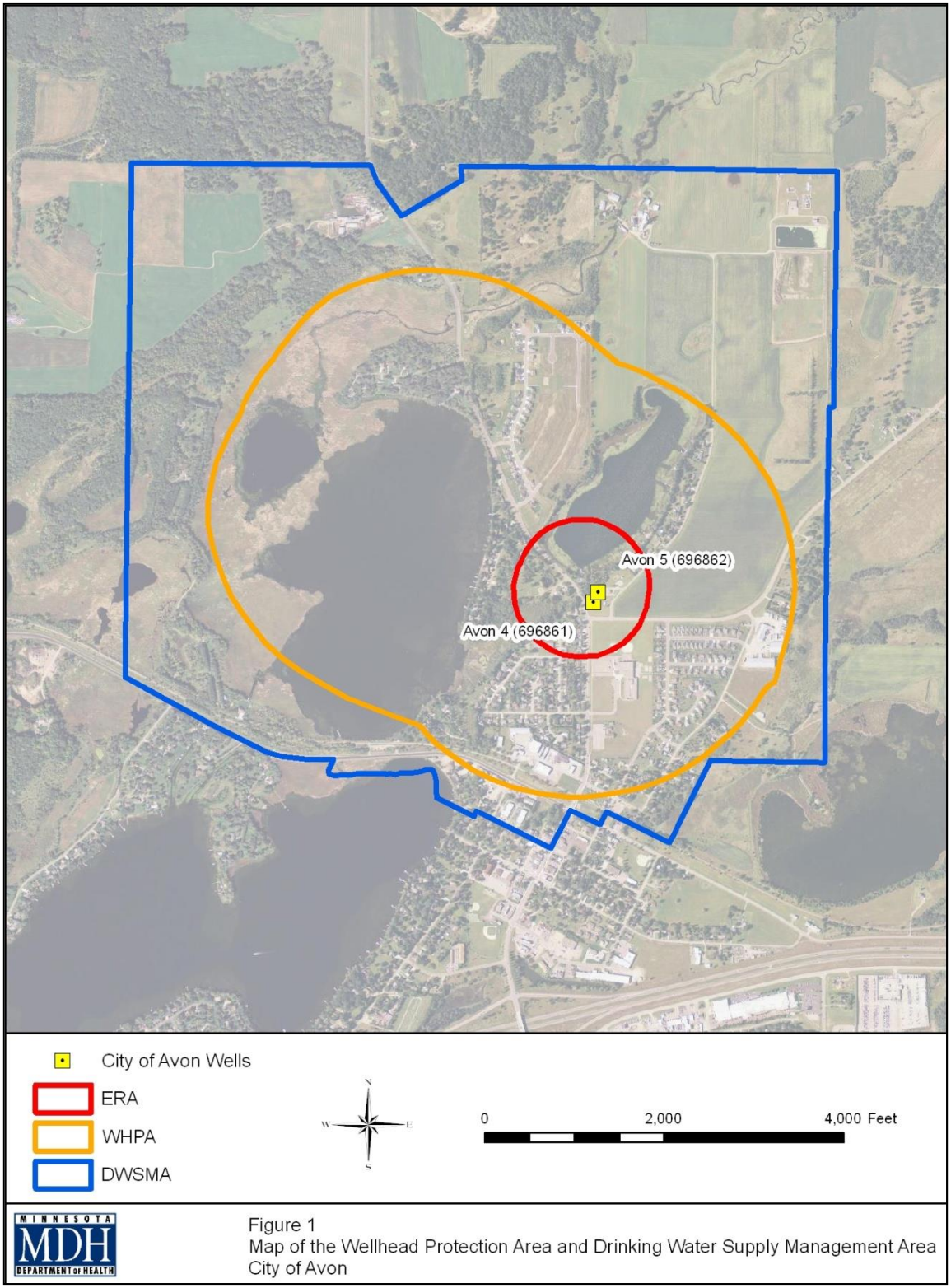
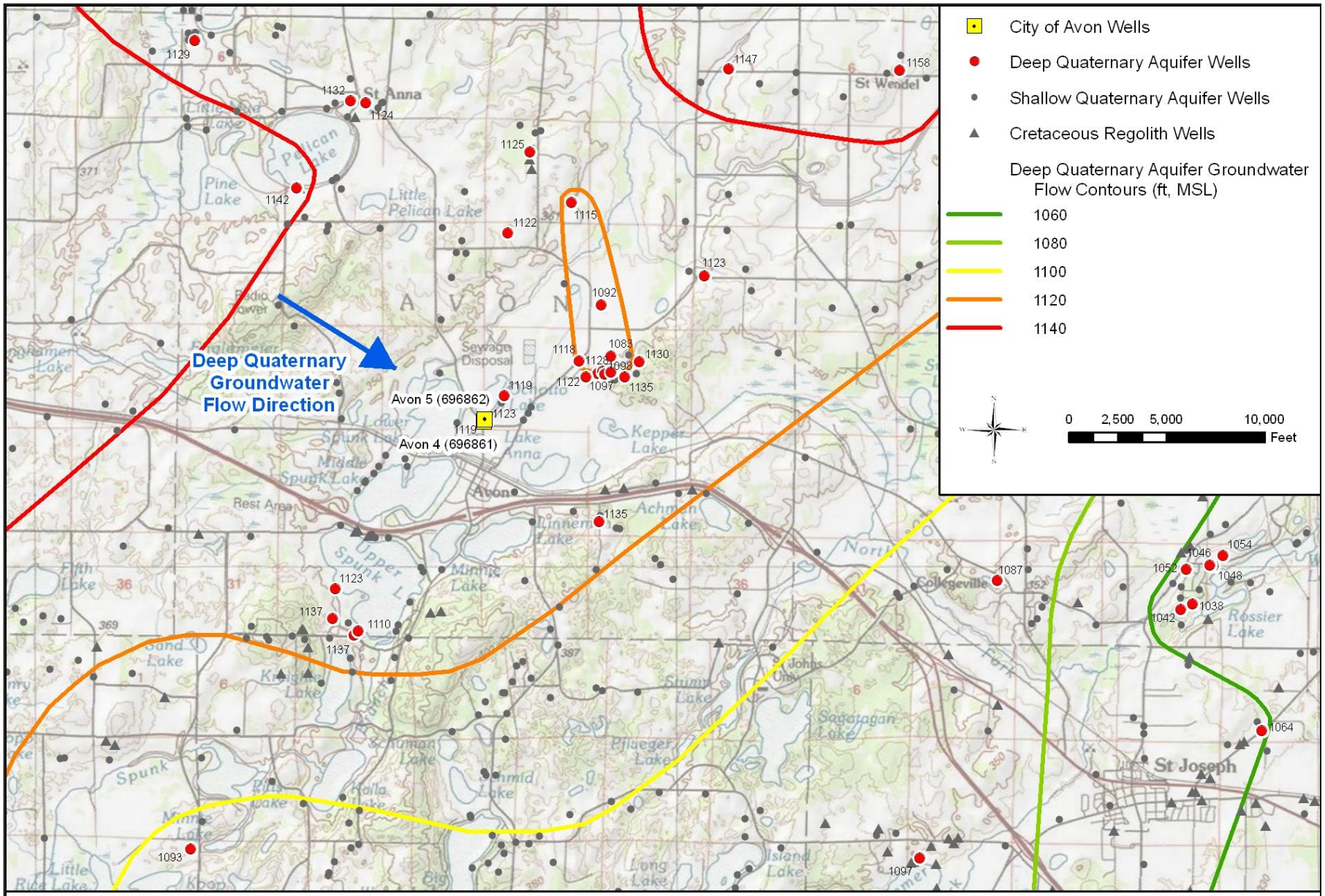
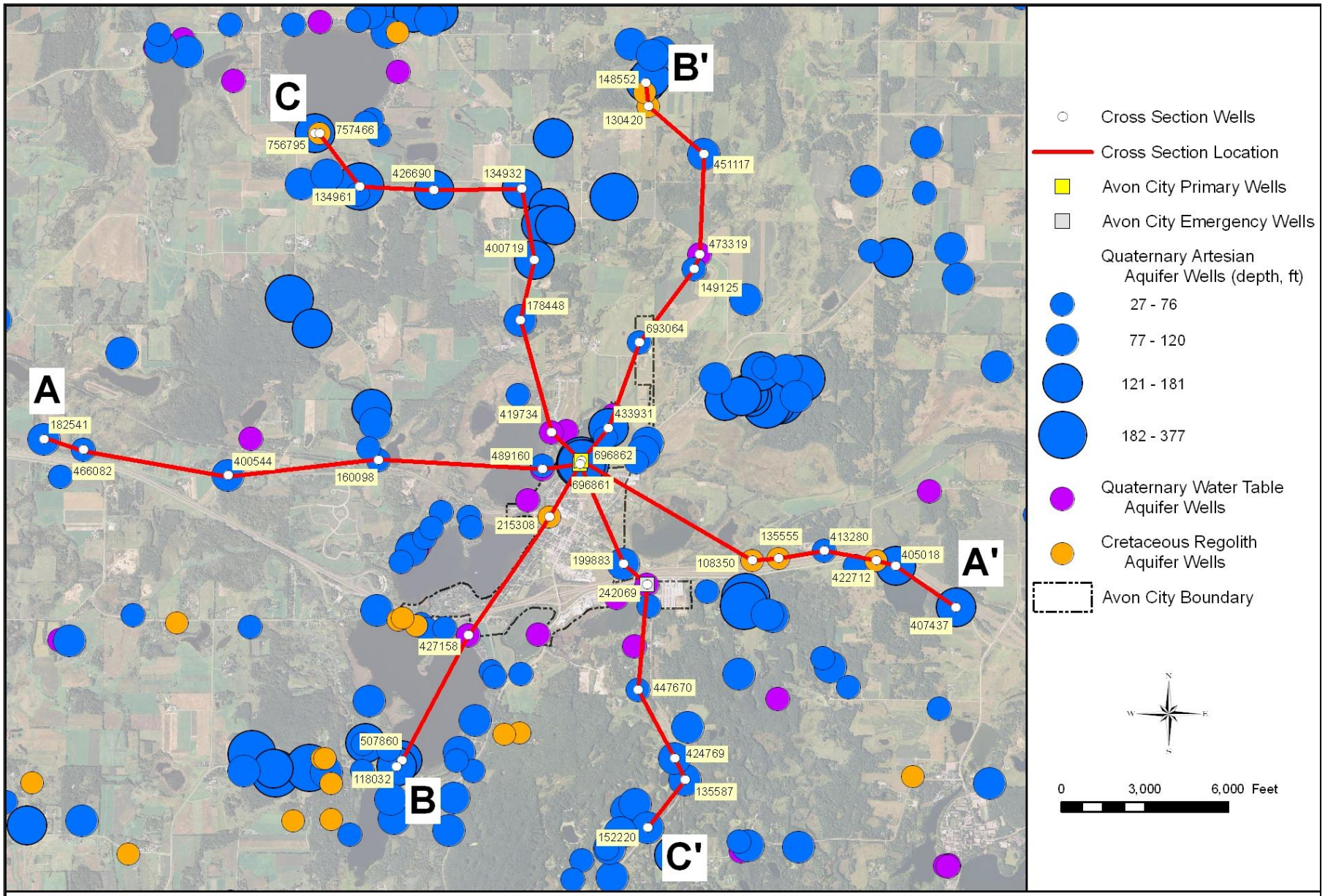


Figure 1
Map of the Wellhead Protection Area and Drinking Water Supply Management Area
City of Avon



MINNESOTA MDH DEPARTMENT OF HEALTH

Figure 2
Ambient Groundwater Flow Field
City of Avon



MINNESOTA MDH DEPARTMENT of HEALTH

Figure 3
Database Map and Trends of Cross Sections
City of Avon

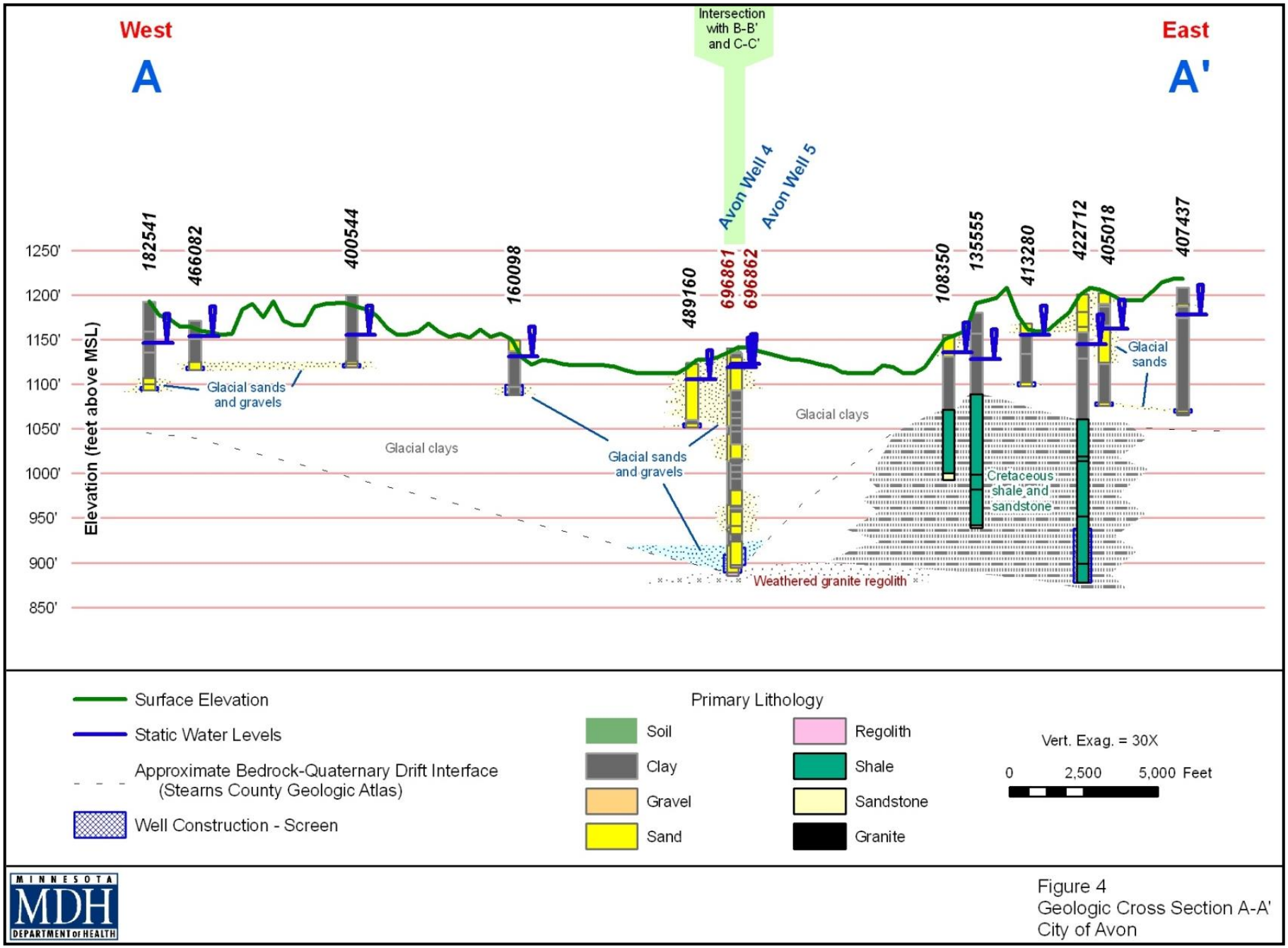


Figure 4
Geologic Cross Section A-A'
City of Avon

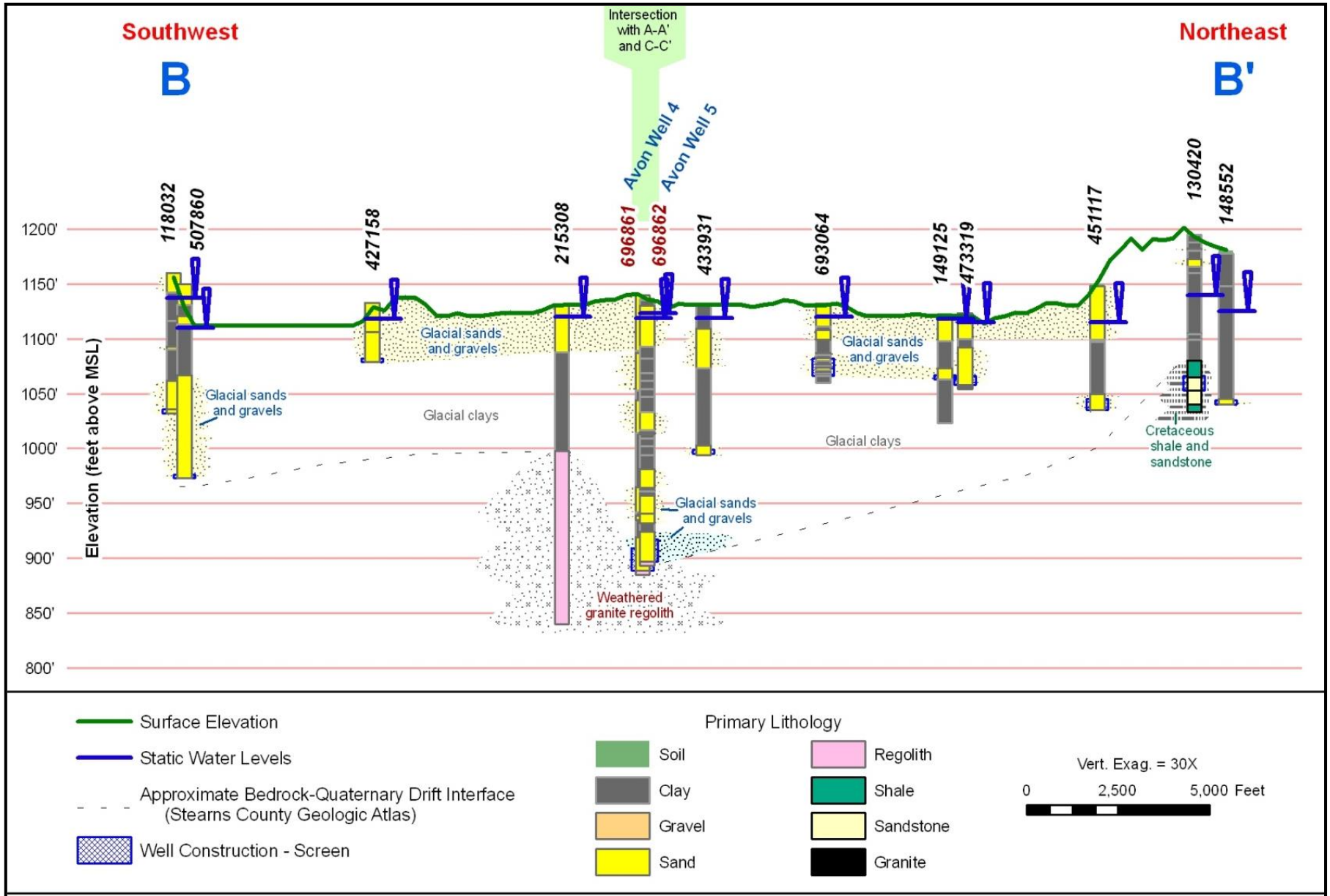


Figure 5
Geologic Cross Section B-B'
City of Avon

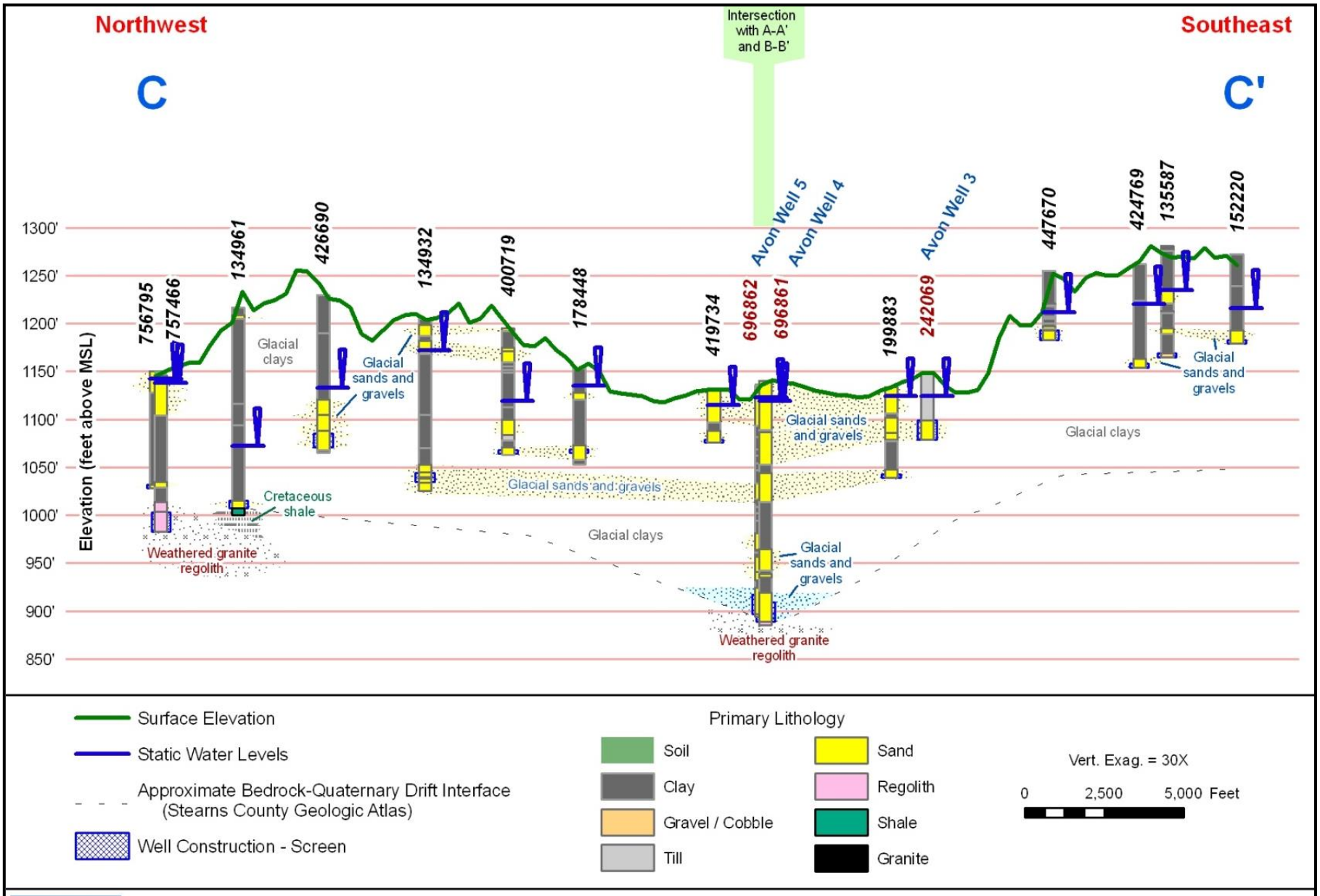


Figure 6
Geologic Cross Section C-C'
City of Avon

Appendix II: Avon Drinking Water Supply Management Area (DWSMA)

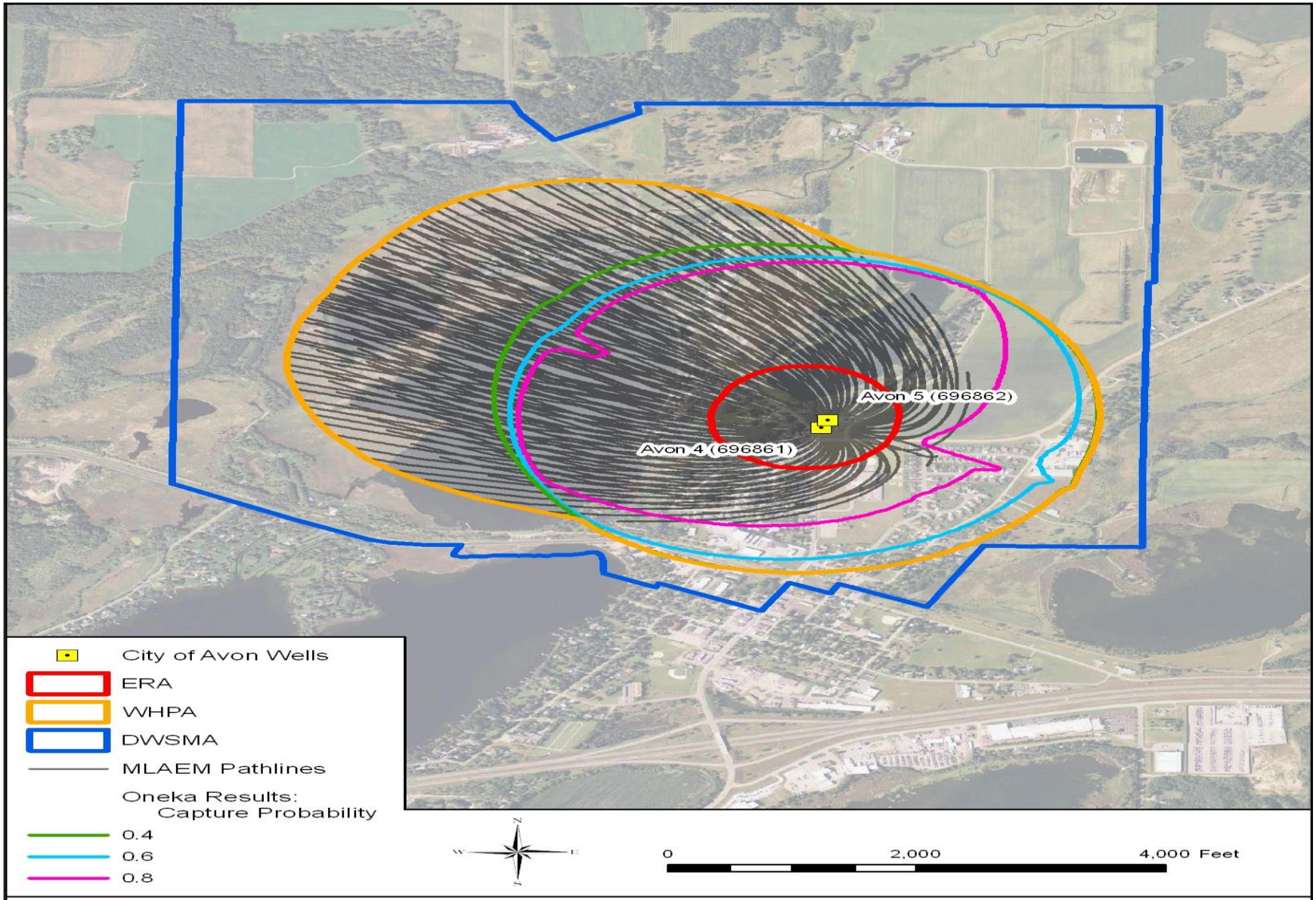
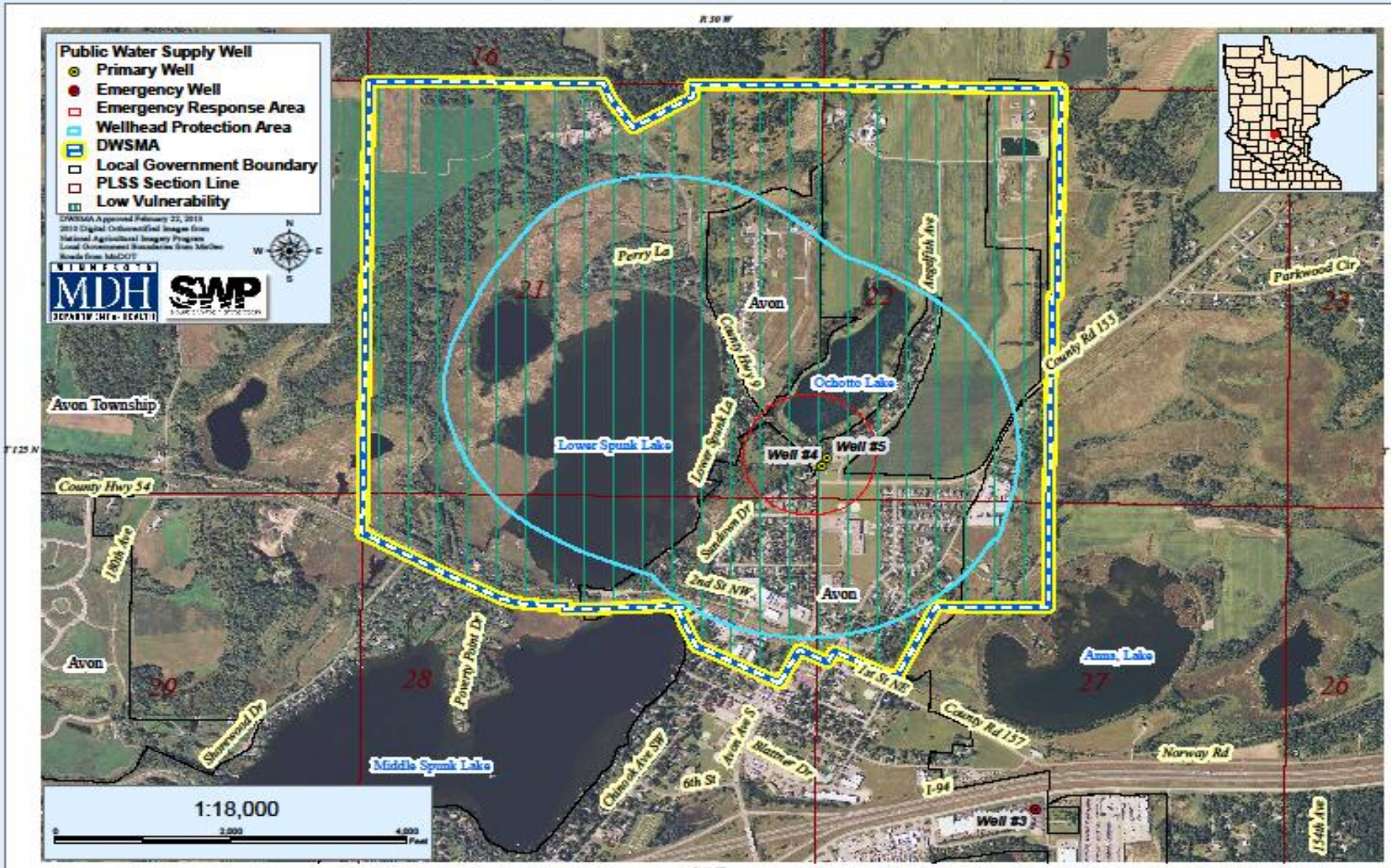


Figure 7
Pathlines and Groundwater Capture Zones for MLAEM and Oneka Delineation Analyses
City of Avon

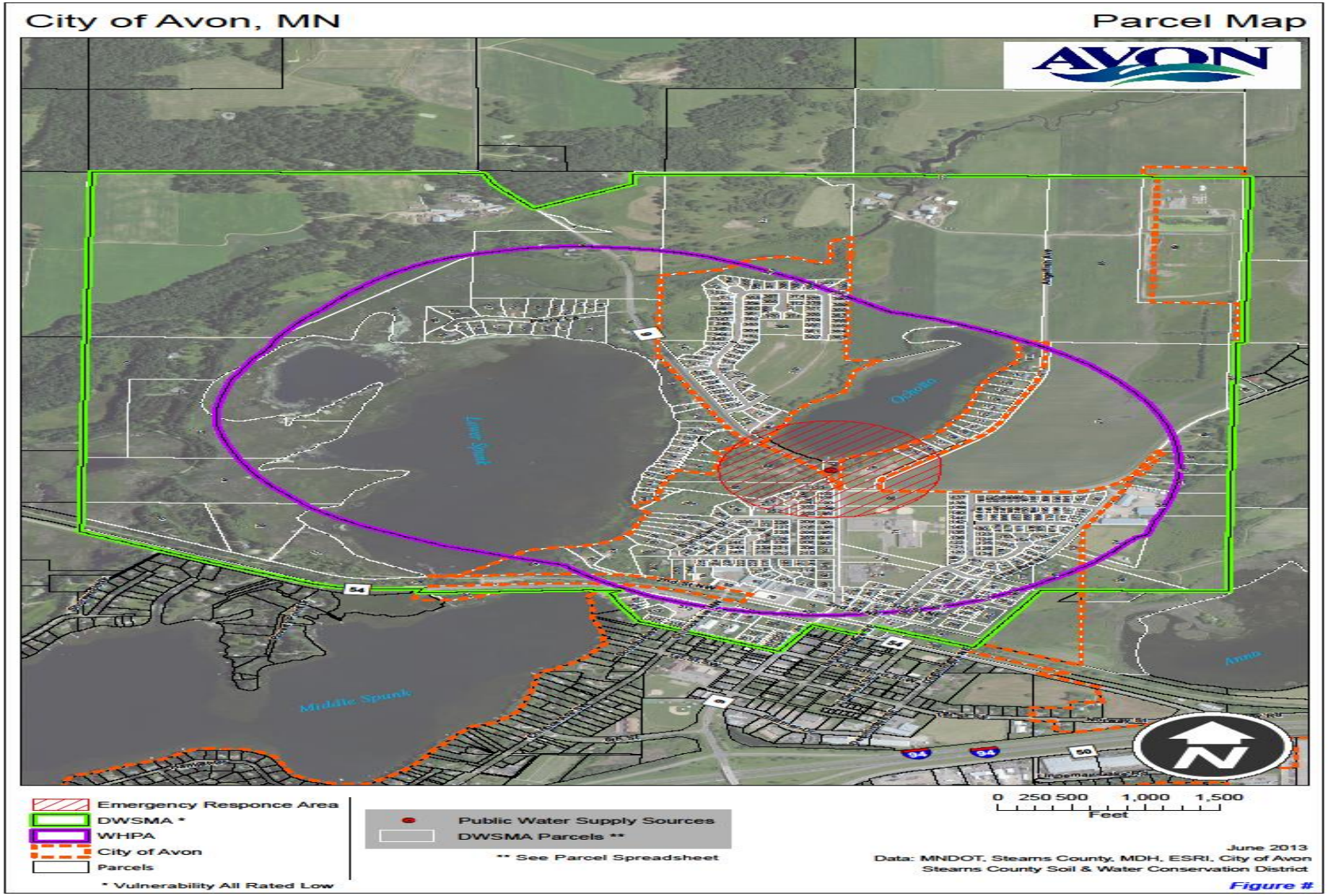
Avon
Stearns County
Minnesota

Avon Drinking Water Supply Management Area (DWSMA) MN-00656 - Low Vulnerability

Minnesota Department of Health
Environmental Health
Source Water Protection Unit



Appendix IIIa: Parcel Map within the WHPA and DWSMA Delineations



Appendix IIIb: Avon WHP Parcel Inventory

Appendix IVa: Potential Contamination Sources

Appendix IVb: Inventory of Potential Contamination Sources

ID	PARCEL	MDH FACILITY I.D. #	WELL_OWNER_NAME	PROPADDR	PROP_CITY	PROP_STATE	PROP_ZIP	Type	Notes	USE_C	DEPTH_DRLL	DEPTH_COMP	DATE_DRILL	CASE_DIAM	CASE_DEPTH	WELL_LABEL	RELATEID	UNIQUE_NO
1	03.00946.0000	1100-01	RAUSCH, NEAL	34122 COUNTY ROAD 9	AVON	MN	56310	Unknown Depth		DO	0.00	0.00	0	0.00	0.00	0		
2	42.26559.0500	1100-01	LANGE, DAVID					Active Wells		DO	290.00	290.00	0	4.00	148.00	215308	0000215308	00215308
3	42.26205.0000	1100-01	AVON WELL #3	530 COUNTY ROAD 50	AVON	MN	56310	PWSS	Well #3	PS	70.00	0.00	1979	12.00	50.00	242069	0000242069	
4	42.26486.0066	1100-01	AVON WELL #4					PWSS	Well #4	PS	251.00	0.00	2003	12.00	231.00	696861		
5	42.26486.0066	1100-01	AVON WELL #5					PWSS	Well #5	PS	240.00	0.00	2003	12.00	220.00	696862		
6	42.26487.0000	1100-01	WOLFORD, DOUG	14 ANGELFISH AVE	AVON	MN	56310	Active Wells	Hooked up to city water	DO	137.00	136.00	19870611	4.00	132.00	433931	0000433931	00433931
7	42.26490.0000	1100-01	BLONIGEN, DAVID	17 ANGELFISH AVE	AVON	MN	56310	Active Wells	Hooked up to city water	DO	148.00	148.00	19900502	4.00	140.00	461816	0000461816	00461816
8	42.26507.0000	1100-01	AVON LUMBER	115 2ND ST NW	AVON	MN	56310	Active Wells		DO	168.00	168.00	19801015	4.00	150.00	178656	0000178656	00178656
9	42.26486.0095	1100-01	GROETSCH, WALTER	12 ANGELFISH AVE	AVON	MN	56310	Active Wells	Hooked up to city water	DO	193.00	193.00	19880830	4.00	189.00	453389	0000453389	00453389
10	42.26488.0000	1100-01	MERGEN, JOHN & SANDY	15 ANGELFISH AVE	AVON	MN	56310	Active Wells	Hooked up to city water	DO	128.00	128.00	19870810	4.00	128.00	421821	0000421821	00421821
11	42.26486.0072	1100-01	WUELLNER, DON & DIANE	6 ANGELFISH AVE	AVON	MN	56310	Active Wells	Hooked up to city water	DO	195.00	195.00	19940627	4.00	191.00	544891	0000544891	00544891
12	03.00944.0010	1100-01	CASPERS, JAMES & KAYLENE	17470 MARSH LN	AVON	MN	56310	Active Wells		DO	134.00	134.00	19990421	4.00	126.00	623014	0000623014	00623014
13	42.26201.0010	1100-01	CITY OF AVON					Unknown Depth	Assumed Well	DO	0.00	0.00	0	0.00	0.00			
14	03.00954.0000	1100-01	KEPPERS, ELMER	34503 ANGELFISH AVE	AVON	MN	56310-9561	Unknown Depth	Assumed Well	DO	0.00	0.00	0	0.00	0.00			
15	03.00942.0000	1100-01	SMITH, LLOYD	34905 COUNTY ROAD 9	AVON	MN	56310-9705	Unknown Depth	Assumed Well	DO	0.00	0.00	0	0.00	0.00			
16	03.00941.0000	1100-01	JONAS, PETER	34759 COUNTY ROAD 9	AVON	MN	56310-9705	Unknown Depth	Assumed Well	DO	0.00	0.00	0	0.00	0.00			
17	03.01379.0000	1100-01	SMITH, DAVID & GAIL	17007 KOPPY LN	AVON	MN	56310	Unknown Depth	Assumed Well	DO	0.00	0.00	0	0.00	0.00			
18	03.01377.0000	1100-01	MONSOUR, RAYMOND	16975 KOPPY LN	AVON	MN	56310	Unknown Depth	Assumed Well	DO	0.00	0.00	0	0.00	0.00			
19	03.01376.0000	1100-01	SOWADA, STANLEY & JANICE	16949 KOPPY LN	AVON	MN	56310-9500	Unknown Depth	Assumed Well	DO	0.00	0.00	0	0.00	0.00			
20	03.01375.0000	1100-01	NIERENHAUSEN, MARCELLA	16923 KOPPY LN	AVON	MN	56310-9500	Unknown Depth	Assumed Well	DO	0.00	0.00	0	0.00	0.00			
21	03.01374.0000	1100-01	KLEINSCHMIDT, ROB & GLORIA	16891 KOPPY LN	AVON	MN	56310-9500	Unknown Depth	Assumed Well	DO	0.00	0.00	0	0.00	0.00			
22	03.01385.0000	1100-01	GRUNLOH, PATRICK & CYNTHIA	16954 KOPPY LN	AVON	MN	56310-9500	Unknown Depth	Assumed Well	DO	0.00	0.00	0	0.00	0.00			

23	03.01385.0000	1100-01	HANSEN, RICHARD & ALMA	16938 KOPPY LN	AVON	MN	56310-9500	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
24	03.01385.0000	1100-01	ACHMAN, WILLIAM	16912 KOPPY LN	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
25	03.01388.0000	1100-01	CRETE, WINNETTEW	16872 KOPPY LN	AVON	MN	56310-9500	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
26	03.01372.0000	1100-01	CHRISTIAN, THOMAS	16829 KOPPY LN	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
27	03.00940.0000	1100-01	DANZL, DOUGLAS & SHARON	34517 COUNTY ROAD 9	AVON	MN	56310-9705	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
28	03.00944.0020	1100-01	MARKMAN, THOMAS & KARA	17426 MARSH LN	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
29	03.00936.0000	1100-01	FLOREN, PHILIPPI TRUST	34337 COUNTY ROAD 9	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
30	03.00937.0000	1100-01	NORBY, CHARLES	34289 COUNTY ROAD 9	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
31	03.00938.0000	1100-01	JAGIELSKI, GILBERT	34275 COUNTY ROAD 9	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
32	03.01227.0001	1100-01	KARASCH, RUSSELL & MARY ANN	34235 COUNTY ROAD 9	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
33	03.00947.0000	1100-01	OLSON, RICHARD & JEANNE	34203 COUNTY ROAD 9	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
34	03.01227.0002	1100-01	SIMPSON, JILL	34213 LOWER SPUNK LN	AVON	MN	56310-9501	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
35	03.01227.0003	1100-01	BUETTNER, ANGELINEA	34187 LOWER SPUNK LN	AVON	MN	56310-9501	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
36	03.01227.0004	1100-01	BOUNDY, KEVIN & SHAWNA	34175 LOWER SPUNK LN	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
37	03.01227.0006	1100-01	SCEPANIAK, RICHARD & DONNA	34151 LOWER SPUNK LN	AVON	MN	56310-9501	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
38	03.01227.0007	1100-01	HALL, PEGGY	34139 LOWER SPUNK LN	AVON	MN	56310-9501	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
39	03.01227.0008	1100-01	JOHNSON, HUGO & MARGARET	34113 LOWER SPUNK LN	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
40	03.01227.0009	1100-01	HOYER, DUANE & KAREN	34105 LOWER SPUNK LN	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
41	03.01227.0010	1100-01	COX, KEVIN	34097 LOWER SPUNK LN	AVON	MN	56310-9501	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
42	03.01227.0012	1100-01	ALPERS, ROBERT	34053 LOWER SPUNK LN	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
43	03.01227.0014	1100-01	FRIE, CLARUS & PATRICIA	34037 LOWER SPUNK LN	AVON	MN	56310-9501	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
44	03.01227.0013	1100-01	CARLSON, BRUCE & JOANN	34025 LOWER SPUNK LN	AVON	MN	56310-9501	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
45	03.01029.0000	1100-01	SOENNEKER, CRAIG & ALISA	17162 MARSH LN	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
46	03.01030.0000	1100-01	BECKER, BRIAN & CARIN	17230 MARSH LN	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00

47	03.01030.0010	1100-01	LUNDBERG, DANIEL & LISA	17295 MARSH LN	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
48	03.01227.0011	1100-01	KALLA, CLAUDE	34069 LOWER SPUNK LN	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
49	03.01010.0000	1100-01	DEAN BUDDE TRUST	34082 CHAR AVE	AVON	MN	56310-8501	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
50	03.00949.0004	1100-01	BUDDE, BENEDICT & JOY	34096 COUNTY ROAD 155	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
51	03.01144.0000	1100-01	GAMBLE, DAVID AND SANDRA	34114 COUNTY ROAD 155	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
52	03.01143.0000	1100-01	NELSON, MARLO	34168 COUNTY ROAD 155	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00
53	03.00952.0000	1100-01	NELSON, MARLO	34232 COUNTY ROAD 155	AVON	MN	56310	Unknown Depth	Assumed Well DO	0.00	0.00	0	0.00	0.00

Appendix Va: Hazardous Waste Sites

Appendix Vb: Inventory of Hazardous Waste Sites

ID	MPCA_ID	NAME	ADDRESS	CITY	ZIP_CODE	LEG_DIST	ACTIVITY	SITE_URL	LATITUDE	LONGITUDE	STATUS
1	MNS000179267	Avon Dental	308A Blattner Dr	Avon	56310	13A	Hazardous Waste, Small to Minimal QG	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=62682969	45.60555213	-94.45007830	Active
2	5609	Lange Trenching Inc.	111 Dorado Ave NW	Avon	56310	13A	Tank Site	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=217873	45.61018699	-94.45433107	Active
3	MN0047325	Avon WWTP	300 Angelfish Ave	Avon	56310	13B	Wastewater Discharger	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=4321	45.61992421	-94.44485466	Active
4	16003	Church Of Saint Benedict	212 1st St SW	Avon	56310	13A	Tank Site	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=55059228	45.60861559	-94.45304624	Active
5	SUB0021337	2005 Waters Edge 2-Waters Edge Circle	986 Waters Edge Circle	Avon	56310	13A	CSW Site Subdivision	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=258495	45.62000927	-94.45185405	Active
6	SUB0022697	Waters Edge Ph 2 - Lot 12 Bl 1	964 Waters Edge Cir	Avon	56310	13A	CSW Site Subdivision	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=268963	45.61983180	-94.45201870	Active
7	Multiple Activities	Avon Oil Quick Mart	304 Blattner Dr PO Box 191	Avon	56310	13A	Multiple Activities	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=217837	45.60555748	-94.45014126	Active
8	54241	Us West	113 1st St SW	Avon	56310	13A	Tank Site	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=229876	45.60830836	-94.45172819	Active
9	Multiple Activities	Tischler Wood Products Inc	401 Blattner Dr	Avon	56310	13A	Multiple Activities	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=5910	45.60558175	-94.44879655	Active
10	C00001850	1995 Lake Horizon Improvements	300 Angelfish Ave	Avon	56310	13B	Construction Stormwater Permit	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=61880	45.61992421	-94.44485466	Inactive
11	148498892	Avon city of	140 Stratford St E	Avon	56310	13A	Hazardous Waste, Small to Minimal QG	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=26933	45.60887858	-94.45042068	Active
12	C00034257	2012 Street Improvements (AVONM 120670)	Address Unknown	Avon	56310	13A	Construction Stormwater Permit	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=63404264	45.60970000	-94.45290000	Inactive
13	MNR000081414	USPS Avon Main Post Office	103 Avon Ave	Avon	56310	13A	Hazardous Waste, Small to Minimal QG	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=75356	45.61088181	-94.44923401	Inactive
14	14575968	Elmer & Marlene Keppers Farm	34503 Angelfish Ave	Avon	56310	13A	Feedlot	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=97279	45.62175679	-94.44431457	Active
15	Multiple Activities	Avon Auto Repair	217 1st St NE	Avon	56310	13A	Multiple Activities	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=26932	45.60978423	-94.44849649	Active
16	14500157	PSI Prefinishing Specialists Inc	314 Blattner Dr	Avon	56310	13A	Air Permit	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=11209	45.60554540	-94.44999428	Active
17	MNS000188524	Lumber One	101 2nd St NW	Avon	56310	13A	Hazardous Waste, Small to Minimal QG	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=65869571	45.61124841	-94.44967251	Active
18	MN0000231654	Pierz Marine of Avon	211 Stratford St	Avon	56310	13A	Hazardous Waste, Small to Minimal QG	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=29416	45.60971451	-94.45231628	Inactive
19	C00035035	Avon Residential Porject	34740 County Road 9	Avon	56310	13B	Construction Stormwater Permit	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=64464395	45.62812900	-94.45311100	Active
20	MNR000107300	USPS Main Post Office - Avon	317 Blattner Dr	Avon	56310	13A	Hazardous Waste, Small to Minimal QG	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=89210	45.60565218	-94.44994857	Inactive
21	A00010364	Avon city of Public Works Shop	221 2nd St NW	Avon	56310	13A	Industrial Stormwater Permit	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=132836	45.61066353	-94.44799704	Inactive
22	315712018	Avon Lawn & Garden	115 1st St NE	Avon	56310	13A	Hazardous Waste, Small to Minimal QG	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=26934	45.61024987	-94.44984664	Inactive
23	148499122	Lange Trenching Inc	111 Dorado Ave NW	Avon	56310	13A	Hazardous Waste, Small to Minimal QG	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=28662	45.61018699	-94.45433107	Active
24	Multiple Activities	Prefinishing Specialists Inc	314 Blattner Dr	Avon	56310	13A	Multiple Activities	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=57422	45.60554540	-94.44999428	Active
25	5630	Jansky Estate Property	Blattner Dr & I 94	Avon	56310	13A	Leak Site	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=243105	45.60570145	-94.44989777	Inactive

26	MNS000188961	Avon Police Dept	140 Stratford St E Police Dept	Avon	56310	13A	Hazardous Waste, Small to Minimal QG	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=65883186	45.60887858	-94.45042068	Active
27	MND980793376	The Barrel Mill	640 Chinook Ave SW	Avon	56310	13B	Hazardous Waste, Small to Minimal QG	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=27420	0.00000000	0.00000000	Active

Appendix VI: Contingency Strategy

WATER SUPPLY CONTINGENCY PLAN
CITY OF AVON, MINNESOTA

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Annual Plan Review

Date Reviewed	*Reviewer*	*Comments*

Plan Distribution

Person	*Organization*	*Plan Location*

Prepared by: Jim Thoren City Clerk/Admin
Date Approved: 3/20/2014

A. PURPOSE

The purpose of this Contingency Plan is to establish, provide and keep updated, certain emergency response procedures and information for the City of Avon MN, which may become vital in the event of a partial or total loss of public water supply services as a result of natural disaster, chemical contamination, civil disorder or human-caused disruptions.

B. PUBLIC WATER SUPPLY CHARACTERISTICS

1. Current Supply Source:

	Well #3	**Well #4**	**Well #5**
Supply Source	242069	696861	696862
Well Depth (ft.)	70ft	251ft	240ft
Well Diameter (in.)	12in	12in	12 in.
Latitude of Well	45.605	45.616	45.617
Longitude of Well	94.44	94.449	94.449
Well Capacity (gpm)	300gpm	800gpm	800gpm
Well Production (gpm)	300gpm	650gpm	650gpm

2. Treatment
   - The city adds chlorine, fluoride, and polyphosphate at the well house. No other treatment is required.
3. Storage and Distribution
   - 200,000 gallon elevated water tower.
4. Maps/Plans
   - Available at Avon City Hall, SEH St. Cloud's office, and Avon city wastewater treatment plant.

C. PRIORITY OF WATER USERS DURING WATER SUPPLY EMERGENCY

Table C-1—Water Use Priority Grouping

Priority Group and Rank	Maximum daily use (gpd)	Minimum daily use (gpd)
Residential--#1	260,820	43,200
Institutional--#2	Included with commercial	Included with commercial
Commercial--#3	41,860	9,720
Industrial--#4	19,320	1,080
Irrigation--#5	N/A	N/A
Unaccounted	13,240	N/A
Wholesale	N/A	N/A

Triggers for implementing water supply reduction/allocation procedures:

The loss of pressure in the water system, failure of the well pump, chemical or other contamination, a water main break, etc., would trigger the need to reduce water demand, or the need for an alternate water supply.

D. ALTERNATIVE WATER SUPPLY OPTIONS

1. Bottled water supplies, delivery and distribution.

- **Finken Water Supply** 3423 Co. Rd. 74, St. Cloud MN 56301; 320-258-2005,
  - Can supply bottled water in 5 gallon bottles. Vendor can deliver to the City.
- **Erkens Water** 109 2nd Ave. NE, Cold Spring MN 56320; 320-685-8762
  - Bottled water available 24 hours/day.
- **Wal-Mart Supercenter** 21 County Highway 120, St. Cloud MN 56303, 320-251-1527
  - Bottled water available during business hours.
- **Coborn's** 1500 Elm St. St. Joseph MN 56374
  - Bottled water available during business hours.
- **MN National Guard**
  - Can furnish equipment capable of hauling up to 2,000 gallons of potable water from another water supply to a city distribution point or facility in an emergency (please see the notification process below).

2. Emergency or backup wells.

- **Well #3** is designated as backup/emergency well.

3. Emergency treatment of water system.

- **The Minnesota National Guard** has the ability to provide emergency treatment of surface waters for human consumption. The closest surface water is Lower Spunk

and Middle Spunk Lakes located within the city limits of Avon, MN.

- **The MN National Guard** can provide Reverse Osmosis Water Purification Units (ROWPU) capable of supplying up to 1,500 gallons/hour, or 25 gallons/minute of potable water. The ROWPU may be housed at Camp Ripley and are available, through a call-up of the National Guard, to any city in the state.

5. <u>Other</u>

- Milk trucks could be made available to haul potable water from another water supply to a City distribution point or facility.

D. INVENTORY OF AVAILABLE EMERGENCY EQUIPMENT AND MATERIAL

Table E-1 contains a list of services, equipment and supplies that are available to the City of Avon to respond to a disruption in the water system. It is believed that the items contained in Table E-1 would be adequate to respond to most (if not all) water system emergencies.

Table E-1

Description	Owner	Telephone	Location	Acquisition Time
Well Repair	Traut Wells	320-251-5090	Waite Park, MN	1 hour
Pump Repair	Traut Wells	320-251-5090	Waite Park, MN	1 hour
Electrician	Liberty Electric	320-290-1364	Albany, MN	1 hour
Plumber	Grutsch Plumbing	320-267-9487	Avon, MN	< 1 hour
Backhoe	Lange Trenching	320-356-7976	Avon, MN	< 1 hour
Chemical Feed	Hawkins	612-331-6190	Minneapolis, MN	3 hours
Meter Repair	HD Water Supply	763-428-7473	St. Michael, MN	2 hours
Generator	City of Avon	612-865-6283	Avon, MN	1 hour
Valves	Granite City Water	320-253-8587	Waite Park, MN	1 hour
Pipe & fittings	Granite City Water Works	320-253-8587	Waite Park, MN	1 hour

F. EMERGENCY IDENTIFICATION PROCEDURES

Incident	Responsible Party	Address	Telephone #(s)	Response Procedure
Identify Disruption	Primary: Utilities Supervisor/ Jon Forsell Alt: Water Operator/Joel Birr	Holdingford, MN	612-865-6283	Identifies the nature of the water supply disruption and communicates this information to the city government, the alternate response coordinator, and members of the emergency oversight committee.
Notify Response Personnel (Coordinator)	Primary: Utilities Supervisor/ Jon Forsell Alt: Water Operator/Joel Birr	Holdingford, MN	612-865-6283	Notifies city staff and others who will be responding to the water supply emergency about the disruption and coordinates their efforts to correct it.
Identify Incident Direction and Control	Primary: Utilities Supervisor/ Jon Forsell Alt Joel Birr/Water Operator	Holdingford, MN	612-865-6283	Identifies the actions that are needed to correct the water supply emergency and directs responders to implement corrective actions.
Identify Internal Communication	Primary: Mayor/Jon Grutsch Alt: City Admin/ Jim Thares	Avon, MN Sauk Rapids, MN	320-267-9487 320-356-	Communicates the status of response efforts to the primary spokesperson and the emergency oversight committee as needed to keep these parties informed of progress.
Inform Public	Primary: Mayor/Jon Grutsch Alt: City Admin/ Jim Thares	Avon, MN Sauk Rapids, MN	320-267-9487	Communicates the status of the emergency to the public and informs them on how to gain access to the alternative water supply.
Assess Incident on Continual Basis	Primary: Utilities Supervisor/ Jon Forsell Alt: Joel Birr/Water Operator	Holdingford, MN Avon, MN	612-865-6283 320-249-	Assesses the efforts to correct the water supply disruption on a continual basis so that the emergency oversight committee can take additional corrective actions and the city government and public are updated on issues and progress.
Assess Contamination Disruption	Primary: Utilities Supervisor/ Jon Forsell Alt: Water Operator/ Joel Birr	Holdingford, MN	612-865-6283	Coordinates efforts to define the extent and level of the contamination with local, state, and federal agencies. This may continue after initial corrective actions have been implemented.
Assess Mechanical Disruption	Primary: Utilities Supervisor/ Jon Forsell Alt: Water Operator/Joel Birr	Holdingford, MN Avon, MN	612-865-6283 320-249-	Coordinates efforts to define the cause(s) of the mechanical failure and the equipment, data, and expertise that are needed to correct it. Identifies measures for reducing the likelihood that a similar mechanical failure will not occur in the future.
Provide Alternate Water Supply	Primary: Utilities Supervisor/ Jon Forsell Alt: Water Operator/Joel Birr	Holdingford, MN Avon, MN	612-865-6283 320-249-	Evaluates the need to obtain an alternate water supply, the time period it is needed before the water supply emergency is corrected, and the actions that are needed to achieve it.
Impose Water Use Restrictions	Primary: Mayor/ Jon Grutsch Alt: City Admin/Jim Thares	Avon, MN Sauk Rapids, MN	320-267-9487 320-356-	Notifies the public on new water uses restrictions and provides instructions on how to obtain the necessary information for the imposed changes.

G. NOTIFICATION PROCEDURES

1. Agency Notification

Table G-1 contains the names and telephone numbers for contacts at various local and state agencies that may be notified in the event of and public water supply system emergency.
Based on the nature of the emergency and the information available, various representatives from this listing will be selected by the response coordinator to be part of *the* ***emergency oversight committee*** which will then meet throughout the duration of the emergency to aid in decision-making and positive outcomes.

Table G-1. Agency Emergency Contact Listing

Personnel	Name	Home Telephone	Work Telephone
Mayor/Board Chair	John Grutsch	320-356-7584	320-267-9487
Council Members	Hugh Knox		320-249-4482
Council Members	Jim Stang		320-237-4790
Council Members	Kurt Marthaler		320-356-7682
Response Coordinator	Joel Richter/ Corey Nellis		320-248-2978 320-260-7402
Alt. Response Coordinator	Joel Richter/ Corey Nellis		320-248-2978 320-260-7402
State Incident Duty Officer			800-422-0798
County Emergency Director	Erin Hausauer		320-250-6195
Fire Chief	Joel Richter		320-248-2978
Sheriff	John Sanner		320-259-3700
Police Chief	Corey Nellis		320-260-7402
System Operator	Jon Forsell		612-856-6283
Alt. System Operator	Joel Birr		320-249-3194
School Superintendent	Steve Dooley		320-845-2171
Ambulance	Gold Cross		320-251-8505
Hospital	St. Cloud Hospital		320-251-2700
Doctor or Medical Facility	Avon Medical Center		320-356-7602
Power Company	Xcel		800-722-9326
Highway Department	Stearns County		320-255-6186
Telephone Company	Century Link		800-888-1300
Neighboring Water System	Albany		320-845-4244
MPCA Groundwater Division	Walt Haas		218-820-3878
MRWA Technical Services	Dave Neiman	218-825-7411	218-820-0595
MDH District Engineer	Kim Larsen		320-223-7330
MDH Source Water Protection	Karen Voz	320-291-3088	320-223-7322
Stearns Co. Soil & Water Conservation District	Carrie Raber		320-251-7800 ext.#3

2. Critical Response Personnel

Table G-2

Title	Name	Address	Telephone	Response Assignment
Response Coordinator	Corey Nellis, Joel Richter	Avon, MN Avon, MN	320-250-6195 320-248-2978	Response Activities/Field Operations
Alt. Response Coordinator	Corey Nellis, Joel Richter	Avon, MN Avon, MN	320-250-6195 320-248-2978	Response Activities/Field Operations
Water Operator	Jon Forsell	Holdingford, MN	612-856-6283	Operations
Alt. Water Operator	Joel Birr	Avon, MN	320-249-3194	Operations
Public Relations	Jon Grutsch	Avon, MN	320-356-7584	Press Correspondence
Alt. Public Relations	Jim Thares	Sauk Rapids, MN	320-356-7922	Press Correspondence
Public Health/Medical	Avon Medical Clinic	Avon, MN	320-356-7602	Health/Medical Operations
Alt. Public Health/Medical	St. Cloud Hospital	St. Cloud MN	320-529-3180	Health/Medical Operations

3. Public Information Plan

A. **Public relations center**: Avon City Hall

B. **Public Information Center Location during emergency**: Avon City Hall
Times Available: As needed.

C. **Information checklist to be conveyed to the public and media**:
Name of water system: City of Avon

Contaminant of concern and date: Contaminant detected and date it was discovered.

Source of contamination: Determine the cause of contamination.

Public health hazard: Possible health effects to be determined at the event.

Steps the public can take: Example may include a boil order, or other treatment options.

Steps the water system is taking: Active testing, flushing, other treatment options.

Other information: City of Avon website, City newsletter, and city marquee.

D. **Media Contacts**

Media	Name	Telephone	Address
Newspaper	Albany Enterprise St. Cloud Times	320-845-2700 320-255-8700	561 Railroad Ave. Albany MN 56307 3000 7th ST. N. St. Cloud MN
Television	KMSP Channel 9	952-944-9999	11358 Viking Dr. Eden Prairie, MN 55344
Radio	KASM	320-845-2184	P.O Box 160 Albany, MN 56307
Shopper	Finken Water Supply	320-258-2005 Ext. 2258	3423 Co. Rd. 74 St. Cloud, MN 56301

G. MITIGATION AND CONSERVATION PLAN

1. MITIGATION

a. Infrastructure maintenance/upgrades/maps: Wastewater Treatment Plant, City Hall, and SEH St. Cloud's office

b. Regular inspection of tower, well, pump house: Inspections completed as part of daily rounds

c. Staff emergency training: Staff is trained on a quarterly basis.

d. System security analysis: Alarm System, Routine Police Patrol.

e. Site new backup well: Well #3 is designated as emergency well.

f. System valving to isolate problems: System valves to isolate areas.

g. Sanitation procedures for construction/repairs: Contractors chlorinate area of repairs before putting the water system back into service.

2. CONSERVATION

a. Water Meters: Water system is metered

b. Public Education: City of Avon website, news letter, and consumer confidence report

c. Rate structure
- $10.00/month access charge
- $2.59/1000 gallons
- Surcharge: $1.00

Appendix VII: Inner Wellhead Management Zone (IWMZ) Potential Contaminant Source Inventory Well #3

MINNESOTA MDH DEPARTMENT of HEALTH
Environmental Health Division
Drinking Water Protection Section
P.O. Box 64975
St. Paul, Minnesota 55164-0975

INNER WELLHEAD MANAGEMENT ZONE (IWMZ) - POTENTIAL CONTAMINANT SOURCE INVENTORY (PCSI) REPORT

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1730002	**COMMUNITY**
NAME	Avon	
ADDRESS	Avon Water Superintendent, City Hall, P.O. Box 69, Avon, MN 56310	

FACILITY (WELL) INFORMATION

NAME	Well #3	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S02	☐ **YES** (Please attach a copy)
UNIQUE WELL NO.	242069	☐ **NO** ☐ **UNDETERMINED**
COUNTY	Stearns	

PWS ID / FACILITY ID	1730002 S02	**UNIQUE WELL NO.**	242069

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
Agricultural Related							
*AC1	Agricultural chemical buried piping	50	50		N		
*AC2	Agricultural chemical multiple tanks or containers for residential retail sale or use, no single tank or container exceeding, but aggregate volume exceeding 56 gal. or 100 lbs. dry weight	50	50		N		
ACP	Agricultural chemical tank or container with 25 gal. or more or 100 lbs. or more dry weight, or equipment filling or cleaning area without safeguards	150	150		N		
ACS	Agricultural chemical storage or equipment filling or cleaning area with safeguards	100	100		N		
ACR	Agricultural chemical storage or equipment filling or cleaning area with safeguards and roofed	50	50		N		
ADW	Agricultural drainage well[2] (Class V well - illegal[3])	50	50		N		
AAT	Anhydrous ammonia tank (stationary tank)	50	50		N		
AB1	Animal building, feedlot, confinement area, or kennel, 0.1 to 1.0 animal unit (stockyard)	50	20	100/40	N		
AB2	Animal building or poultry building, including a horse riding area, more than 1.0 animal unit	50	50	100	N		
ABS	Animal burial area, more than 1.0 animal unit	50	50		N		
FWP	Animal feeding or watering area within a pasture, more than 1.0 animal unit	50	50	100	N		
AF1	Animal feedlot, unroofed, 300 or more animal units (stockyard)	100	100	200	N		
AF2	Animal feedlot, more than 1.0, but less than 300 animal units (stockyard)	50	50	100	N		
AMA	Animal manure application	use discretion	use discretion		N		
REN	Animal rendering plant	50	50		N		
MS1	Manure (liquid) storage basin or lagoon, unpermitted or noncertified	300	300	600	N		
MS2	Manure (liquid) storage basin or lagoon, approved earthen liner	150	150	300	N		
MS3	Manure (liquid) storage basin or lagoon, approved concrete or composite liner	100	100	200	N		
MS4	Manure (solid) storage area, not covered with a roof	100	100	200	N		
OSC	Open storage for crops	use discretion	use discretion		N		
SSTS Related							
AA1	Absorption area of a soil dispersal system, average flow greater than 10,000 gal./day	300	300	600	N		
AA2	Absorption area of a soil dispersal system serving a facility handling infectious or pathological wastes, average flow 10,000 gal./day or less	150	150	300	N		
AA3	Absorption area of a soil dispersal system, average flow 10,000 gal./day or less	50	50	100	N		
AA4	Absorption area of a soil dispersal system serving multiple family residences or a non-residential facility and has the capacity to serve 20 or more persons per day (Class V well)[2]	50/300/150[4]	50/300/150[4]	100/600/300[4]	N		
CSP	Cesspool	75	75	150	N		
AGG	Dry well, leaching pit, seepage pit	75	75	150	N		
*FD1	Floor drain, grate, or trough connected to a buried sewer	50	50		N		
*FD2	Floor drain, grate, or trough if buried sewer is air-tested, approved materials, serving one building, or two or less single-family residences	50	20		N		
*GW1	Gray-water dispersal area	50	50	100	N		
LC1	Large capacity cesspools (Class V well - illegal)[2]	75	75	150	N		

1/8/2014 1

Appendix VII, continued

PWS ID / FACILITY ID	1730002 S02	UNIQUE WELL NO.	242069

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		

Appendix VII, continued

PWS ID / FACILITY ID	1730002 S02	UNIQUE WELL NO.	242069

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		N		
PU1	Pit or unfilled space more than four feet in depth	20	20		N		
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	N		
SP1	Swimming pool, in-ground	20	20		N		
*VH1	Vertical heat exchanger, horizontal piping conforming to rule	50	10		N		
*VH2	Vertical heat exchanger (vertical) piping, conforming to rule	50	35		N		
*WR1	Wastewater rapid infiltration basin, municipal or industrial	300	300	600	N		
*WA1	Wastewater spray irrigation area, municipal or industrial	150	150	300	N		
*WS1	Wastewater stabilization pond, industrial	150	150	300	N		
*WS2	Wastewater stabilization pond, municipal, 500 or more gal./acre/day of leakage	300	300	600	N		
*WS3	Wastewater stabilization pond, municipal, less than 500 gal./acre/day of leakage	150	150	300	N		
*WT1	Wastewater treatment unit tanks, vessels and components (Package plant)	100	100		N		
*WT2	Water treatment backwash disposal area	50	50	100	N		
Additional Sources (If there is more than one source listed above, please indicate here).							
Potential Contamination Sources and Codes Based on Previous Versions of this Form							
SBA	Sewer buried, approved, air tested	50	20		Y	150	N
FFH	Fire or flushing hydrant	10	N/A		Y	50	N

* New potential contaminant source.

[1] A sensitive well has less than 50 feet of watertight casing, and which is not cased below a confining layer or confining materials of at least 10' in thickness.

[2] These sources, known as Class V underground injection wells, are regulated by the federal U.S. Environmental Protection Agency.

[3] These sources are classified as illegal by Minnesota Rules, Chapter 4725.

[4] Isolation distance is determined by average flow per day or if a facility handles infectious or pathological wastes.

[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; or is protected with secondary containment.

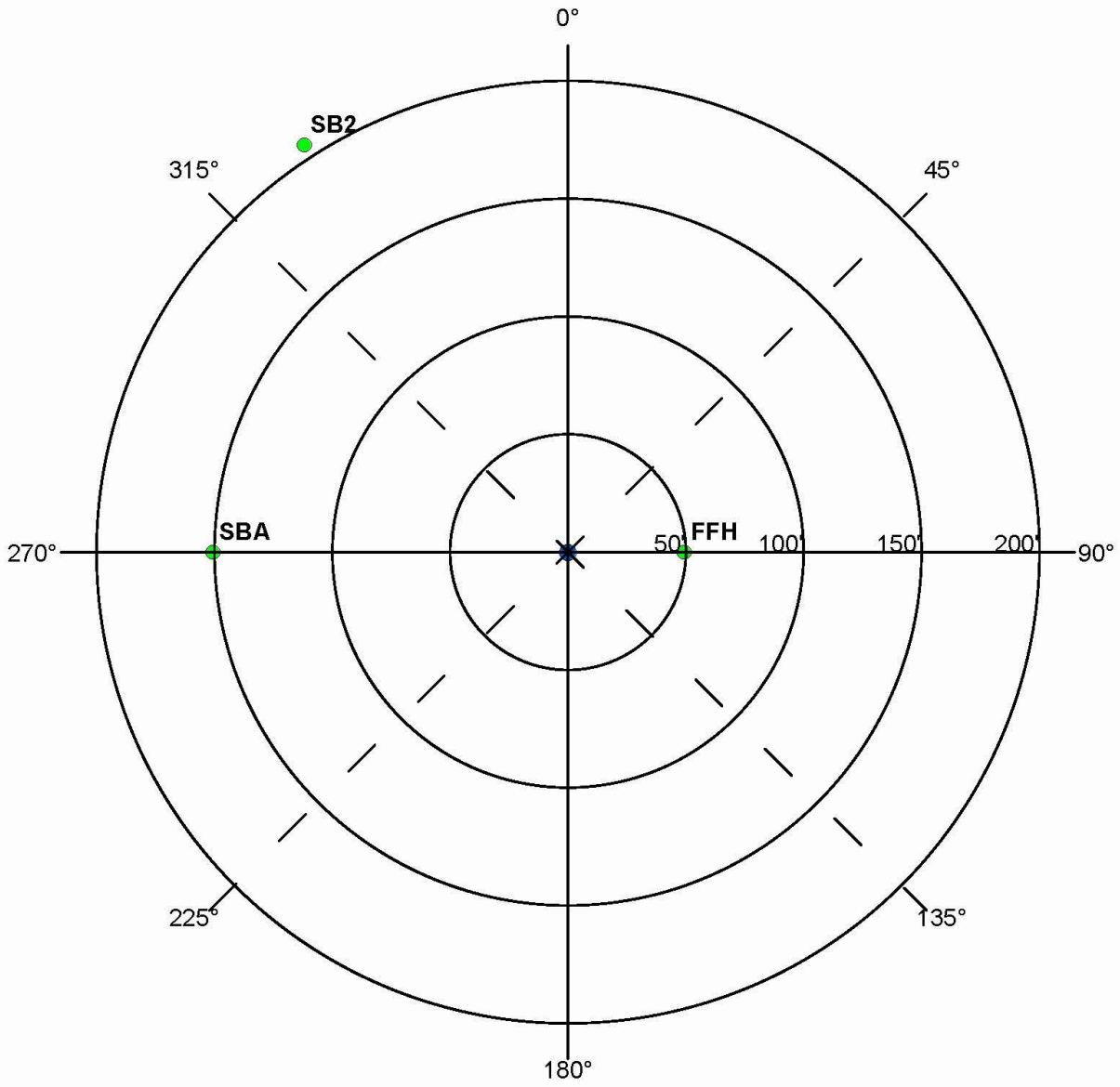
This form is based on the new isolation distances in Minnesota Rules, Chapter 4725, related to wells and borings adopted August 4, 2008, and Minnesota Rules, Chapter 4720, related to wellhead protection.

Appendix VII, continued

PWS ID / FACILITY ID	1730002 S02	UNIQUE WELL NO.	242069

SETBACK DISTANCES	All potential contaminant sources must be noted on sketch.

Record the distance and approximate compass bearing of each potential contaminant source from the well, and identify the source using the "Source Code". Unlabeled points on the map are unsealed wells.



Were the isolation distances maintained for the new sources of contamination?	Y	N	N/A
Is the system monitoring existing nonconforming sources of contamination?	Y	N	N/A

Reminder Question: Were the wellhead protection measure(s) implemented?

INSPECTOR	Voz, Karen (SWP)	DATE	6 - 10 - 2013

PWS ID / FACILITY ID	1730002 S02	UNIQUE WELL NO.	242069

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced.		

COMMENTS

9/7/2003 - Location for PCSI Type BLD (bearing = 0, distance = 0 , inventory date: 2/4/1999) could not be determined.
9/7/2003 - Location for PCSI Type ETL (bearing = 90, distance = 0 , inventory date: 2/4/1999) could not be determined.
9/7/2003 - Location for PCSI Type GSP (bearing = 0, distance = 75 , inventory date: 2/4/1999) could not be determined.
9/7/2003 - Location for PCSI Type PCH (bearing = 0, distance = 10 , inventory date: 2/4/1999) could not be determined.
9/7/2003 - Location for PCSI Type SBM (bearing = 0, distance = 100 , inventory date: 2/4/1999) could not be determined.
9/7/2003 - Location for PCSI Type DRA (bearing = 90, distance = 0 , inventory date: 2/4/1999) could not be determined.
9/7/2003 - Location for PCSI Type GPR (bearing = 0, distance = 0 , inventory date: 2/4/1999) could not be determined.
9/7/2003 - Location for PCSI Type PLE (bearing = 0, distance = 0 , inventory date: 2/4/1999) could not be determined.

For further information, please contact:

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

Section Receptionist: 651-201-4700
Division TDD: 651-201-5797 or MN Relay Service @ 1-800-627-3529 and ask for 651-201-5000

Appendix VIII: Inner Wellhead Management Zone (IWMZ) Potential Contaminant Source Inventory Well #4

MINNESOTA MDH DEPARTMENT of HEALTH
Environmental Health Division
Drinking Water Protection Section
P.O. Box 64975
St. Paul, Minnesota 55164-0975

INNER WELLHEAD MANAGEMENT ZONE (IWMZ) - POTENTIAL CONTAMINANT SOURCE INVENTORY (PCSI) REPORT

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1730002	**COMMUNITY**
NAME	Avon	
ADDRESS	Avon Water Superintendent, City Hall, P.O. Box 69, Avon, MN 56310	

FACILITY (WELL) INFORMATION

NAME	Well #4	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S03	☐ YES (Please attach a copy)
UNIQUE WELL NO.	696861	☐ NO ☐ UNDETERMINED
COUNTY	Stearns	

PWS ID / FACILITY ID	1730002 S03	**UNIQUE WELL NO.**	696861

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
Agricultural Related							
*AC1	Agricultural chemical buried piping	50	50		N		
*AC2	Agricultural chemical multiple tanks or containers for residential retail sale or use, no single tank or container exceeding, but aggregate volume exceeding 56 gal. or 100 lbs. dry weight	50	50		N		
ACP	Agricultural chemical tank or container with 25 gal. or more or 100 lbs. or more dry weight, or equipment filling or cleaning area without safeguards	150	150		N		
ACS	Agricultural chemical storage or equipment filling or cleaning area with safeguards	100	100		N		
ACR	Agricultural chemical storage or equipment filling or cleaning area with safeguards and roofed	50	50		N		
ADW	Agricultural drainage well[2] (Class V well - illegal[3])	50	50		N		
AAT	Anhydrous ammonia tank (stationary tank)	50	50		N		
AB1	Animal building, feedlot, confinement area, or kennel, 0.1 to 1.0 animal unit (stockyard)	50	20	100/40	N		
AB2	Animal building or poultry building, including a horse riding area, more than 1.0 animal unit	50	50	100	N		
ABS	Animal burial area, more than 1.0 animal unit	50	50		N		
FWP	Animal feeding or watering area within a pasture, more than 1.0 animal unit	50	50	100	N		
AF1	Animal feedlot, unroofed, 300 or more animal units (stockyard)	100	100	200	N		
AF2	Animal feedlot, more than 1.0, but less than 300 animal units (stockyard)	50	50	100	N		
AMA	Animal manure application	use discretion	use discretion		N		
REN	Animal rendering plant	50	50		N		
MS1	Manure (liquid) storage basin or lagoon, unpermitted or noncertified	300	300	600	N		
MS2	Manure (liquid) storage basin or lagoon, approved earthen liner	150	150	300	N		
MS3	Manure (liquid) storage basin or lagoon, approved concrete or composite liner	100	100	200	N		
MS4	Manure (solid) storage area, not covered with a roof	100	100	200	N		
OSC	Open storage for crops	use discretion	use discretion		N		
SSTS Related							
AA1	Absorption area of a soil dispersal system, average flow greater than 10,000 gal./day	300	300	600	N		
AA2	Absorption area of a soil dispersal system serving a facility handling infectious or pathological wastes, average flow 10,000 gal./day or less	150	150	300	N		
AA3	Absorption area of a soil dispersal system, average flow 10,000 gal./day or less	50	50	100	Y	174	N**
AA4	Absorption area of a soil dispersal system serving multiple family residences or a non-residential facility and has the capacity to serve 20 or more persons per day (Class V well)[2]	50/300/150[4]	50/300/150[4]	100/600/300[4]	N		
CSP	Cesspool	75	75	150	N		
AGG	Dry well, leaching pit, seepage pit	75	75	150	N		
*FD1	Floor drain, grate, or trough connected to a buried sewer	50	50		N		
*FD2	Floor drain, grate, or trough if buried sewer is air-tested, approved materials, serving one building, or two or less single-family residences	50	20		N		
*GW1	Gray-water dispersal area	50	50	100	N		
LC1	Large capacity cesspools (Class V well - illegal)[2]	75	75	150	N		

Appendix VIII, continued

PWS ID / FACILITY ID	1730002 S03	UNIQUE WELL NO.	696861

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	101	N
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		Y	45	
WEL	Operating well	record dist.	record dist.		Y	124	
WEL	Operating well	record dist.	record dist.		Y	154	
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		

PWS ID / FACILITY ID	1730002 S03	UNIQUE WELL NO.	696861

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		N		
PU1	Pit or unfilled space more than four feet in depth	20	20		N		
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	N		
SP1	Swimming pool, in-ground	20	20		N		
*VH1	Vertical heat exchanger, horizontal piping conforming to rule	50	10		N		
*VH2	Vertical heat exchanger (vertical) piping, conforming to rule	50	35		N		
*WR1	Wastewater rapid infiltration basin, municipal or industrial	300	300	600	N		
*WA1	Wastewater spray irrigation area, municipal or industrial	150	150	300	N		
*WS1	Wastewater stabilization pond, industrial	150	150	300	N		
*WS2	Wastewater stabilization pond, municipal, 500 or more gal./acre/day of leakage	300	300	600	N		
*WS3	Wastewater stabilization pond, municipal, less than 500 gal./acre/day of leakage	150	150	300	N		
*WT1	Wastewater treatment unit tanks, vessels and components (Package plant)	100	100		N		
*WT2	Water treatment backwash disposal area	50	50	100	N		
Additional Sources (If there is more than one source listed above, please indicate here).							
Potential Contamination Sources and Codes Based on Previous Versions of this Form							
	none found within 200' of this well.						

* New potential contaminant source.

** This number is the estimated distance that this potential source is from this well even though it was identified during an inventory for an adjacent well.

[1] A sensitive well has less than 50 feet of watertight casing, and which is not cased below a confining layer or confining materials of at least 10' in thickness.

[2] These sources, known as Class V underground injection wells, are regulated by the federal U.S. Environmental Protection Agency.

[3] These sources are classified as illegal by Minnesota Rules, Chapter 4725.

[4] Isolation distance is determined by average flow per day or if a facility handles infectious or pathological wastes.

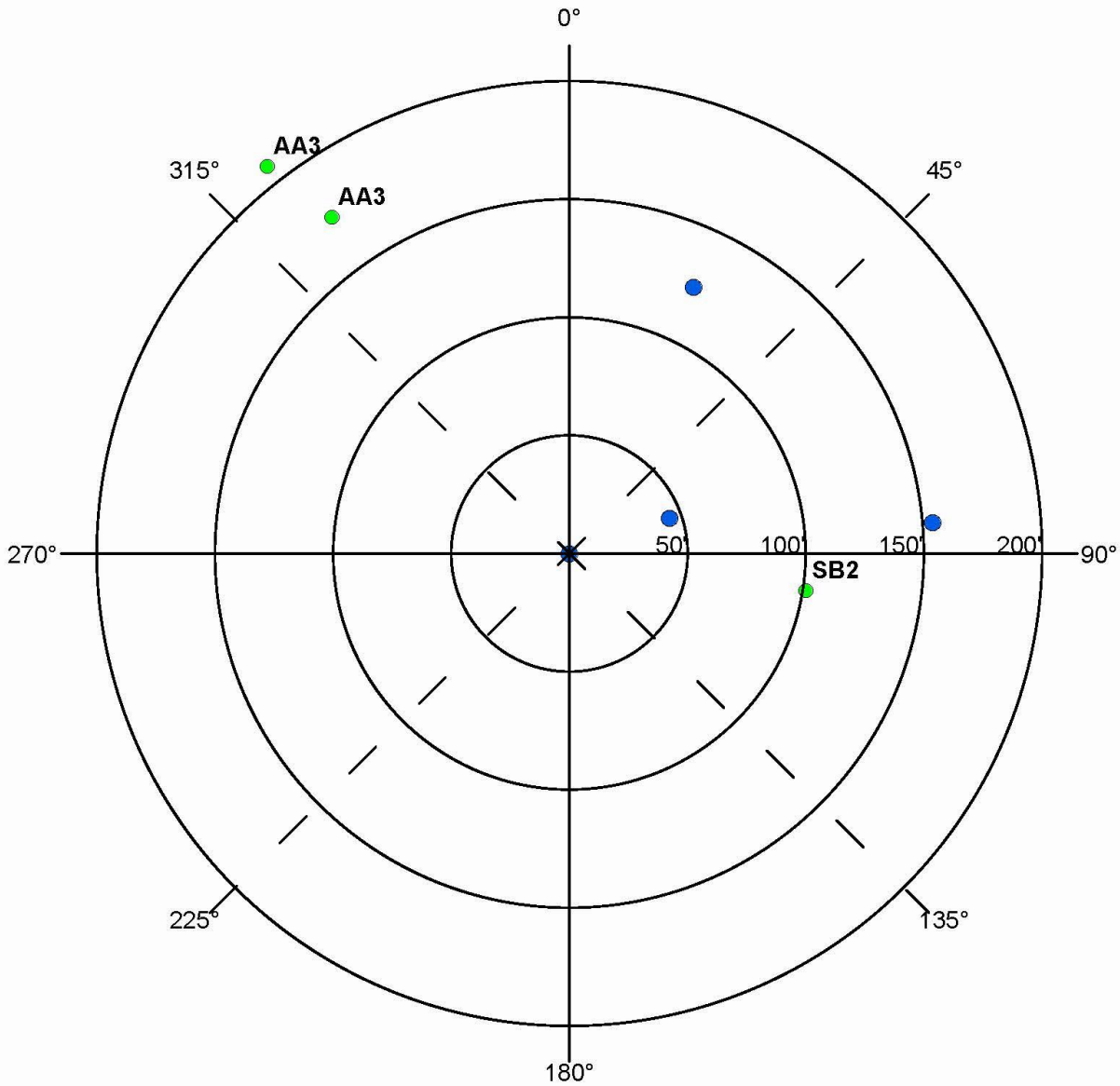
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; or is protected with secondary containment.

This form is based on the new isolation distances in Minnesota Rules, Chapter 4725, related to wells and borings adopted August 4, 2008, and Minnesota Rules, Chapter 4720, related to wellhead protection.

PWS ID / FACILITY ID	1730002 S03	UNIQUE WELL NO.	696861

SETBACK DISTANCES	All potential contaminant sources must be noted on sketch.

Record the distance and approximate compass bearing of each potential contaminant source from the well, and identify the source using the "Source Code". Unlabeled points on the map are unsealed wells.



Were the isolation distances maintained for the new sources of contamination?	Y	N	N/A
Is the system monitoring existing nonconforming sources of contamination?	Y	N	N/A

Reminder Question: Were the wellhead protection measure(s) implemented?

INSPECTOR	Voz, Karen (SWP)	DATE	

1/8/2014 4

Appendix VIII continued

PWS ID / FACILITY ID	1730002 S03	UNIQUE WELL NO.	696861

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
The precise location of subsurface sewage treatment system components should be determined. This can help assess the potential impact on the water supply.		
Connection to a community sewer system could be considered.		
Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced.		

COMMENTS

For further information, please contact:

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

Section Receptionist: 651-201-4700
Division TDD: 651-201-5797 or MN Relay Service @ 1-800-627-3529 and ask for 651-201-5000

Appendix IX: Inner Wellhead Management Zone (IWMZ) Potential Contaminant Source Inventory Well #5

MINNESOTA MDH DEPARTMENT of HEALTH

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

INNER WELLHEAD MANAGEMENT ZONE (IWMZ) - POTENTIAL CONTAMINANT SOURCE INVENTORY (PCSI) REPORT

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1730002	**COMMUNITY**
NAME	Avon	
ADDRESS	Avon Water Superintendent, City Hall, P.O. Box 69, Avon, MN 56310	

FACILITY (WELL) INFORMATION

NAME	Well #5	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S04	☐ YES (Please attach a copy)
UNIQUE WELL NO.	696862	☐ NO ☐ UNDETERMINED
COUNTY	Stearns	

PWS ID / FACILITY ID	1730002 S04	**UNIQUE WELL NO.**	696862

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
Agricultural Related							
*AC1	Agricultural chemical buried piping	50	50		N		
*AC2	Agricultural chemical multiple tanks or containers for residential retail sale or use, no single tank or container exceeding, but aggregate volume exceeding 56 gal. or 100 lbs. dry weight	50	50		N		
ACP	Agricultural chemical tank or container with 25 gal. or more or 100 lbs. or more dry weight, or equipment filling or cleaning area without safeguards	150	150		N		
ACS	Agricultural chemical storage or equipment filling or cleaning area with safeguards	100	100		N		
ACR	Agricultural chemical storage or equipment filling or cleaning area with safeguards and roofed	50	50		N		
ADW	Agricultural drainage well[2] (Class V well - illegal[3])	50	50		N		
AAT	Anhydrous ammonia tank (stationary tank)	50	50		N		
AB1	Animal building, feedlot, confinement area, or kennel, 0.1 to 1.0 animal unit (stockyard)	50	20	100/40	N		
AB2	Animal building or poultry building, including a horse riding area, more than 1.0 animal unit	50	50	100	N		
ABS	Animal burial area, more than 1.0 animal unit	50	50		N		
FWP	Animal feeding or watering area within a pasture, more than 1.0 animal unit	50	50	100	N		
AF1	Animal feedlot, unroofed, 300 or more animal units (stockyard)	100	100	200	N		
AF2	Animal feedlot, more than 1.0, but less than 300 animal units (stockyard)	50	50	100	N		
AMA	Animal manure application	use discretion	use discretion		N		
REN	Animal rendering plant	50	50		N		
MS1	Manure (liquid) storage basin or lagoon, unpermitted or noncertified	300	300	600	N		
MS2	Manure (liquid) storage basin or lagoon, approved earthen liner	150	150	300	N		
MS3	Manure (liquid) storage basin or lagoon, approved concrete or composite liner	100	100	200	N		
MS4	Manure (solid) storage area, not covered with a roof	100	100	200	N		
OSC	Open storage for crops	use discretion	use discretion		N		
SSTS Related							
AA1	Absorption area of a soil dispersal system, average flow greater than 10,000 gal./day	300	300	600	N		
AA2	Absorption area of a soil dispersal system serving a facility handling infectious or pathological wastes, average flow 10,000 gal./day or less	150	150	300	N		
AA3	Absorption area of a soil dispersal system, average flow 10,000 gal./day or less	50	50	100	Y	188	N**
AA3	Absorption area of a soil dispersal system, average flow 10,000 gal./day or less	50	50	100	Y	156	N
AA4	Absorption area of a soil dispersal system serving multiple family residences or a non-residential facility and has the capacity to serve 20 or more persons per day (Class V well)[2]	50/300/150[4]	50/300/150[4]	100/600/300[4]	N		
CSP	Cesspool	75	75	150	N		
AGG	Dry well, leaching pit, seepage pit	75	75	150	N		
*FD1	Floor drain, grate, or trough connected to a buried sewer	50	50		N		
*FD2	Floor drain, grate, or trough if buried sewer is air-tested, approved materials, serving one building, or two or less single-family residences	50	20		N		

1/8/2014 1

Appendix IX, continued

PWS ID / FACILITY ID	1730002 S04	UNIQUE WELL NO.	696862

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
*GW1	Gray-water dispersal area	50	50	100	N		
LC1	Large capacity cesspools (Class V well - illegal)[2]	75	75	150	N		
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	137	N**
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		Y	98	
WEL	Operating well	record dist.	record dist.		Y	124	
WEL	Operating well	record dist.	record dist.		Y	142	
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		

PWS ID / FACILITY ID	1730002 S04	UNIQUE WELL NO.	696862

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		N		
PU1	Pit or unfilled space more than four feet in depth	20	20		N		
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	N		
SP1	Swimming pool, in-ground	20	20		N		
*VH1	Vertical heat exchanger, horizontal piping conforming to rule	50	10		N		
*VH2	Vertical heat exchanger (vertical) piping, conforming to rule	50	35		N		
*WR1	Wastewater rapid infiltration basin, municipal or industrial	300	300	600	N		
*WA1	Wastewater spray irrigation area, municipal or industrial	150	150	300	N		
*WS1	Wastewater stabilization pond, industrial	150	150	300	N		
*WS2	Wastewater stabilization pond, municipal, 500 or more gal./acre/day of leakage	300	300	600	N		
*WS3	Wastewater stabilization pond, municipal, less than 500 gal./acre/day of leakage	150	150	300	N		
*WT1	Wastewater treatment unit tanks, vessels and components (Package plant)	100	100		N		
*WT2	Water treatment backwash disposal area	50	50	100	N		
Additional Sources (If there is more than one source listed above, please indicate here).							
Potential Contamination Sources and Codes Based on Previous Versions of this Form							
	none found within 200' of this well.						

* New potential contaminant source.

** This number is the estimated distance that this potential source is from this well even though it was identified during an inventory for an adjacent well.

[1] A sensitive well has less than 50 feet of watertight casing, and which is not cased below a confining layer or confining materials of at least 10' in thickness.

[2] These sources, known as Class V underground injection wells, are regulated by the federal U.S. Environmental Protection Agency.

[3] These sources are classified as illegal by Minnesota Rules, Chapter 4725.

[4] Isolation distance is determined by average flow per day or if a facility handles infectious or pathological wastes.

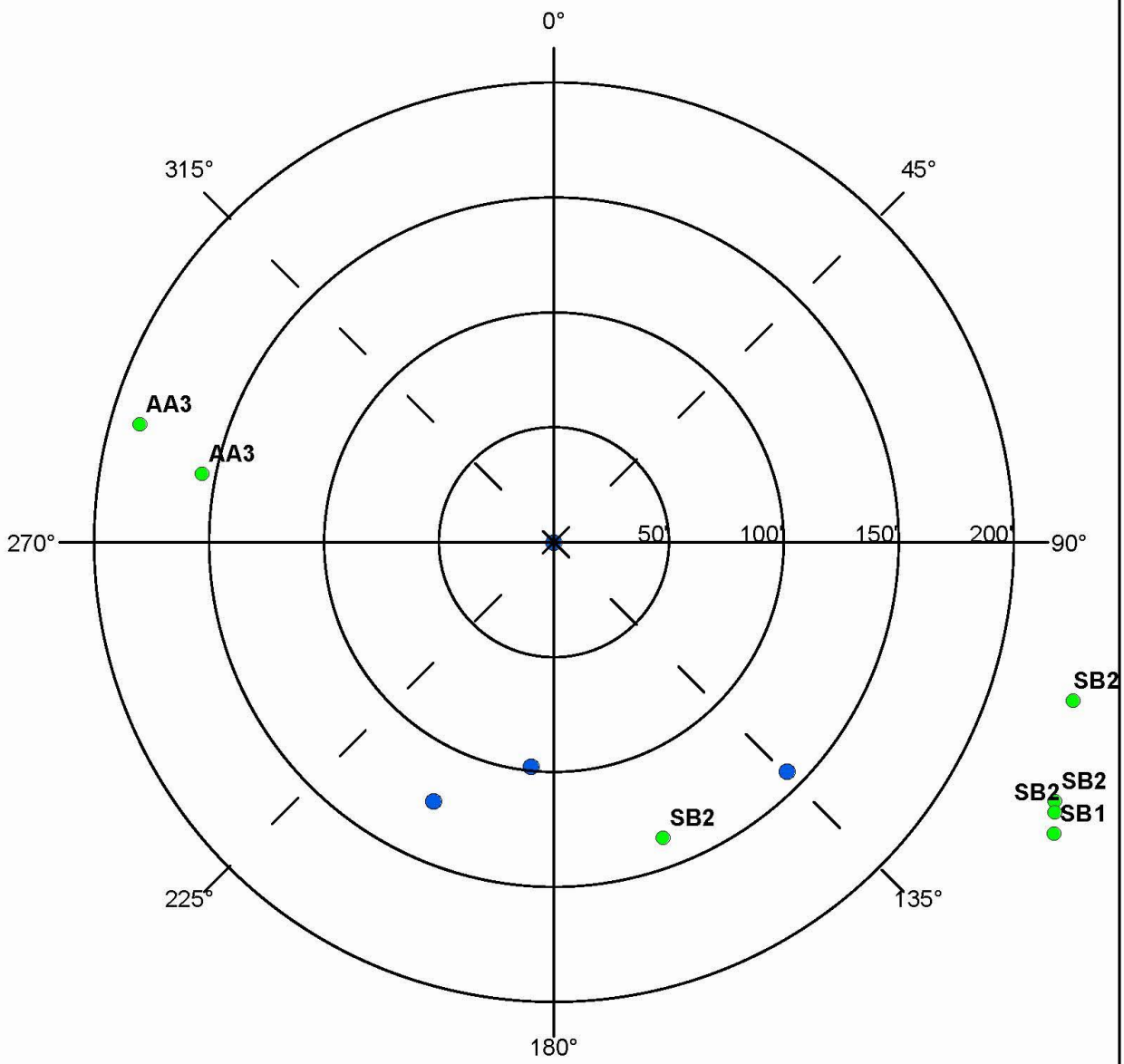
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; or is protected with secondary containment.

This form is based on the new isolation distances in Minnesota Rules, Chapter 4725, related to wells and borings adopted August 4, 2008, and Minnesota Rules, Chapter 4720, related to wellhead protection.

PWS ID / FACILITY ID	1730002 S04	UNIQUE WELL NO.	696862

SETBACK DISTANCES	All potential contaminant sources must be noted on sketch.

Record the distance and approximate compass bearing of each potential contaminant source from the well, and identify the source using the "Source Code". Unlabeled points on the map are unsealed wells.



Were the isolation distances maintained for the new sources of contamination?	Y	N	N/A
Is the system monitoring existing nonconforming sources of contamination?	Y	N	N/A

Reminder Question: Were the wellhead protection measure(s) implemented?

INSPECTOR	Voz, Karen (SWP)	DATE	

1/8/2014 4

Appendix IX, continued

PWS ID / FACILITY ID	1730002 S04	UNIQUE WELL NO.	696862

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
The precise location of subsurface sewage treatment system components should be determined. This can help assess the potential impact on the water supply.		
Connection to a community sewer system could be considered.		

COMMENTS

For further information, please contact:

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

Section Receptionist: 651-201-4700
Division TDD: 651-201-5797 or MN Relay Service @ 1-800-627-3529 and ask for 651-201-5000

Appendix X: Scoping Decision Notice No. 1

SCOPING DECISION NOTICE No. 1

The purpose for the first Scoping Meeting, as required by Minnesota Rules, part 4720.5310, is to discuss the information necessary for preparing a Part I Report of a Wellhead Protection Plan. The Part I Report identifies the area that provides the source of drinking water for the public water supply (PWS) so that the PWS can develop land use or management practices to protect their groundwater resource from contamination. Specifically, the Part I Report documents the delineation of the wellhead protection area (WHPA), the delineation of the drinking water supply management area (DWSMA), and assesses the vulnerability of the PWS wells and DWSMA.

The wellhead rule (Minnesota Rules, part 4720.5310) refers to the information required for wellhead planning as data elements. This form lists the data elements that are stated in Minnesota Rules, part 4750.5400. The Minnesota Department of Health (MDH) uses this form to designate which data elements are needed to prepare the Part I Report, based on the hydrogeological setting, vulnerability of the wells, and aquifer information known at the time of the Scoping 1 Meeting.

Name of Public Water Supply **City of Avon (PWSID =1730002)**		**Date** February 24, 2011
Name of the Wellhead Protection Manager Jim Thares		
Address P.O. Box 69	**City** Avon	**Zip** 56310
Unique Well Numbers 242069 (Emergency), 696861, 696862		**Phone** 320-356-7922

<u>Instructions for Completing the Scoping No. 1 Form</u>

N	D	V	S	
X				**N** = If this box is checked with an "X," this data element is **NOT** necessary for the **Part I Report** of your Wellhead Protection Plan. This data element may be identified later at the Scoping 2 Meeting and used for the Part 2 Report. Please go to the next data element.

N	D	V	S	
	X			**D** = If this box is checked with an "X," the preparer of the Part I Report is **required** to use this information for the **DELINEATION** of the WHPA or the DWSMA. If there is no check in the "S" box, this information is available in the public domain or is on-file at MDH.

N	D	V	S	
		X		**V** = If this box is checked with an "X," the preparer of the Part I Report is **required** to use this information for the **VULNERABILITY** assessment of the PWS well or the DWSMA. If there is no check in the "S" box, this information is available in the public domain or is on-file at MDH.

N	D	V	S	
			X	**S** = If this box is checked with an "X," the PWS **must SUBMIT** the information to the MDH.

DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT

A. PRECIPITATION

N	D	V	S	
X				A.1: An existing map or list of local precipitation gauging stations.

Technical Assistance Comments:

N	D	V	S	
X				A.2: An existing table showing the average monthly and annual precipitation, in inches, for the preceding five years.

Technical Assistance Comments:

B. GEOLOGY

N	D	V	S	
	X	X	X	B.1: An existing geologic map and a description of the geology, including aquifers, confining layers, recharge areas, discharge areas, sensitive areas as defined in Minnesota Statutes, section 103H.005, subdivision 13, and groundwater flow characteristics.

Technical Assistance Comments: Information of this type is required to characterize the geologic and hydrogeologic setting of the PWS well field(s). This information is used to define aquifer geometry, location and magnitude of the recharge and discharge areas, and groundwater flow information. Aquifer tests or alternatives listed in MN Rules, part 4720.5510, subpart 6, can be used to help characterize flow in the aquifer. Reference all information used to develop the conceptual model of the geologic setting and submit to MDH only the information that is not available in the public domain.

N	D	V	S	
	X	X	X	B.2: Existing records of the geologic materials penetrated by wells, borings, exploration test holes, or excavations, including those submitted to the department.

Technical Assistance Comments: Information of this type may be useful to refine the understanding of the geologic and hydrogeologic setting on a local basis. Submit only if the PWS or city has information of test drilling or site investigations conducted by the city that is not available in the public domain.

N	D	V	S	
	X	X	X	B.3: Existing borehole geophysical records from wells, borings, and exploration test holes.

Technical Assistance Comments: Information from geophysical records may provide additional information about aquifer thickness, well construction, and water level information at a local scale. Submit only if the information is not available in the public domain.

N	D	V	S	
	X	X	X	B.4: Existing surface geophysical studies.

Technical Assistance Comments: Information from geophysical studies may be useful to refine the understanding of the geology on a local basis. Submit only if the information is not available in the public domain.

C. SOILS

N	D	V	S	
X				C.1: Existing maps of the soils and a description of soil infiltration characteristics.

Technical Assistance Comments:

N	D	V	S	
X				C.2: A description or an existing map of known eroding lands that are causing sedimentation problems.

Technical Assistance Comments:

D. WATER RESOURCES				
N	D	V	S	D.1: An existing map of the boundaries and flow directions of major watershed units and minor watershed units.
X				
Technical Assistance Comments:				
N	D	V	S	D.2: An existing map and a list of public waters as defined in Minnesota Statutes, section 103G.005, subdivision 15, and public drainage ditches.
X				
Technical Assistance Comments:				
N	D	V	S	D.3: The shoreland classifications of the public waters listed under sub-item (2), pursuant to part 6120.3000 and Minnesota Statutes, sections 103F.201 to 103F.221.
X				
Technical Assistance Comments:				
N	D	V	S	D.4: An existing map of wetlands regulated under Chapter 8420 and Minnesota Statutes, section 103G.221 to 103G.2373.
X				
Technical Assistance Comments:				
N	D	V	S	D.5: An existing map showing those areas delineated as floodplain by existing local ordinances.
X				
Technical Assistance Comments:				

DATA ELEMENTS ABOUT THE LAND USE

E. LAND USE				
N	D	V	S	E.1: An existing map of parcel boundaries.
	X		X	
Technical Assistance Comments: This information may be helpful in delineating the DWSMA, if available. If this information is provided, identification numbers must be provided for each parcel. An electronic format for the map is preferable.				
N	D	V	S	E.2: An existing map of political boundaries.
	X		X	
Technical Assistance Comments: Please provide this information if the boundaries have been updated/changed. This information may help delineate the DWSMA. An electronic format for the map is preferable.				
N	D	V	S	E.3: An existing map of public land surveys, including township, range, and section.
	X			
Technical Assistance Comments: This information is available in the public domain and may be used to delineate the DWSMA.				
N	D	V	S	E.4: A map and an inventory of the current and historical agricultural, residential, commercial, industrial, recreational, and institutional land uses and potential contaminant sources.
X				
Technical Assistance Comments:				
N	D	V	S	E.5: An existing, comprehensive land-use map.
X				
Technical Assistance Comments:				
N	D	V	S	E.6: Existing zoning map.
X				
Technical Assistance Comments:				

F. PUBLIC UTILITY SERVICES

N	D	V	S	
	X			F.1: An existing map of transportation routes or corridors.

Technical Assistance Comments: This information is available in the public domain and may be used to delineate the DWSMA.

N	D	V	S	
X				F.2: An existing map of storm sewers, sanitary sewers, and the public water supply systems.

Technical Assistance Comments:

N	D	V	S	
X				F.3: An existing map of gas and oil pipelines used by gas and oil suppliers.

Technical Assistance Comments:

N	D	V	S	
X				F.4: An existing map or list of public drainage systems.

Technical Assistance Comments:

N	D	V	S	
	X	X	X	F.5: An existing record of construction, maintenance, and use of the public water supply well(s) and other wells within the drinking water supply management area.

Technical Assistance Comments: If the information is different than that on-file with MDH, please provide 1) the pumping rates for the current and previous years, and the projected annual pumping rates for the next five years for each well in the PWS; and 2) well record(s) for the PWS well(s). Information about the PWS well(s) may affect the vulnerability assessment due to rehabilitation/reconstruction of a well or changes in pumping rates.

DATA ELEMENTS ABOUT WATER QUANTITY

G. SURFACE WATER QUANTITY

N	D	V	S	
X				G.1: An existing description of high, mean, and low flows on streams.

Technical Assistance Comments:

N	D	V	S	
X				G.2: An existing list of lakes where the state has established ordinary high water marks.

Technical Assistance Comments:

N	D	V	S	
X				G.3: An existing list of permitted withdrawals from lakes and streams, including source, use, and amounts withdrawn.

Technical Assistance Comments:

N	D	V	S	
X				G.4: An existing list of lakes and streams for which state protected levels or flows have been established.

Technical Assistance Comments:

N	D	V	S	
	X	X	X	G.5: An existing description of known water-use conflicts, including those caused by groundwater pumping.

Technical Assistance Comments: Please notify MDH of surface water/well interference problems of which the PWS is aware, because this information would be used to delineate the WHPA or determine or confirm the vulnerability rating.

H. GROUNDWATER QUANTITY				
N	D	V	S	H.1: An existing list of wells covered by state appropriation permits, including amounts of water appropriated, type of use, and aquifer source.
	X	X	X	
Technical Assistance Comments: Please submit this information for wells that are not permitted by the DNR because this information may be useful in identifying the hydrologic boundary conditions that could affect the size and shape of the WHPA boundaries.				
N	D	V	S	H.2: An existing description of known well interference problems and water-use conflicts.
	X	X	X	
Technical Assistance Comments: Please notify MDH of well interference problems of which the PWS is aware. Interference problems with other wells, if present, likely indicate a hydrologic boundary that would need to be considered in making the WHPA delineation.				
N	D	V	S	H.3: An existing list of state environmental boreholes, including unique well number, aquifer measured, years of record, and average monthly levels.
	X	X	X	
Technical Assistance Comments: Only submit monthly water level measurements (with unique well numbers and dates) if this information is not available in the public domain.				

DATA ELEMENTS ABOUT WATER QUALITY

I. SURFACE WATER QUALITY				
N	D	V	S	I.1: An existing map or list of the state water quality management classification for each stream and lake.
X				
Technical Assistance Comments:				
N	D	V	S	I.2: An existing summary of lake and stream water quality monitoring data, including: 1. bacteriological contamination indicators; 2. inorganic chemicals; 3. organic chemicals; 4. sedimentation; 5. dissolved oxygen; and 6. excessive growth or deficiency of aquatic plants.
X				
Technical Assistance Comments:				

J. GROUNDWATER QUALITY

N	D	V	S	
	X	X	X	J.1: An existing summary of water quality data, including: 1) bacteriological contamination indicators; 2) inorganic chemicals; and 3) organic chemicals.

Technical Assistance Comments: Submit if the PWS has information that is not available in the public domain, because the information may help explain groundwater flow paths.

N	D	V	S	
	X	X	X	J.2: An existing list of water chemistry and isotopic data from wells, springs, or other groundwater sampling points.

Technical Assistance Comments: Submit if the PWS has information that is not available in the public domain, because the information may help explain groundwater flow paths.

N	D	V	S	
	X	X	X	J.3: An existing report of groundwater tracer studies.

Technical Assistance Comments: Submit if the PWS has information that is not available in the public domain, because the information may help explain groundwater flow paths.

N	D	V	S	
		X	X	J.4: An existing site study and well water analysis of known areas of groundwater contamination.

Technical Assistance Comments: Submit if the PWS has information on contaminant sources not available in the public domain, because these reports may contain additional geologic or hydrogeologic information.

N	D	V	S	
X				J.5: An existing property audit identifying contamination.

Technical Assistance Comments:

N	D	V	S	
	X	X		J.6: An existing report to the Minnesota Department of Agriculture and the Minnesota Pollution Control Agency of contaminant spills and releases.

Technical Assistance Comments: Notify MDH of reports on spills or contaminant releases that are on-file with the PWS or city but are not in the public domain. These reports do not need to be submitted but the MDH staff would like to review the reports.

Summary of Data Request
Specific Data to be provided to MDH by City of Avon

As discussed during the first Scoping Meeting on February 24, 2011, the city of Avon (PWS) will supply the following information for Part I of their Wellhead Protection Plan to the Minnesota Department of Health. The number of the data element that refers to the information needed to prepare the Part I Report is listed in the parenthesis at the end of each request.

1) PWS well information: Use Tables 1 and 2, the well records for the PWS wells, and a map showing the locations of all the PWS wells, to review the accuracy of 1) all PWS well construction, 2) well locations, and 3) pumping information. (F.5)

   Table 1 lists well use and construction for each of the PWS wells.

   The enclosed map shows the locations of the primary public water supply wells and the emergency backup well. Please let us know if you feel the wells are not correctly located. These locations must be used to delineate your wellhead protection areas.

   Table 2 shows the available pumping information and indicates what information the PWS needs to provide for the delineation of the capture zone.

2) Please provide a copy of any aquifer test or specific capacity information (or production test data) for either PWS well that was obtained during well construction, maintenance, or repair. (B.1)

3) Is there an existing map of parcel and/or political boundaries that could be used for defining the Drinking Water Supply Management Area (DWSMA)? If you wish to use parcel lines, please provide the parcel identification number for each parcel boundary along with the map. Have the city boundaries changed? If the city boundaries have changed, please provide the new boundaries. The boundaries of the DWSMA may be larger if political boundaries are used instead of the parcel boundaries. (E.1 and E.2)

4) If there are private well records, soil boring reports, geophysical studies, or water level measurements in your files that MDH staff did not identify at the scoping meeting and that would be available for MDH staff to review and copy, please notify MDH. (B.2, B.3, B.4, and H.3)

5) Please identify reports that you have on-file relating to leaks/contamination sites that may be a concern to your drinking water supply that MDH may review and copy. (J.4)

6) If your files contain water chemistry data, such as bacteria, virus, inorganic, organic, or isotopic results from wells or other groundwater sampling points, that are not currently available to MDH that MDH may review and copy, please notify MDH. (J.1 and J.2)

7) Please identify reports that you have in your files relating to groundwater tracer studies that have been conducted. (J.3)

8) Please provide information about other high-capacity wells in your area that may not be permitted and are not listed on the attached Table 3. (H.1)

9) Please describe any conflicts over water use that the PWS has been involved with, such as 1) private wells that went dry (or well interference) or 2) springs or wetlands that were affected. Was the Department of Natural Resources involved in resolving the conflict? (G.5 and H.2)

MINNESOTA MDH DEPARTMENT OF HEALTH

City Well Locations
City of Avon

Appendix XI: Second Scoping Decision Notice

May 29, 2013

Mr. Jim Thares, Clerk/Administrator
City of Avon
P. O. Box 69
Avon, Minnesota 56310-0069

Dear Mr. Thares:

Subject: **Second Scoping Decision Notice – City of Avon – PWSID #1730002**

This letter provides notice of the results of a scoping meeting held with you, Jolene Foss, Student Intern, and Jon Forsell, Water Operator (city of Avon) on May 3, 2013, at Avon City Hall regarding wellhead protection (WHP) planning. During the meeting, we discussed the data elements that must be included and used to prepare the part of the WHP plan related to the management of potential contaminants in the approved drinking water supply management area. The enclosed Scoping 2 Decision Notice lists the data elements discussed at the meeting.

The city of Avon has met the requirements to distribute copies of the first part of the WHP plan to local units of government and hold an informational meeting for the public. The city of Avon will have until February 15 2014, to complete its WHP plan.

If a data element is marked on the enclosed notice as a data element that must be used and it does not exist, it is helpful if your plan notes this. I will be contacting you to review the progress of the development of Part II of your plan. If you have any questions regarding the enclosed notice, contact me by email at karen.s.voz@state.mn.us or by phone at 320/223-7322.

Sincerely,

Karen S. Voz

Karen S. Voz, Principal Planner
Source Water Protection Unit
Environment Health Division
St. Cloud District Office
3333 West Division Street, Suite # 212
St. Cloud, Minnesota 56301-4557

KSV:ds-b
Enclosures
cc: Kim Anding Larsen, MDH Engineer, St. Cloud District Office
Byron Adams, Water Monitoring Section, Minnesota Pollution Control Agency
Eric Mohring, Board of Water and Soil Resources
Joe Richter, Division of Waters, Minnesota Department of Natural Resources
Ron Struss, Minnesota Department of Agriculture

SCOPING 2 DECISION NOTICE

Remainder of the Wellhead Protection Plan

Name of Public Water Supply: **City of Avon** **PWSID #1730002**		**Date:** May 29, 2013
Name of the Wellhead Protection Manager: Jim Thares, Clerk/Administrator		
Address: P.O. Box 69	**City and State:** Avon, Minnesota	**Zip:** 56310-0069
Unique Well Numbers: 696861(Well 4), 696862 (Well 5), 242069 (Well 3 Emergency)*		**Phone:** 320/356-7922

*Emergency wells only use the IWMZ Form for data collection.

Instructions for Completing the Scoping 2 Form

N	R	S	
X			**N = Not required.** If this box is checked, this data element is **NOT** necessary for your wellhead protection plan because it is not needed or it has been included in the first scoping decision notice. **Please go to the next data element.**

N	R	S	
	X		**R = Required for the remainder of the plan.** If this box is checked, this data **MUST** be used for the "**remainder of the plan.**"

N	R	S	
		X	**S = Submit to MDH.** If this box is checked, this data element **MUST** be included in your **wellhead protection plan and submitted to MDH.** If there is **NO** check mark in the **"S"** box but there is an **"X"** in the **"R"** box, this data element **MUST** be included in your plan, but should **NOT be submitted to MDH.** This box will only be checked if MDH does not have access to this data element. This will help to reduce the cost by reducing the amount of paper and time to reproduce the data element.

Note: Any data elements required in the first scoping decision notice must also be used to complete the remainder of the wellhead protection plan.

DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT

PRECIPITATION			
N	R	S	An existing map or list of local precipitation gauging stations.
X			
Technical Assistance Comments:			
N	R	S	An existing table showing the average monthly and annual precipitation in inches for the preceding five years.
X			
Technical Assistance Comments:			
GEOLOGY			
N	R	S	An existing geologic map and a description of the geology, including aquifers, confining layers, recharge areas, discharge areas, sensitive areas as defined in Minnesota Statutes, section 103H.005, subdivision 13, and groundwater flow characteristics.
	X		
Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.			
N	R	S	Existing records of the geologic materials penetrated by wells, borings, exploration test holes, or excavations, including those submitted to the department.
	X		
Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.			
N	R	S	Existing borehole geophysical records from wells, borings, and exploration test holes.
	X		
Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.			
N	R	S	Existing surface geophysical studies.
	X		
Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.			
SOILS			
N	R	S	Existing maps of the soils and a description of soil infiltration characteristics.
X			
Technical Assistance Comments:			
N	R	S	A description or an existing map of known eroding lands that are causing sedimentation problems.
X			
Technical Assistance Comments:			

WATER RESOURCES			
N	R	S	An existing map of the boundaries and flow directions of major watershed units and minor watershed units.
X			
Technical Assistance Comments:			
N	R	S	An existing map and a list of public waters as defined in Minnesota Statutes, section 103G.005, subdivision 15, and public drainage ditches.
X			
Technical Assistance Comments:			
N	R	S	The shoreland classifications of the public waters listed under subitem (2), pursuant to part 6120.3000 and Minnesota Statutes, sections 103F.201 to 103F.221.
X			
Technical Assistance Comments:			
N	R	S	An existing map of wetlands regulated under chapter 8420 and Minnesota Statutes, section 103G.221 to 103G.2373.
X			
Technical Assistance Comments:			
N	R	S	An existing map showing those areas delineated as floodplain by existing local ordinances.
X			
Technical Assistance Comments:			

DATA ELEMENTS ABOUT THE LAND USE

LAND USE			
N	R	S	An existing map of parcel boundaries.
	X	X	
Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.			
N	R	S	An existing map of political boundaries.
	X	X	
Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.			
N	R	S	An existing map of public land surveys including township, range, and section.
	X		
Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.			

N	R	S	
	X	X	A map and an inventory of the current and historical agricultural, residential, commercial, industrial, recreational, and institutional land uses and potential contaminant sources.

Technical Assistance Comments: The inventory, mapping, and management of land uses and potential sources of contamination for all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements, as follows:

Low Vulnerability

1) All potential contaminant sources and facility designations as listed on the attachment (Only those wells constructed at a depth of 115 feet or greater are required to be inventoried);
2) a land use/land cover map and table; and
3) an inventory of the Inner Wellhead Management Zone (IWMZ).

As a starting point, MDH will provide a 1992 or 2001 land cover map and table from federal data bases. This data set must be used unless an alternative electronic data set that is more current and detailed is available.

Management strategies must be developed for all land uses and potential sources of contamination.

N	R	S	
	X	X	An existing comprehensive land-use map.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element. Include any urban fringe planning areas.

N	R	S	
	X	X	Existing zoning map.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.

PUBLIC UTILITY SERVICES

N	R	S	
X			An existing map of transportation routes or corridors.

Technical Assistance Comments:

N	R	S	
X			An existing map of storm sewers, sanitary sewers, and public water supply systems.

Technical Assistance Comments:

N	R	S	
X			An existing map of the gas and oil pipelines used by gas and oil suppliers.

Technical Assistance Comments:

N	R	S	
X			An existing map or list of public drainage systems.

Technical Assistance Comments:

N	R	S	
	X		An existing record of construction, maintenance, and use of the public water supply well(s) and other wells within the drinking water supply management area.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

DATA ELEMENTS ABOUT WATER QUANTITY

SURFACE WATER QUANTITY

N	R	S	
X			An existing description of high, mean, and low flows on streams.

Technical Assistance Comments:

N	R	S	
X			An existing list of lakes where the state has established ordinary high water marks.

Technical Assistance Comments:

N	R	S	
X			An existing list of permitted withdrawals from lakes and streams, including source, use, and amounts withdrawn.

Technical Assistance Comments:

N	R	S	
X			An existing list of lakes and streams for which state protected levels or flows have been established.

Technical Assistance Comments:

N	R	S	
X			An existing description of known water-use conflicts, including those caused by groundwater pumping.

Technical Assistance Comments:

GROUNDWATER QUANTITY

N	R	S	
	X		An existing list of wells covered by state appropriation permits, including amounts of water appropriated, type of use, and aquifer source.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

N	R	S	
	X		An existing description of known well interference problems and water use conflicts.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

N	R	S	
	X		An existing list of state environmental bore holes, including unique well number, aquifer measured, years of record, and average monthly levels.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.

DATA ELEMENTS ABOUT WATER QUALITY

SURFACE WATER QUALITY

N	R	S	
X			An existing map or list of the state water quality management classification for each stream and lake.

Technical Assistance Comments:

N	R	S	
X			An existing summary of lake and stream water quality monitoring data, including: 1. bacteriological contamination indicators; 2. inorganic chemicals; 3. organic chemicals; 4. sedimentation; 5. dissolved oxygen; and 6. excessive growth or deficiency of aquatic plants.

Technical Assistance Comments:

GROUNDWATER QUALITY

N	R	S	
	X		An existing summary of water quality data, including: 1. bacteriological contamination indicators; 2. inorganic chemicals; and 3. organic chemicals.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

N	R	S	
	X		An existing list of water chemistry and isotopic data from wells, springs, or other groundwater sampling points.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

N	R	S	
	X		An existing report of groundwater tracer studies.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.

N	R	S	
	X		An existing site study and well water analysis of known areas of groundwater contamination.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

N	R	S	
	X		An existing property audit identifying contamination.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.

N	R	S	
	X		An existing report to the Minnesota Department of Agriculture and the Minnesota Pollution Control Agency of contaminant spills and releases.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.

Appendix XII: Old MUNI Well Reports

Sealing Record Well #1 – Old MUNI

6/20/13 Well Log Report - 00241593

Minnesota Unique Well No. 241593

County Stearns
Quad Avon
Quad ID 157C

#1

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 09/08/1992
Update Date 05/06/2005
Received Date

Well Name AVON 2
Township Range Dir Section Subsections Elevation 1122 ft.
125 30 W 28 ACDACA Elevation Method 7.5 minute topographic map (+/- 5 feet)

Well Depth ft. Depth Completed ft. Date Well Completed

Drilling Method --

Well Address
AVON MN

Drilling Fluid --
Well Hydrofractured? ☐ Yes ☐ No From Ft. to Ft.

Use Abandoned Status Sealed

Geological Material Color Hardness From To

Casing Type Joint No Information Drive Shoe? ☐ Yes ☐ No Above/Below 0 ft.

Casing Diameter 6 in. to ft. Weight lbs./ft. Hole Diameter

Open Hole from ft. to ft.

Screen Make Type
Diameter Slot/Gauze Length Set Between

Static Water Level
ft. from Date Measured

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

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

REMARKS
WELL SEALED 10-11-1989 BY 73025 ?
ORIGINAL USE MU - MUNICIPAL

Grouting Information Well Grouted? ☐ Yes ☐ No

Located by: Minnesota Geological Survey
Method: Digitized - scale 1:24,000 or larger (Digitizing Table)
Unique Number Verification: Other, note in remarks
Input Date: 01/01/1990
System: UTM - Nad83, Zone15, Meters
X: 386538 Y: 5051693

Nearest Known Source of Contamination
__feet __direction __type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☑ Not Installed Date Installed
Manufacturer's name Model number __ HP 0 Volts
Length of drop Pipe _ft. Capacity 40 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Well Contractor Certification
Minnesota Department of Health MDH
License Business Name Lic. Or Reg. No. Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 241593 Printed 6/20/2013 HE-01205-07

mdh-agua.health.state.mn.us/cwi/well_log.asp?wellid=0000241593 1/1

Sealing Record Well #2 – Old MUNI

Well Log Report - 00241592

#B 2,

Minnesota Unique Well No.

241592

County Stearns
Quad Avon
Quad ID 157C

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 09/08/1992
Update Date 01/25/2013
Received Date

Well Name AVON 1

Township Range Dir Section Subsections Elevation 1131 ft.

125 30 W 28 AACDCD Elevation Method Calc from DEM (USGS 7.5 min or equiv.)

Well Depth 142 ft. Depth Completed 142 ft. Date Well Completed 00/00/1962

Drilling Method --

Well Address

AVON MN

Drilling Fluid --

Well Hydrofractured? ☐ Yes ☐ No From Ft. to Ft.

Use Abandoned Status Sealed

Geological Material	Color	Hardness	From	To
NO RECORD			0	132
SAND & GRAVEL			132	142

Casing Type Joint No Information Drive Shoe? ☐ Yes ☐ No Above/Below 0 ft.

Casing Diameter	Weight	Hole Diameter
16 in. to 132 ft.	lbs./ft.	

Open Hole from ft. to ft.

Screen YES Make Type

Diameter	Slot/Gauze	Length	Set Between
0		10	132 ft. and 142 ft.

Static Water Level
ft. from Date Measured

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

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

REMARKS
WELL SEALED 10-10-2003 BY 73646 ✓ Trout
ORIGINAL USE PC - COMMUNITY SUPPLY

Grouting Information Well Grouted? ☐ Yes ☐ No

Located by: Minnesota Department of Health Method: GPS SA On (averaged)
Unique Number Verification: Other, note in remarks Input Date: 03/22/1999
System: *UTM - Nad83, Zone15, Meters* X: 386736 Y: 5051976

Nearest Known Source of Contamination
__feet __direction __type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☑ Not Installed Date Installed
Manufacturer's name Model number __ HP 0 Volts
Length of drop Pipe _ft. Capacity 75 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No

First Bedrock
Last Strat sand +larger
Aquifer Quaternary Undiff.
Depth to Bedrock ft.

Well Contractor Certification
Minnesota Department of Health — License Business Name
MDH — Lic. Or Reg. No.
Name of Driller

County Well Index Online Report **241592** Printed 6/20/2013 HE-01205-07

mdh-agua.health.state.mn.us/cwi/well_log.asp?wellid=0000241592 1/1

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING SEALING RECORD

Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No. H 209414

Minnesota Unique Well No. or W-series No. (Leave blank if not known) 241592

WELL OR BORING LOCATION

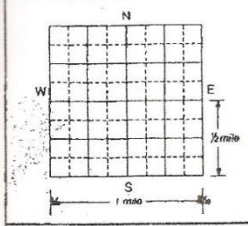
County Name: Stearns

Township Name	Township No.	Range No.	Section No.	Fraction (sm → lg)
	125	30	28	AA CD¼ CA¼

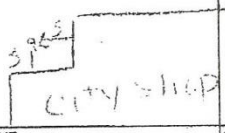
GPS LOCATION: Latitude 45 degrees 36.724 minutes ____ seconds; Longitude 94 degrees 27.155 minutes ____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location

Show exact location of well or boring in section grid with "X"



Sketch map of well or boring location, showing property lines, roads, and buildings.



Date Sealed: 10/10/03

Date Well or Boring Constructed: 1962

Depth Before Sealing: 142 ft.

Original Depth: 142 ft.

AQUIFER(S) ☐ Single Aquifer ☐ Multiaquifer

WELL/BORING ☐ Water Supply Well ☐ Monit. Well ☐ Env. Bore Hole ☐ Other ____

STATIC WATER LEVEL ☐ Measured ☐ Estimated

13 ft. ☐ below ☐ above land surface

CASING TYPE(S) ☐ Steel ☐ Plastic ☐ Tile ☐ Other ____

WELLHEAD COMPLETION

Outside: ☐ Well House ☐ Pitless Adapter/Unit ☐ Well Pit ☐ Buried

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried

PROPERTY OWNER'S NAME/COMPANY NAME: City of Avon Well #1

Property owner's mailing address if different than well location address indicated above:

PO Box 69
Avon, MN 56310

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
16 in.	from 0 to 132 ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in.	from ____ to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in.	from ____ to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

WELL OWNER'S NAME/COMPANY NAME: SAME AS ABOVE

Well owner's mailing address if different than property owner's address indicated above

SCREEN/OPEN HOLE

Screen from 132 to 142 ft. Open Hole from ____ to ____ ft.

OBSTRUCTIONS ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☐ No Obstruction

Type of Obstructions (Describe) ____

Obstructions removed? ☐ Yes ☐ No Describe ____

PUMP

Type: unknown - too corroded

☐ Removed ☐ Not Present ☐ Other ____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring				
Drift			0	142

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:

☐ No Annular Space Exists ☐ Annular space grouted with tremie pipe ☐ Casing Perforation/Removal

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

Type of perforator ____

☐ Other ____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material: Volclay Grout from 0 to 142 ft. ____ yards 54 bags

____ from ____ to ____ ft. ____ yards ____ bags

____ from ____ to ____ ft. ____ yards ____ bags

OTHER WELLS AND BORINGS

Other unsealed and unused well or boring on property? ☐ Yes ☐ No How many? ____

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J Traut Wells, Inc. — Contractor Business Name

73646 — License or Registration No.

Dave Traut — Authorized Representative Signature

10/17/03 — Date

Michael S — Name of Person Sealing Well or Boring

WELL CONTRACTOR COPY H 209414

Appendix XIII: 2013 Consumer Confidence Report

CONSUMER CONFIDENCE REPORT

PWSID: 1730002

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

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

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

nd—No Detection.

N/A—Not Applicable (does not apply).

Contaminant (units)	MCLG	MCL	Level Found		Typical Source of Contaminant
			Range (2012)	Average /Result*	
Arsenic (ppb) (12/14/2009)	0	10	N/A	6.94	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.
Barium (ppm) (12/14/2009)	2	2	N/A	.09	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Combined Radium (pCi/l) (08/27/2008)	0	5.4	N/A	1.2	Erosion of natural deposits.
Fluoride (ppm)	4	4	1.1-1.2	1.15	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.
Haloacetic Acids (HAA5) (ppb) (08/10/2011)	0	60	N/A	3.1	By-product of drinking water disinfection.
Nitrate (as Nitrogen) (ppm)	10.4	10.4	nd-3	3	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
TTHM (Total trihalomethanes) (ppb) (08/10/2011)	0	80	N/A	.8	By-product of drinking water disinfection.

*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.

While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Contaminant (units)	MRDLG	MRDL	****	*****	Typical Source of Contaminant

2

CONSUMER CONFIDENCE REPORT

PWSID: 1730002

City of Avon
2012 Drinking Water Report

The City of Avon is issuing the results of monitoring done on its drinking water for the period from January 1 to December 31, 2012. 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 Avon provides drinking water to its residents from a groundwater source: two wells ranging from 240 to 251 feet deep, that draw water from the Quaternary Buried Artesian aquifer.

The water provided to customers may meet drinking water standards, but the Minnesota Department of Health has also made a determination as to how vulnerable the source of water may be to future contamination incidents. If you wish to obtain the entire source water assessment regarding your drinking water, please call 651-201-4700 or 1-800-818-9318 during normal business hours. Also, you can view it on line at www.health.state.mn.us/divs/eh/water/swp/swa.

Call 612-865-6283 if you have questions about the City of Avon drinking water or would like information about opportunities for public participation in decisions that may affect the quality of the water.

Results of Monitoring

No contaminants were detected at levels that violated federal drinking water standards. However, some 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 2012. 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.

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.

PWSID: 1730002

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

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

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

nd—No Detection.

N/A—Not Applicable (does not apply).

Contaminant (units)	MCLG	MCL	Level Found		Typical Source of Contaminant
			Range (2012)	Average /Result*	
Arsenic (ppb) (12/14/2009)	0	10	N/A	6.94	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.
Barium (ppm) (12/14/2009)	2	2	N/A	.09	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Combined Radium (pCi/l) (08/27/2008)	0	5.4	N/A	1.2	Erosion of natural deposits.
Fluoride (ppm)	4	4	1.1-1.2	1.15	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.
Haloacetic Acids (HAA5) (ppb) (08/10/2011)	0	60	N/A	3.1	By-product of drinking water disinfection.
Nitrate (as Nitrogen) (ppm)	10.4	10.4	nd-3	3	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
TTHM (Total trihalomethanes) (ppb) (08/10/2011)	0	80	N/A	.8	By-product of drinking water disinfection.

*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.

While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Contaminant (units)	MRDLG	MRDL	****	*****	Typical Source of Contaminant

PWSID: 1730002

Contaminant (units)	MRDLG	MRDL	****	*****	Typical Source of Contaminant
Chlorine (ppm)	4	4	.5-1.5	1.02	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) (06/22/2011)	1.3	1.3	.33	0 out of 10	Corrosion of household plumbing systems; Erosion of natural deposits.
Lead (ppb) (06/22/2011)	0	15	3.7	0 out of 10	Corrosion of household plumbing systems; Erosion of natural deposits.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. City of Avon 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.

Monitoring may have been done for additional contaminants that do not have MCLs established for them and are not required to be monitored under the Safe Drinking Water Act. Results may be available by calling 651-201-4700 or 1-800-818-9318 during normal business hours.

Compliance with National Primary Drinking Water Regulations

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.

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 and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.

Appendix XIV: City of Avon – WHP Implementation Schedule

NOTE: 1) For a complete description of each strategy, refer to the WHP Plan, Table 10 – WHP Plan of Action
2) Year 1 starts 60 days after final plan approval is received from MDH.

Measure	Strategies	ongoing	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Completion Date
	Monitoring, Data Collection and Assessment:												
1	Maintain well inventory.	X											
2	Monitor for Class V wells throughout the DWSMA.	X											
3	Seal unused wells. Pursue state and local grant funds to assist.	X											
4	Review old municipal well and boring information to locate and determine efforts needed to address former city wells and borings without sealing records.	X											
5	Complete a historical review of land uses and areas in the DWSMA suspected of having unused/unsealed wells.		X										

Measure	Strategies	ongoing	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Completion Date
	Well Management:												
6	Monitor setbacks for all new potential sources of contamination within the IWMZ.							X					
7	Monitor any non-conforming potential contaminant sources identified in the IWMZ.	X											
8	Assess recorded spill at Casey's gas station or other future spills risk to the PWS.			X									
9	Provide a DWSMA map to local responders. Request their awareness and response to activities within the DWSMA.		X										
10	Establish a budget to seal wells. Apply for grants to offset costs.		X										
11	Obtain sealing records to substantiate proper sealing of a former muni well and submit to MDH.		X										
12	Distribute well management information to landowners within the DWSMA.			X					X				
13	Inform landowners of any financial resources to seal private wells.			X					X				
14	Provide property owner of Class V Well information on management and permitting options.	X											
15	Identify any new high capacity wells in or within one mile of the DWSMA.	X											
16	If a new high capacity well is identified work with MDH to evaluate impacts on the delineated WHPA boundaries.	X											

Measure	Strategies	ongoing	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Completion Date
	WHP Coordination, Reporting and Evaluation:												
33	Meet annually with city staff to discuss WHP Plan implementation and coordination.		X	X	X	X	X	X	X	X	X	X	
34	Submit an annual year-end report on completed WHP activities to the City Council.		X	X	X	X	X	X	X	X	X	X	
35	Maintain a "WHP folder" to provide documentation of completed WHP activities.		X	X	X	X	X	X	X	X	X	X	
36	Develop a implementation schedule to track WHP activities.		X										
37	Complete a WHP evaluation report every 2.5 years.				X		X			X			

Measure	Strategies	ongoing	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Completion Date
	Land Use Planning:												
26	Update the Emergency/Contingency Plan after local elections.		X	X	X	X	X	X	X	X	X	X	
27	Educate residents on water conservation through its newsletter or video presentation.			X				X				X	
28	Inform the County Water Plan Coordinator on your WHP plan and identified issues/activities.		X										
29	Request to be notified about proposed zoning, rezoning and permits in the DWSMA.		X			`							
30	Work with City's Planning Commission to address potential risks to the water supply.	X											
31	Explore a new policy that requires the status of all wells on a property for all new building and/or land use permits.	X											
32	Update comprehensive plan to reflect existing WHP issues and identify changes to local controls.						X						

Measure	Strategies	ongoing	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Completion Date
	WHP Coordination, Reporting and Evaluation:												
33	Meet annually with city staff to discuss WHP Plan implementation and coordination.		X	X	X	X	X	X	X	X	X	X	
34	Submit an annual year-end report on completed WHP activities to the City Council.		X	X	X	X	X	X	X	X	X	X	
35	Maintain a "WHP folder" to provide documentation of completed WHP activities.		X	X	X	X	X	X	X	X	X	X	
36	Develop a implementation schedule to track WHP activities.		X										
37	Complete a WHP evaluation report every 2.5 years.				X		X			X			

Appendix XV: 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 surface and subsurface areas surrounding a public water supply well, including the wellhead protection area, that must be managed by the entity identified in the wellhead protection plan. (Minnesota Rules, part 4720.5100, subpart 13). This area is delineated using identifiable landmarks that reflect the scientifically calculated wellhead protection area boundaries as closely as possible.

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.

Emergency Standby Well. A well that is pumped by a public water supply system only during emergencies, such as when an adequate water supply cannot be achieved because one or more primary or seasonal water supply wells cannot be used.

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 City of Avon, Minnesota must manage the IWMZ to help protect it from sources of pathogen or chemical contamination that may cause an acute health effect.

Nonpoint Source Contamination. Refers to contamination of the drinking water aquifer that is caused by polluted runoff or pollution sources that cannot be attributed to a specifically defined origin, e.g., runoff from agricultural fields, feedlots, or urban areas.

Point Source Contamination. Refers to contamination of the drinking water aquifer that is attributed to pollution arising from a specifically defined origin, such as discharge from a leaking fuel tank, a solid waste disposal site, or an improperly constructed or sealed well.

Primary Water Supply Well. A well that is regularly pumped by a public water supply system to provide drinking water.

Seasonal Water Supply Well. A well that is only used to provide drinking water during certain times of the year, either when pumping demand cannot be met by the primary water supply well(s) or for a facility, such as a resort, that is closed to the public on a seasonal basis.

Vulnerability. Refers to the likelihood that one or more contaminants of human origin may enter either 1) a water supply well that is used by the City of Avon, Minnesota or 2) an aquifer that is a source of public drinking water.

WHP 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, part 103I.005, subdivision 24).

WHP Plan Goal. An overall outcome of implementing the WHP plan, e.g., providing for a safe and adequate drinking water supply.

WHP Measure. A method adopted and implemented by a City of Avon, Minnesota to prevent contamination of a public water supply, and approved by the Minnesota Department of Health under Minnesota Rules, parts 4720.5110 to 4720.5590.

WHP Plan Objective. A capability needed to achieve one or more WHP goals, e.g., implementing WHP measures to address high priority potential contamination sources within 5 years.

Appendix XVI: List of Acronyms

DNR	MN Department of Natural Resources
DOT	Department of Transportation
DWSMA	Drinking Water Supply Management Area
EPA	Environmental Protection Agency
FD	Local Fire Department
IWMZ	Inner Wellhead Management Zone
LMIC	Land Management Information Center
MDA	MN Department of Agriculture
MDH	MN Department of Health
Mg/l	Milligrams per Liter
Mg/y	Million Gallons per Year
MGS	MN Geological Survey
MN	Minnesota
MPCA	MN Pollution Control Agency
MRWA	Minnesota Rural Water Association
MUNI	Municipal
PCSI	Potential Contaminant Source Inventory
PWS	Public Water Supply
SCESD	Stearns County Environmental Services Department
SRWD	Sauk River Watershed District
SSTS	Subsurface Sewage Treatment System
SWCD	Soil & Water Conservation District
TOT	Time of Travel
USGS	United States Geological Survey
WHP	Wellhead Protection
WHPA	Wellhead Protection Area