Part II Wellhead Protection Plan

Potential Contaminant Inventory, Goals, and Management Strategy

City of Avon, Minnesota

AVONM 178036 | July 31, 2024

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Part II Wellhead Protection Plan

Potential Contaminant Inventory, Goals, and Management Strategy
City of Avon, Minnesota

SEH No. AVONM 178036

July 31, 2024

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Glossary of Terms

Data Element

A specific type of information required by the Minnesota Department of Health (MDH) to prepare a wellhead protection plan.

Drinking Water Supply Management Area (DWSMA)

The area delineated using identifiable landmarks that reflects the scientifically calculated wellhead protection area boundaries as closely as possible (Minnesota Rules, part 4720.5100, subPart I3).

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 I9). 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.

Potential Contaminant Source Inventory (PCSI)

The identification and assessment of potential sources of contamination and other threats within the DSWMA to be managed to reduce the risk of contamination and other threats to the water supply.

Surface Water Contribution Area (SWCA)

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

Wellhead Protection (WHP)

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

Wellhead Protection Area (WHPA)

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

Well Vulnerability

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

Acronyms

CWI	County Well Index
CMWEA	Central Minnesota Water Education Alliance
MWI	Minnesota Well Index
DNR	Minnesota Department of Natural Resources
DWSMA	Drinking Water Supply Management Area
EPA	United States Environmental Protection Agency
ERA	Emergency Response Area
IWMZ	Inner Wellhead Protection Management Zone
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MGS	Minnesota Geological Survey
MnDOT	Minnesota Department of Transportation
MPARS	DNR Permitting and Reporting System (formerly known as SWUDS)
MPCA	Minnesota Pollution Control Agency
PCSI	Potential Contaminant Source Inventory
PLS	Public Land Survey
SWCA	Surface Water Contributing Area
SWCD	Soil and Water Conservation District
UMN	University of Minnesota
USGS	United States Geological Survey
WHP	Wellhead Protection
WHPA	Wellhead Protection Area

Contents

Contents (continued)

List of Tables

Contents (continued)

List of Figures

List of Appendices

Part II Wellhead Protection Plan

Potential Contaminant Inventory, Goals, and Management Strategy

Prepared for the City of Avon, Minnesota

1 Introduction

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 4720.5100 to 4720.5590. Also, the support that federal, state, and local agencies will provide is presented to identify their roles in protecting the city's drinking water supply. The Plan was developed for the City's municipal wells identified in **Table 1** and is effective for 10 years after the approval date specified by MDH. The city is responsible for implementing its WHP plan of action as described in **Table 13** 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.

The wellhead protection area (WHPA) is the region that supplies groundwater to The City. The area around the WHPA, which is to be protected and managed, is defined as the Drinking Water Supply Management Area (DWSMA). These areas were delineated in Part 1 of the Wellhead Protection Plan. Geographic landmarks, such as roads and property lines, were used to map the boundaries of the DWSMA so that it is readily identifiable. The location of the DWSMA, relative to other communities, is shown on **Figure 1**. The well vulnerabilities, WHPA, and DWSMA were established by the MDH in August 2023 and are also shown on **Figure 1** and **Figure 2**.

The City utilizes two active municipal wells and one emergency well (Wells 4, 5, and 3 (emergency) corresponding to MN Unique Well Nos. 696861, 696862, 242069, respectively). All three wells are completed in sand and gravel aquifers and have all but well 5 have been determined to be vulnerable to contamination from land surface activities based on the geologic setting. Based on the local geologic conditions, the DWSMA has been delineated with areas of moderate vulnerability. Consequently, the potential sources of contamination to the source water aquifers include select land uses and other wells that penetrate the aquifer. This information was presented during the Second Scoping Meeting held with MDH staff on October 23, 2023, when the necessary requirements for the content of Part II were outlined and discussed in detail.

The DWSMA vulnerability was established based upon the shallow groundwater table and the lack of geologic material (i.e. clay) at depth, inhibiting vertical groundwater flow, there appears to be a connection between surface water and groundwater within the DWSMA. Additionally, detectable tritium in wells 3 and 4 indicates the presence of young (post-1953) water. This is reinforced by the chloride concentration and chloride/bromide ratios presented below (**Appendix B**). Higher concentrations or concentration ratios indicate recent recharge from the surface. Well #5 also shows evidence for human impact based on chloride and bromide, but apparently the proportion of young water at this well is lower due to the absence of detectable tritium.

1.1 Report Contents

This report is Part II of the WHP Plan for the City of Avon and includes the following:

- A review and assessment of the data elements per the MDH Scoping Notice documented in **Appendix A**.
- The results of the Potential Contaminant Source Inventory (PCSI).
- A review of changes, issues, problems, and opportunities related to the public water supply and the identified potential contaminant sources.
- A detailed discussion of the potential contaminant source management strategies and corresponding goals, objectives, and action plans.
- A review of the wellhead/source water protection evaluation program.
- An alternative water supply contingency strategy.

1.2 Content of Appendices

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

Appendix A contains the Scoping Decision Notice No. 2 which was developed by the MDH based on the findings of Part I.

Appendix B contains the Part I of the Plan completed in 2023 by the MDH. Part I of the Plan is summarized in **Section 2**. In Part I of the Plan, the Wellhead Protection Area (WHPA) and Drinking Water Supply Management Area (DWSMA) were delineated, and vulnerability assessments of the wells and corresponding DWSMA were based on data available on the source water aquifer used by the municipal wells.

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

Appendix D contains the Minnesota Department of Natural Resources (DNR) approval letter for the City of Avon's Water Supply Plan under DNR jurisdiction and has been determined to meet contingency requirements for the WHPP Amendment water contingency plan.

Appendix E contains the Inner Wellhead Management Zone (IWMZ) – Potential Contaminant Source Inventory (PCSI) Report.

Appendix F contains the MDH Public Water Supply Sources Report for Old Municipal Wells. Also provided in this appendix are sealing records for old Municipal Wells.

Appendix G contains written comments received during the 60-day Local Units of Government (LUG) period.

1.3 General Information

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

Public Water Supply

- Name: City of Avon PWSID # ***1730002***

- Address: P.O. Box 69, Avon, Minnesota 56310

Wellhead Protection Manager(s)

- Justin Kurtz, Water/Wastewater Foreman
- Address: P.O. Box 69, Avon, Minnesota 56310
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- Email: justin.k@cityofavonmn.com

Wellhead Protection Manager(s)

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- Telephone: (320)828-7159
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Minnesota Department of Health – Source Water Protection Planner

- Chad Anderson, Principal Planner
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- Telephone: (651)201-5847
- Email: Chad.R.Anderson@state.mn.us | Web: https://www.health.state.mn.us/communities/environment/water/swp/index.htm

Minnesota Department of Health – Source Water Protection Planner

- Gail Haglund, Hydrologist
- Address: 625 Robert St. N P.O. Box 64975 St. Paul, MN 55164-0975
- Telephone: (651)201-4691
- Email: Gail.Haglund@state.mn.us | Web: https://www.health.state.mn.us/communities/environment/water/swp/index.htm

Stearns Soil and Water Conservation District

- Wayne Cymbaluk, Community Conservationist
- Address: 110 2nd Street South, Suite 128, Waite Park, MN 56387
- Telephone: (320)-293-6498
- Email: Wayne.Cymbaluk@mn.nacdnet.net | Web: https://www.stearnscountyswcd.net

Stearns Soil and Water Conservation District

- Stephanie Hatzenbihler, Water Plan Coordinator
- Address: 110 2nd Street South, Suite 128, Waite Park, MN 56387
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Wellhead Protection Consultant

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- Email: msherrill@sehinc.com & mniday@sehinc.com | Web: www.sehinc.com

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

2.1 WHPA and DWSMA Delineation

The boundaries of the WHPA and DWSMA and the DWSMA vulnerability are shown on **Figures 1** and **2**. Well vulnerability is listed in **Table 2**. A detailed description of the process used for 1) delineating the WHPA and the DWSMA, and 2) preparing the vulnerability assessments of the city water supply well(s) and DWSMA is presented in the Part I Wellhead Protection Plan, which can be found in **Appendix B**. The Part I WHP plan was completed by the MDH and delineated the DWSMA corresponding to the source water used to supply the City's active municipal wells.

The WHPA is defined by the surface and subsurface area surrounding a well or well field that supplies a public water system for a 10-year time of travel through which contaminants are likely to move toward and reach the well or well field (Minnesota Statutes, section 103I.005, subdivision 24). Furthermore, the DWSMA is defined by correlating the WHPAs to the outer extent of geographically identifiable features or administrative boundaries. The WHPAs and DWSMA are shown on **Figure 1**. Additionally, **Figure 1** shows the emergency response areas (ERAs), which are defined by a 1-year time of travel and the IWMZs, which are defined by the area within a 200-foot radius around each well. Definitions of rule-specific terms that are used are provided in the "Glossary of Terms".

2.2 DWSMA Vulnerability Assessment

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

An assessment of DWSMA vulnerability was completed in Part I (MDH, 2023) including a review of isotopic sampling information, water chemistry, well construction, and boring logs. From this assessment the DWSMA was assigned a Moderate vulnerability for the DWSMA. **Figure 2** shows vulnerability for the DWSMA.

MDH has determined the following definition for the vulnerabilities found within the DWSMA:

- Moderate vulnerability DWSMA indicates that vertical recharge to the source water aquifer occurs over a time period of years to several decades.

3 Data Elements and Assessment

3.1 Scoping Notice Required Data Elements

Chapter 3, outlined below, follows requirements of the Scoping 2 Data elements and provides a summary of information gathered for the part 2 WHP plan.

The data elements that are included in this plan document establish potential contaminant sources and determine 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 to discuss the data elements that are specified in Minnesota Rules, part 4720.5400, for preparing a WHP plan.

For the Part II WHPP, the Scoping 2 meeting was held on October 23, 2023 and discussed the data elements required to 1) identify potential risks to the public water supply and 2) develop effective management strategies to protect the public water supply in relation to the well and DWSMA vulnerability. The results of the meeting were communicated to the city by MDH through a formal scoping decision notice. The formal scoping decision notice for the Part II WHPP is included in **Appendix A**. **Figure 2** shows the vulnerability for the DWSMA, the WHP Area, and the ERAs.

The Part II data elements are based on the determination in the Part I that the DWSMA vulnerability is moderate. Each data element is required to be assessed for its impact on 1) use of the well(s), 2) quality and quantity of water supplying the public water supply well(s), and 3) land and groundwater uses in the DWSMA. This information is found in **Appendix A**.

The availability of the information relating to each data element that is used in this plan was evaluated by staff from the MDH, the City of Avon, and Short Elliott Hendrickson Inc. (SEH®). During the evaluation process the City of Avon, SEH, and MDH discussed whether a data element was considered an issue, concern, or opportunity that the City of Avon must address in this plan. Any such items identified are discussed in **Section 3** and summarized in **Section 4** with PCSI data elements detail found in **Appendix C** and non-PCSI data elements depicted in the figures. The PCSI locations (**Appendix C**) queried as part of this plan were assessed for locational accuracy during the development of this plan. Potential contaminant sources that were found to have poor or incorrect locations were reassigned based on local knowledge or historical data provided with each data source. Over 150 unlocated wells were reviewed and reassigned to parcels within or outside of the DWSMA.

The following sections detail each scoping notice item and its relevance to the source water quality and quantity when relevant to the City of Avon WHP part II.

3.2 Data Elements to be Submitted in the Plan

The Scoping II Notice determined that the following information must be submitted in the Part 2 by including it in the plan narrative and/or appendix.

- A map that indicates the vulnerability and includes the DWSMA, WHP Area, and Emergency Response Area must be included in the Part 2.
  - **Figure 1** depicts the IWMZ, ERA, WHPA, and DWSMA. **Figure 2** depicts the vulnerability for the entire DWSMA.

3.2.1 Data Elements about the Land Use-

3.2.1.1 Land Use

- An existing map of political boundaries.
  - **Figure 3** depicts political boundaries that intersect the DWSMA. The DWSMA falls within one Minnesota County: Stearns County. Parcels for the county are illustrated on **Figure 11** through **Figure 12** and are also available for download from the Minnesota Geospatial data commons and on the respective County interactive

mapping website. The ERA intersects the City of Avon and Avon Township. Land use information and the extent and limits of the WHPA and DWSMA will be helpful to decision-makers in future planning efforts, by considering groundwater quality issues and wellhead and source water protection. Since there are areas within the DWSMA where the source water aquifers have been classified as moderately vulnerable, most land uses have also been considered as part of the potential contaminant source inventory **Appendix C**. The City of Avon may have limited authority in proactively addressing any such past or future contaminant source. The City will need to work cooperatively with neighboring local government units to address any issues. Stearns County, Sauk River Watershed District, and Stearns County Soil Water Conservation District, hereby referred to as "Stearns SWCD", are important partnerships to maintain to help work with neighboring communities outside of Avon's jurisdiction.

- An existing map of public land surveys including township, range, section.
  - Multiple Township, Range, and Section (TRS) Boundaries intersect the DWSMA and are shown on **Figure 3**. The DWSMA fully or partially intersects 4 sections within portions of Township 125, Range 30, and Sections 21, 22, 28, and 27.

3.2.1.2 Potential Contaminant Source Inventory (PCSI)

Potential Contaminant Sources were inventoried as determined from the Scoping Notice.

1. A map and an inventory of the current and historical agricultural, residential, commercial, industrial, recreational, and institutional land uses and potential contaminant sources.
   - The DWSMA consists of primarily commercial, residential, and agricultural land within the City of Avon and Avon Township. Historically most major development within the DWSMA has been around the City center and changes and records of previous contaminated sites are documented in state agency files. Any future commercial and industrial land uses may become potential contaminant sources as land activities may affect source water quality and quantity. At this time, most of Avon Township that intersects the DWSMA is expected to be developed into low density residential property. The area around County Road 155 is depicted as turning into commercial property. The sections below detail maps and tables related to these details.

The Potential Contaminant Source Inventory (PCSI) data in both a table and a map format must be created and included in the Part 2. Include potential contaminant sources as listed on the PCSI attachment provided for each existing vulnerability within the DWSMA. The Scoping 2 Meeting WHP Planning Issues Summary may also be used to provide guidance on the PCSI. PCS Inventory Requirements for Moderately Vulnerable DWSMA.

1. Inventory potential contaminant sources in the DWSMA as identified in the listed on Moderately Vulnerable PCSI Requirements.

- PCSI identified for this plan are detailed in **Appendix C** and depicted on **Figure 11 to Figure 12**. The inventory, mapping, and management of land uses and potential sources of contamination for the DWSMA reflect what is known about these data elements. PCSI identified for this plan are discussed in greater detail in **Chapter 4**.
- The Scoping Notice requires assessment of many types of PCSI depending on the DWSMA Vulnerability. The PCSI that were and were not identified within the DWSMA are listed in **Table 7**.

2. A land use/land cover map and table.
   - Land cover from the United States Geologic Survey's National Land Cover Database (USGS NLCD) is depicted on **Figure 7** and detailed in **Table 5**. Land cover for the

DWSMA is primarily open water and developed area. Areas of development with varying intensity is centered around the City of Avon.

3. Inventory of the Inner Wellhead Management Zone (IWMZ).
    - Detailed in **Appendix E** and listed on **Table 6**. The IWMZ was completed by the SWP Planner with assistance from the PWS staff. The IWMZ was completed for each primary and emergency well with management recommendations on the MDH form, or a table that summarizes the number and type of contaminant sources with the management recommendations must be included. The summary of these reports was incorporated into **Table 13**.
4. An Existing Comprehensive Land-Use Map.
    - Avon's comprehensive land-use map including Zoning and Future Land Use is depicted on **Figure 5** and **Figure 6** and total acreage of each type is summarized in **Table 3** and **Table 4**. Land use changes over the lifetime of this plan are expected to remain a mixture of residential, commercial, and industrial. Avon intends to expand municipal limits and develop additional residential and commercial areas within Avon Township. At this time, most of Avon Township that intersects the DWSMA is expected to be developed into low density residential property. The area around County Road 155 is depicted as turning into commercial property. Land use changes can affect both water quality and quantity. Industrial and commercial users may require additional supply from the City and/or apply for their own wells to supply water. Any development could potentially bring potential contaminant sources that could negatively impact the source water aquifer or remove protective geologic layers during construction/development. Best management practices should be followed for any future wells or chemical use on properties. Additionally, setback distances for Community PWS wells should be maintained as development occurs.
5. An Existing Zoning Map.
    - The City of Avon does not have a separate land use and zoning map. Zoning is depicted on **Figure 5** (along with zoning from Avon Township). Zoning within the DWSMA is primarily commercial/industrial around primary city streets and increasingly residential away from the City center. Avon Township currently zones the DWSMA as urban development. Zoning will likely reflect the future land use map as the municipal boundaries update and urban development occurs.

3.2.1.3 Public Utility Services

- An existing map of transportation routes or corridors
    - Transportation Routes are depicted in **Figure 10**. Multiple major and minor roadways traverse the areas to be managed within the DWSMA. Interstate 94 runs through southern portion of the DWSMA. County State Aid Highways include CSAH 9, 54, and 50. County Highway's 155, 157, and 159run through the DWSMA. Multiple county, township, and city roads are within DWSMA. Roadway corridors pose a risk for transportation related spills and dumping. Industry and commercial business pose some risk with their associated transportation of hazardous substances through traffic activities. The presence of these transportation routes will be managed by proactively working with local emergency management entities to make them aware of the DWSMA and consider DWSMA protection should any spills occur. Emergency Responders, The Minnesota Department of Transportation (MnDOT) and Stearns County have multiple programs and specifications for helping to mitigate the dispersal, flow, or recharge of contamination.

- No railroad lines were found to intersect the DWSMA; however one former railroad line ran through Avon in the southern portion of the DWSMA.

- An existing map of storm sewers, sanitary sewers, and public water supply systems.
  - Public water supply systems, storm sewers, and sanitary sewers within the DWSMA are generally in good condition.
  - Public water supply systems. A map of public water supply systems is available at the City. The public water supply system water main is depicted on **Figure 10**.
  - Stormwater systems. Stormwater utilities are depicted in **Figure 10.**
  - Sanitary systems. Sanitary systems are depicted in **Figure 10**.
- An existing map of the gas and oil pipelines used by gas and oil suppliers.
  - The National Pipeline Mapping System (NPMS) Public Viewer shows no hazardous liquid pipelines within the DWSMA.

3.3 Data Elements Required to be Discussed in the Plan

3.3.1 Data Elements about the Physical Environment

3.3.1.1 Water Resources

Management of the DWSMA must consider local and federal knowledge on Water Resources. Water Features. The following data elements are required to be discussed:

- An existing map of the boundaries and flow directions of major watershed units and minor watershed units:
  - Water resources including watersheds, and flow direction are depicted on **Figure 8-1** and **Figure 8-2**. Surface water resources in The City's WHPA is within the following two watersheds as delineated by the Minnesota DNR:
  1. North Fork Watab River (HUC12-070102010602)
  2. Spunk Lakes (070102010201)
  - The Avon DWSMA is located within the Mississippi River Sartell Watershed. The watershed partners, which includes SWCDs and Counties, are organizing to create a comprehensive watershed management plan (CWMP) through the Board of Water and Soil Resources' (BWSR) One Watershed, One Plan (1W1P) program. The partners are applying for a planning grant in June 2024 and expect to hear if the grant is awarded in August 2024. After that time, municipalities within the watershed will receive invitations to participate in the planning efforts.
  - The DWSMA is also intersected by Spunk Creek. Water planning efforts should be coordinated with 1W1P, Watershed Restoration and Protection Strategies (WRAPS), and/or Groundwater Restoration and Protection Strategies (GRAPS). WRAPS lists a portion of the North Fork Watab River as highest priority for strategy implementation. The City should stay aware of any planning efforts by 1W1P especially if they go into active planning in August 2024.
  - The general water flow direction of Watersheds are depicted on **Figure 8-1 and Figure 8-2**, which depicts DNR catchment flow network (flow through wetlands, lakes, rivers, ditches) and catchment pour points. within the WHPA follows the series of regional lakes and rivers/public ditches. The primarily river running through the DWSMA is spunk creek which flows to the North.
- An existing map and a list of public waters as defined in Minnesota Statutes, section 103G.005, subdivision 15, and public drainage ditches.

  - Public Drainage systems are depicted in **Figure 8-1** and **Figure 8-2**. Depicted on the figure is the Department of Natural Resources Buffer Protection Map (watercourses and ditches), DNR stream centerlines (including confluence and flow direction), wetlands, and local watersheds. Public Drainage systems can help understand surface to groundwater interactions, recharge to groundwater, and contaminant travel.
  - Multiple water bodies are within the DWSMA including Lower Spunk Lake, Middle Spunk Lake, Lake Anna, and Ochotto Lake.
- An existing map showing those areas delineated as floodplain by existing local ordinances:
  - **Figure 9** depicts floodplain delineated as part of the Federal Emergency Management Agency (FEMA) flood zone survey. These layers typically depict the annual flood chance based on a 0.2% and 1% (500 year and 100 year) chance based upon historical data. A portion of the DWSMA around Lower Spunk Lake is depicted as within an area with a 100 year floodplain. No flood hazard areas pertaining to 100 year or 500 year floods are within the IWMZ or ERA areas. Additionally, the City is not aware of any issues related to flooding around their public water supply wells.

3.3.2 Data Elements about the Land Use-

3.3.2.1 Land Use

- An existing map of parcel boundaries.
  - **Figure 11** and **12** depicts parcels that intersect the DWSMA. The DWSMA falls within Stearns County.
  - Alternatively, for more detailed information, parcel data is also available on the respective County interactive mapping website and available where it is also available for download.

3.4 Data Elements Pertaining to the Part 1 WHPP

Data Elements pertaining to the Part 1 WHPP are summarized, reviewed, and assessed in this document. The Part I WHPP is included in **Appendix B**.

3.4.1 Data Elements about the Physical Environment -

- An existing geologic map and a description of the geology, including aquifers, confining layers, recharge areas, discharge areas, sensitive areas as defined in Minnesota Status section 103H.005, subdivision 13, and groundwater flow characteristics.
  - The geology for the area was described in the Part I WHPP (MDH, 2023) and is included in this report as **Appendix B**.
  - The Quaternary glacial deposits in the area consist of Des Moines Lobe outwash and Superior Lobe till and ice contact deposits. Outwash deposits consist of sand and gravel deposited by the meltwater of the Des Moines Lobe margin. Outwash deposits cover the majority of the City. Superior Lobe till is present to the northwest, northeast, southwest, and southeast. Till is pitted supraglacial till and subglacial till consisting of reddish brown to yellowish brown, sandy loam textured, unsorted sediment (MGS 1995). The Quaternary deposits are relatively thin (typically approximately 50 feet, not within the buried bedrock valley) in the area. At the

surface the deposits are described as sand, gravelly, sand, and cobbly gravel (see soil description below).

  - The bedrock geology of Stearns County consists of Precambrian bedrock of Archean and Proterozoic age. In a large portion of the county, the Precambrian bedrock is overlain by a thin veneer of Cretaceous shale and siltstone. These Cretaceous deposits are variable in thickness and extent due to the erosional surface at the base and subsequent glacial erosion at the top of the unit.
  - The city of Avon has two primary wells screened in a sand aquifer that is buried beneath a layer of clay-rich sediment. Such aquifers are known generically as Quaternary Buried Artesian Aquifers (QBAA). Regionally, groundwater flows towards Avon from the northwest and the south, draining to the northeast.
  - The city of Avon is located west of St. Cloud along Highway 94 in Stearns County. The surrounding area is covered by sandy loam textured, unsorted sediment ranging from silty sand to cobbly gravel lenses associated with the Superior or Rainy Lobes (Meyer et al. 1995). The city of Avon wells draws groundwater from a QBAA composed of sand found approximately 220 feet below land surface. The buried aquifer is separated from the land surface by clay-rich sediments that act as natural geologic protection against surficial contaminants. The aquifer thickness is estimated to be approximately 27 - 30 feet at the well sites but is spatially variable beneath the city of Avon and surrounding area.

- Existing records of the geologic materials penetrated by Wells, borings, exploration test holes, or excavations, including those submitted to the department.

  - A list of existing state environmental boreholes, including unique well number, aquifer measured, years of record, and water levels is provided to the public by the MDH. The MDH tracks wells and boreholes information through the Minnesota Well Index (MWI). Information from the MWI is included in **Appendix C** and detailed in the PCSI part of this plan.

- Existing borehole geophysical records from wells, borings, and exploration test holes.
  - The Minnesota Geologic Survey and the Minnesota Department of Natural Resource provide information on geophyiscal records from wells, borings, and exploration test holes within the County Atlas Program (published in 1995). The geology of the area is fairly well established and no additional data from geophysical records were addressed or dicsussed within the Part I WHPP.
- Existing surface geophysical studies.
  - No additional surface geophysical studies were included in the Part I WHPP. Detailed information on studies can be obtained from the Minnesota Geologic Survey.

3.4.2 Data Elements about the Physical Environment –

3.4.2.1 Public Utility Service

- An existing record of construction, maintenance, and use of the public water supply well and other wells within the DWSMA.
  - Detailed information on the construction, maintenance, and use of the public water supply wells are detailed in **Table 1** and **Table 2**. Vulnerability and sensitivity of the public water supply wells were established in the Part I WHPP.
  - The groundwater sensitivity and susceptibility (estimated vertical travel time for water-borne surface contaminants to reach the source water aquifer) for the Avon area is moderate, with travel time ranging from years to decades.
  - Other wells are depicted on **Figure 11** and detailed in **Appendix C**.

3.4.3 Data Elements about Water Quantity –

3.4.3.1 Groundwater Quantity

- An existing list of wells covered by State appropriation permits, including amounts of water appropriated, type of use, and aquifer source.
  - A list of existing wells covered by state appropriation permits, including amounts of water appropriated, type of use, and aquifer source is listed in the Part I WHPP (**Appendix B)** and can also be obtained from the MnDNR Permitting and Reporting System (MPARS). No other high capacity wells were identified within the Avon DWSMA.
- An existing description of known well interference problems and water use conflicts.
  - No known groundwater conflicts have been identified due to groundwater pumping from The City wellfield. The DNR regulates water quantity through appropriation permits.
- An existing list of state environmental bore holes, including unique well number, aquifer measured, years of record, and average monthly levels.
  - A list of existing state environmental boreholes, including unique well number, aquifer measured, years of record, and water levels is provided to the public by the MDH. The MDH tracks wells and boreholes information through the Minnesota Well Index (MWI) and can be accessed on the State's interactive map. Information from the MWI compiled for the PCSI is included in **Appendix C**.

3.4.4 Data Elements about Water Quality -

3.4.4.1 Groundwater Quality

- An existing summary of water quality data, including: 1. bacteriological contamination indicators; 2. inorganic chemicals; and 3. organic chemicals.
  - Samples from The City water supply system are routinely collected and analyzed by the MDH as required under the Minnesota Public Water Supply Program and the federal *Safe Drinking Water Act*. The samples from the water supply system distribution are tested for microorganisms, inorganic compounds, organic chemicals, pesticides and herbicides, and radioactive contaminants. No contaminants were detected at levels that violated federal drinking water standards or the Minnesota Department of Health: Health Based Guidelines. There are currently no known issues related to the quality of the water obtained by the public water supply wells.
  - The MDH recommended that the City of Avon take additional water samples to better understand the source water aquifer. These recommended samples are detailed in **Table 13**.
- A list of existing water chemistry and isotopic data from wells, springs, or other groundwater sampling points.
  - Water samples collected from both wells 4 and 5 were analyzed for tritium, nitrate, chloride, and bromide (**Appendix B**). Elevated tritium was detected in the sample from Well #4, confirming its vulnerable nature of the wells (Alexander and Alexander, 1989). In addition, the chloride and bromide results confirm that the well has been impacted by land-use activities. Well #5 showed no detectable tritium but did show elevated chloride and chloride/bromide ratio, suggesting it is also capturing water impacted by human activities. It is presumed that it is capturing a smaller proportion of young, human-impacted water than Well #4 based on their differing tritium results.
- A report of existing groundwater tracer studies.

  - No known tracer studies have been conducted in the area.
- An existing site study and well water analysis of known areas of groundwater contamination.
  - The MPCA and MDA documents and records known areas of groundwater contamination within the “What’s in My Neighborhood” (WIMN) database. Listings from this database are included in **Appendix C** and detailed in **Section 4**. Additionally, the MPCA provides groundwater plumes via the groundwater contamination atlas of state superfund sites. No such sites were depicted within the DWSMA.
  - Since 2002, the MDH has partnered with the MPCA to investigate Per- and Polyfluoroalkyl Substances (PFAS) in Minnesota. At this time no known PFAS plumes intersect the DWSMA. As with other emerging contaminants, The City should remain aware of PFAS in Minnesota and work with the MPCA and the MDH to complete sampling or monitoring in wells.
- An existing property audit identifying contamination.
  - The Minnesota Pollution Control Agency documents sites with Affidavits, Deed Restrictions and Environmental Covenants. This database can be accessed via the Minnesota Geospatial Data commons. No sites with property audits were identified in the DWSMA.
- An existing report to the Minnesota Department of Agriculture and the Minnesota Pollution Control Agency of contaminant spills and releases.
  - The MDA spills and the MPCA incident reports (MPCA “spills”) databases contain information pertaining to known and documented spill sites. These reports can be accessed through the agencies websites and are also when relevant included in **Appendix C** and detailed in **Section 4** of this report.

4 Assigning Potential Contamination Sources

The types of potential contamination sources that may be inventoried within the DWSMA were derived from the information collected to satisfy the data element requirements described in **Section 3** based upon the scoping notice provided by the MDH (**Appendix A**). The scoping notice further defines required data elements based upon 1) results of the assessment of DWSMA and well vulnerability; and 2) the presence or absence of human-caused contaminants in the source water. Data elements that meet the requirements laid out by the scoping notice are included in the PCSI and are discussed in **Section 4.1** and **Section 4.2** and are summarized in **Appendix C**. **Table 6** indicates the risk that the City of Avon has assigned to potential point sources of contamination that are located within the IWMZ. Whereas **Table 7** indicates the risk that the City of Avon has assigned to potential point sources of contamination that are located in the remainder of the DWSMA beyond the IWMZ.

4.1 Issues, Problems, and Opportunities related to Potential Contaminant Sources

An overview of required data elements are discussed in **Section 3**, Identification and Assessment of the Data Elements. Local, state, and federal databases were assessed in determining potential contaminant sources to satisfy required data elements. From these requirements, the following sources were identified for the DWSMA.

4.1.1 Aquifers

Avon's DWSMA and vulnerabilities increased from low vulnerability to moderate vulnerability from the Part I WHPP Amendment (MDH, 2023). The Part I WHPP noted higher vulnerability due to detections of tritium in primary wells.

The vulnerability of the DWSMA is based upon the following

information:

1. Isotopic and water chemistry data from the Avon wells indicate that the aquifer is a mix of old and younger water with some evidence of human-caused contamination. The groundwater age as determined from tritium is mixed (DNR-MDH, 2020). Human-caused contamination is evidenced by elevated chloride and chloride/bromide.
2. Review of the geologic logs contained in the MWI database, geological maps, and reports indicate that the deep source aquifer exhibits a low geologic sensitivity throughout the DWSMA. Therefore, given the information currently available, it is prudent to assign a moderate vulnerability rating to the DWSMA, in accordance with the Minnesota Wellhead Protection Rule (parts 4720.5100 to 4720.5590).

At present, none of the contaminants for which the Safe Drinking Water Act has established health-based standards are found above maximum allowable levels in the city's water supply, nor are any present at one-half of those levels. However, arsenic has been detected at very low levels.

Lastly, the potential contaminant sources identified as part of this plan can help identify, manage, limit, and prevent future anthropogenic alteration to the drinking water quality and quantity.

4.1.2 Land Use

Zoning for the DWSMA is under the ordinances, planning, and jurisdiction of the City of Avon and the Memorandum of Understanding (MOU) between Avon Township and Stearns County. Changes in land use have the potential to introduce pathways from contaminants to reach the aquifer or sources of contamination to the source water aquifers. The City of Avon will work with the township to assure that potential contaminants within each other's jurisdictional boundaries are given a high priority, are monitored and or eliminated, if possible, to help protect the aquifer used by the City of Avon for a public water supply.

Due to the information contained in Part 1, which indicates that the public water supply (PWS) has a moderate vulnerability, an inventory of other wells that reach or penetrate the aquifer the public water supply is using for a drinking water source, chemical and petroleum storage tanks, shallow disposal wells, leaking underground storage tanks, pipelines, other potential contamination sites such as superfund sites or solid waste management sites, spills and chemical storage and preparation areas located within the DWSMA is required. The City of Avon staff and a SEH representative conducted a potential contaminant source inventory (PCSI). A spreadsheet and map of potential contaminants identified in the DWSMA are presented in the **Appendix C**.

Landowners not connected to City water or that have the need for additional water may utilize a private well. Wells can both act as a pathway for contaminants to enter the source water aquifer or over utilize water resources and decrease water quantity in the aquifer. Industrial, commercial, or agricultural land uses may also use large quantities of water and require a DNR appropriations

permit. If so, such water users may increase the water consumption in the source water aquifer. Overuse of water, where losses outpace the recharge of new water, from the source water aquifer may lead to drawdowns in the aquifer and depletion of potable water.

The City of Avon is unaware of any proposed large-scale land use changes within the DWSMA that could potentially impact the municipal wells or source water aquifers; however, commercial business is expected to be developed along County Road 155. Due to the proximity to the City's wellfields, The City should remain aware of future business and their potential for hazardous materials that could impact the wellfield. The City could enact additional ordinances for PCSI such as tanks to ensure hazardous materials are properly stored.

4.1.3 Wells within the DWSMA

Other wells in the DWSMA are considered a potential threat to the source water aquifers and the City's public water supply system. If improperly constructed or maintained, they can act as direct conduits for contaminants at the land surface to vertically migrate downward into the deeper aquifers. In addition, high-capacity wells near the municipal wells can cause groundwater interference and decrease the performance and capacity of the municipal wells.

Wells identified within the DWSMA through the Minnesota Geological Survey-MDH Minnesota Well Index are shown in **Figure 11** along with other potential contaminant sources. Information regarding these wells, including addresses and Parcel Identification Numbers is provided in **Appendix C**.

The MnDNR manages the water appropriation permits for the state. An Appropriation Permit is required for any person or business that uses more than 10,000 gallons of water per day or 1,000,000 gallons per year. The permits are cataloged in the State Water Use Data System. This database was queried for Part I of the Plan to identify high-capacity wells that could potentially influence or impact the local groundwater flow fields and the City's municipal wells. No other high capacity wells within the DWSMA are known to exist.

This wellhead protection plan is also concerned with other unsealed water supply wells, which are classified as one type of PCSI, at any depth located within the DWSMA. The MDH provides a database with indexed wells known as the Minnesota Well Index (MWI) within the DWSMA to be included as part of this PCSI. Private and public wells can both impact the quality or quantity of the source water aquifer. Wells that penetrate confining layers can act as a preferential pathway, or conduit, for potential contaminant sources to reach the source water aquifer. Additionally, wells that draw a large quantity of water from the source water aquifer have the possibility to adversely affect source water quantity. Wells inventoried as part of this plan are included in **Appendix C** and depicted on **Figure 11**.

The MDH provides the Old Municipal well data to aid in locating and identifying old municipal wells in need of sealing. Old Municipal well data provided from the MDH is included in **Appendix F**. The Old Municipal Well report did not identify any additional old municipal wells.

The placement of additional high-capacity wells, increased pumping from existing wells, or significant changes in current groundwater appropriations within the DWSMA may have an impact on groundwater availability to all users, or increased risk that contamination may enter the part of the aquifer used by the public water supply wells.

4.1.4 Disposal Wells (Class V Injection Wells)

The EPA is the regulatory authority for Class V Wells. The EPA is required to maintain an inventory of Class V shallow disposal wells. Class V Wells are typically shallow disposal systems that are used to place a variety of fluids below the land surface. Examples of Class V injection wells include: motor vehicle waste disposal wells, large capacity cesspools, storm water drainage wells, aquifer remediation wells, and large capacity septic systems.

Class V Wells can act as a direct pathway for contaminants to penetrate the source water aquifer. No Class V Wells were listed within the DWSMA

The following EPA representative for the State of Minnesota Underground Injection Control division can be reached for more information:

Lawrence Curley

Email: curley.lawrence@epa.gov

Phone: 312-886-6339

Or https://www.epa.gov/uic/underground-injection-control-epa-region-5-il-mi-mn-oh-and-wi

The City should remain aware of Class V Wells and prevent the installation of any such type of well as they can pose an immediate threat to the source water aquifer.

4.1.4.1 Transportation Corridors

Transportation corridors within the DWSMA are discussed in this plan as they have easement or Right-of-Way and have the potential to affect water quantity or quality. Transportation corridors may manage stormwater through culverts, ditches or ponds all of which may supply recharge to the source water aquifer. Potential contaminant sources may be transported and traffic accidents may lead to spills.

Any such spills that occur within this transportation corridor are reported to the MPCA Duty officer and associated emergency response will be assessed or completed by the MPCA's Emergency Management Unit following MPCA's Emergency Management Program Spill Cleanup Policy.

4.1.5 MPCA Potential Contaminant Source Inventory

The MPCA provides multiple statewide database sources for potential contaminate sources as part of their GIS ready "What's in my Neighborhood" database and Spills database. Resources are described as follows:

- MPCA "What's in My Neighborhood" database is mapped using the following locating methodology including Address Matching House Number, Digitized-DRG, Digitized - Map Tool, Zip Code Centroid, Interpolation Unknown, and GPS – Other. These location methods are considered reliable aside from Zip Code Centroid and Interpolation Unknown.
- The MPCA Spills (incidents reports) database provides an address that was used to geocode registered Spills within the DWSMA.

Sites which were located by the MPCA using poor location accuracy were attempted to be relocated by the City of Avon and SEH using address matching and local knowledge.

4.1.5.1 Tank Sites

Underground and above ground storage tanks used to store large quantities of liquids and potentially hazardous substances are considered high risk for groundwater contamination. If leaking or ruptured, tanks could release large quantities of chemicals into the subsurface, which could enter source water aquifers and public water supply wells. Tank sites depicted in **Figure 12** and detailed in **Appendix C** can remain a potential source of contaminants even after closure.

4.1.5.2 Leak Sites

Leaking storage tanks sites also pose a high risk for groundwater contamination. As discussed in the previous section, these sites have had a storage tank release its contents into or onto the ground. Although many have been “cleaned” and “closed” by the MPCA, some of these sites may still have remaining soil and/or groundwater contamination. Leak sites depicted in **Figure 12** and detailed in **Appendix C** can remain a potential source of contaminants after closure.

4.1.5.3 VIC Sites and Petroleum Brownfield Sites

The MPCA Voluntary Investigation and Cleanup (VIC) Program database lists properties with known or suspected environmental contamination. The VIC sites include sites or facilities, which present a substantial danger to the public health, welfare, or the environment in the state of Minnesota. The VIC Program is a non-petroleum brownfield program. VIC provides technical assistance to buyers, sellers, developers, or local governments seeking to voluntarily investigate or clean up contaminated land. Properties often enter the VIC program in preparation for sale, financing, or redevelopment. Voluntary parties that complete investigation and/or cleanup activities under MPCA oversight can receive liability assurances that protect them from future Superfund liability. In some cases, the MPCA may use institutional controls as part of the overall site remedy and notify interested parties of any property use conditions or restrictions. VIC sites depicted in **Figure 12** and detailed in **Appendix C** can remain a potential source of contaminants after closure.

Petroleum Brownfield sites may have been contaminated with petroleum due to a past or current leak. Petroleum Brownfields program staff assesses the risk associated with petroleum contamination at these sites and then provide technical assistance to help get the site cleaned up, developed, and/or transferred to a new owner. Petroleum Brownfields depicted in **Figure 12** and detailed in **Appendix C** can remain a potential source of contaminants after closure.

MPCA VIC and Brownfields sites are listed in the PCSI (**Appendix C**) under the code “PCS”.

4.1.5.4 MPCA Spill Listings (MPCA Incident Reports)

In the State of Minnesota, spills that may cause pollution, such as spills of toxic, flammable, corrosive, and dangerous industrial chemicals, are required to be reported. Spills of any quantity are required to be reported, with the exception of petroleum that has a reporting threshold of greater than five gallons. Spill sites depicted in **Figure 12** and detailed in **Appendix C** can remain a potential source of contaminants after closure.

4.1.6 Minnesota Department of Agriculture

MDA listings represent emergencies and locations of spills and investigations managed by the MDA for agricultural chemical incidents. MDA listings are depicted in **Figure 12** and detailed in **Appendix C**.

4.2 Inventory Results and Risk Assessment

A map and description of the locations of potential contamination sources are presented in **Appendix C** and depicted on **Figures 11 and 12**.

The priority assigned to each type of potential contamination source addresses each of the following: 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; and 5) the time required for the City of Avon to obtain cooperation from governmental agencies that regulate it. Risk assigned for each type of PCSI is listed in **Table 7**.

A high (H) risk potential implies that the potential source type has the greatest likelihood to negatively impact the City water supply and should receive highest priority for management.

A moderate (M) risk potential implies that the potential source type may have an impact on the City water supply and should receive an intermediate priority for management.

A low (L) risk potential implies that a potential source type may have a marginal or negligible impact on the City water supply and should receive a low priority for management.

4.2.1 Data Accuracy and Limitations

For this plan, the City of Avon has attempted to identify and specifically locate as many potential contaminant sources as possible and feasible given the current level of information and available resources. However, some potential contaminant sources may exist within the DWSMA that have not yet been identified or accurately located.

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

The City of Avon anticipates minimal changes to the physical environment, land use, surface water, and groundwater may occur over the ten-year period that the WHP plan is in effect. Any changes must be considered 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 of Avon and thus the City should remain aware of all land use changes within their DWSMA.

Table 8 describes the anticipated changes to the physical environment, land use, and surface water or groundwater in relationship to the following: 1) the influence that existing governmental land and water programs and regulations may have on the anticipated change; and 2) the administrative, technical, and financial considerations of the City of Avon and property owners within the DWSMA.

6 Issues, Problems, and Opportunities

6.1 Identification of Issues, Problems, and Opportunities

The City of Avon has identified water and land use issues, problems, and opportunities related to the following: 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 each of the following parameters: 1) input from public meetings and written comments that it received; 2) the data elements identified by MDH during the scoping meetings; and 3) and the status and adequacy of the City's official controls and plans on land use and water uses, as well as those of local, state, and federal government programs. The results of this effort are presented in **Table 9** which defines the nature and magnitude of contaminant source management issues in the City's DWSMA. Identifying the issues, problems, and opportunities as well as resource needs enables the City to: 1) take advantage of opportunities that may be available to make effective use of existing resources; 2) set meaningful priorities for source management; and 3) solicit support for implementing specific source management strategies.

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, as well as to comment. Following completion of the WHPP Part I, a public information meeting was held to review the results of the delineation of the WHP area, DWSMA, and the vulnerability assessments. On May 2, 2024 The City of Avon held a meeting with SEH and local governments including the MDH, Stearns County, Stearns SWCD, Sauk River Watershed District to discuss their help in assisting the City in implementing their WHPP and to allow them to review the draft plan and allow them to provide comments prior to the official local government review. Stearns SWCD and the MDH provided comments, which were subsequently incorporated into the plan.

Also, a public hearing was held before the completed WHP plan was sent to MDH for state agency review and approval.

Comments received during the official 60 day local government review are included in **Appendix G** with written responses provide below.

During the official 50 day local government review, comments were received from Stearns SWCD, Stearns County, and the MDH. The comments are re-stated below followed by respective responses:

1. Stearns SWCD: *Page 19 section 7.4 support provided by nonprofit organizations.*

   1W1P, WRAPS, GRAPS, BWSR – these should be moved to section 7.3 State Agency and Federal Agency Support

   Stearns SWCD, Stearns County – these should be moved to section 7.2 Local Government Controls and Programs

   Response: Local and State agencies have been updated as suggested in the text.

2. Stearns SWCD: Measure 3 – remove the text “the City of Avon must participate in the 1W1P process to be considered for project funding.” While it would be ideal for the city to participate it is not a requirement to access funding for projects.

   Response: Measure 3 of the Plan’s Management strategies have been updated as suggested.

3. Stearns County: The zoning of Avon Township is not shown correctly. Below is the correct zoning shown from the Property Viewer available here: https://stearns-county-gisstearns.hub.arcgis.com/apps/fbc70d782fc547f9b8220218eac3c966. There are some small areas in the NW area of the WHPA that are zoned Ag-40 (green) and are not Urban Expansion (purple).

   Response: The plan has been updated to include the zoning corrections.

4. MDH: Update plan to include a management strategy for cross connection.

   Response: The plan has been updated to include an updated measure #7 on cross connections.

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

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

7.1 Existing City of Avon Controls and Programs

The City has identified a number of legal controls and/or programs that it has in-place that can be used to support the management of potential contamination sources within the DWSMA. These can be found in **Table 10**.

7.2 Local Government Controls and Programs

Table 11 details departments or programs within the County that 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.

The Stearns SWCD is a local unit of government that manages and directs voluntary natural resource management programs at the local level to carry out a program for the conservation, use, and development of soil, water, and related resources. The SWCD also provides educational material for communities to use for Wellhead Protection. The Stearns County can provide technical assistance in well sealing, feedlots (MMP), and private septic system management. Stearns SWCD can provide technical assistance and financial assistance for well sealing and other voluntary conservation practices.

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 services include: 1) administration of state regulations that affect specific potential sources of contamination and 2) can provide technical assistance for property owners to comply with these regulations.

Table 12 identifies specific regulatory programs or technical assistance that state and federal agencies may provide to the City of Avon to support implementation of its WHP plan. It is likely that other opportunities for assistance may be available over the ten-year period that the Plan is in effect due to changes in legal authority or increases in funding granted to state and federal agencies. Therefore, the table references opportunities available when the City's WHP plan was first approved by MDH.

One Watershed, One Plan (1W1P) is a program through the Board of Water and Soil Resources (BWSR) that was developed by the Local Government Water Roundtable (Association of Minnesota Counties, and the Minnesota Associations of Watershed Districts and Soil and Water Conservation Districts) which charges local governments with water management responsibilities to organize and develop focused implementation plans on a watershed scale. Other programs and strategies that can provide support are the Watershed Restoration and Protection Strategies (WRAPS) and Groundwater Restoration and Protection Strategies (GRAPS).

7.4 Support Provided by Nonprofit Organizations

A number of existing organizations work to support water management programs. The City of Avon annually holds a water festival with partnership with the Sauk River Watershed District. Similarly, Minnesota Rural Water Association also develops and can provide reference education and outreach materials.

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

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 each of the following: 1) the data elements (**Section 2**, and **Appendix A**; 2) the

PCSI (**Sections 2 and 3 and Appendix C**); 3) the impacts that changes in land and water use present (**Section 5**); and 4) issues, problems, and opportunities related to administrative, financial, and technical considerations (**Section 6**).

9.1 Objectives

The following objectives have been identified to support goals of the WHPP for the City of Avon:

A. Create awareness and general knowledge about the importance of WHP in the Community and the City of Avon DWSMA.
B. Properly inventory and manage potential contaminant sources to protect the drinking water supply for the City of Avon.
C. Support ongoing data collection efforts to enhance future WHP activities.
D. Effectively track, evaluate, and report the implementation efforts and wellhead protection plan progress to all governing authorities.
E. Manage the IWMZ to prevent contamination.
F. Effectively prepare the City of Avon for disruptions to the water distribution system.
G. Develop local land use controls and partner with local units of government to better protect the aquifer used by the City of Avon.

9.2 WHP Measures and Action Plan

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

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

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

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

The objective that each measure supports is noted as well as the following: lead party and any cooperators and the year or years in which it will be implemented. **Table 13** lists each measure

that it will implement over the ten-year period that the city's WHP plan is in effect, as well as the priority that it has assigned to each measure.

The PWS (WHP Manager) will manage and budget resources (staff time, hard costs of activities where money may need to be budgeted, etc.) for the implementation of the management strategies in the plan; the PWS (WHP Manager) is responsible for annually reviewing and budgeting time and financial resources needed for the coming year to implement measures in a plan; and MDH or Minnesota Rural Water Association staff will be contacted to answer questions or provide technical assistance needed to implement activities in the plan.

10 Evaluation Program

Plan evaluation is specified under **Section 9.1** and provides the mechanism for determining whether WHP action items are achieving the intended result or whether they need to be modified to address changing administrative, technical, or financial resource conditions within the DWSMA. Evaluation is used to support plan implementation and is required under Minnesota Rules, part 4720.5270, and prior to amending the city's WHP plan. The City has identified the following procedures that it will use to evaluate the success of implementing its WHP plan:

- The WHP team will meet at a minimum every two and one half years to assess the status of plan implementation and to identify issues that impact implementation of action steps throughout the DWSMA.
- The City will assess results of each action item that has been taken to determine whether the action item has been accomplished to its purpose or whether modification is needed.

The City will prepare a written report that documents how it has assessed plan implementation and the action items that were carried out. The report will be presented to MDH at the first scoping meeting that it will hold with the City to begin amending the WHPP.

11 Contingency Strategy

The City's Water Supply Plan, Water Emergency Plan, and Conservation Plan was completed in 2019 and has received approval on February 22, 2019 by the DNR under Water Appropriation Permit #1962-0203. The plan has been adopted by the City Council and provides a detailed water contingency strategy. The DNR and City Council approval letters can be found in **Appendix D**.

12 References

City of Avon Zoning Map

City of Avon Comprehensive Plan maps.

City of Avon Township Zoning map.

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Tables

Table 1 – Water Supply Wells Included in WHP

Well No.	Unique Well No.	Well Status
Well #3	242069	Emergency
Well #4	696861	Active, Primary
Well #5	696862	Active, Primary

Table 2 – Water Supply Well Data

Well No.	Unique Well No.	Date Constructed	Aquifer	Total Depth (ft)	Casing Depth (ft)	Casing Diameter (in)	Vulnerability
Well #3	242069	1979	Quaternary Water Table Aquifer (QWTA)	70	50	12	Vulnerable
Well #4	696861	9/26/2003	Quaternary Buried Artesian Aquifer (QBAA)	251	231	12	Vulnerable
Well #5	696862	8/11/2003	Quaternary Buried Artesian Aquifer (QBAA)	240	240	12	Not Vulnerable

Table 3 – City of Avon Zoning

Land Use Category	Avon DWSMA Zoning in Acres
Avon Township Urban Expansion	596.62
Avon Township Ag-40	144.02
R-1 - Single Family Residential	229.25
PUD - Waters Edge	61.34
R-2 - Two-Family Residential	32.04
I2 - Industrial Online Auto Auctions	24.64
I1 - Industrial	23.51
C-2 - Highway Business Commercial District	20.38
Parks	15.48
PUD/R1 - Planned Unit Development	14.01
C2/I-94 - Commercial Business District	10.22
C-1 - Central Business District	8.03
I1 - Industrial	7.65
R-3 - Multiple Family Residential	3.67

Sorted from highest to lower in acres

Table 4 – City of Avon Future Land Use

Land Use Category	Avon DWSMA
	Future Land Use in Acres
Low Density Residential	955.74
Water	550.23
ROW	157.92
Highway Commercial	116.39
Industrial	77.67
Park	19.87
High Density Residential	17.06
Business District	15.19

Sorted from highest to lower in acres

Table 5 – National Land Cover Dataset (NLCD, 2019)

Land Use Category	Avon DWSMA
	Land Cover in Acres
Barren Land	5.12
Cultivated Crops	275.11
Deciduous Forest	47.59
Developed, High Intensity	90.96
Developed, Medium Intensity	179.48
Developed, Low Intensity	142.11
Developed, Open Space	87.18
Emergent Herbaceous Wetlands	358.51
Evergreen Forest	2.22
Hay/Pasture	185.93
Herbaceous	9.79
Mixed Forest	13.57
Open Water	470.38
Woody Wetlands	52.71

Source: NLCD 2019

Table 6 – Potential Contamination Sources and Assigned Risk for the IWMZ

Potential Contaminant Source Type	Status	Number of Sites Within DWSMA	Assigned Risk
Well 3 (242069)			
Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	A	1	Moderate
Sewer buried, approved, air tested	A	1	Low
Fire or flushing hydrant	A	1	Low
Well 4 (696861)			
Absorption area of a soil dispersal system, average flow 10,000 gal./day or less	A	1	Low
Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	A	1	Moderate
Monitoring well	A	1	Low
Operating well	A	2	Low
Well 5 (696862)			
Absorption area of a soil dispersal system, average flow 10,000 gal./day or less	A	2	Low
Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	A	1	Low
Portable (privy) or toilet	A	1	Low
Monitoring well	A	1	Low
Operating well	A	2	Low
Notes: Sites were inventoried based off the 2024 MDH survey.			

Table 7 – Potential Point Contamination Source Type and Assigned Risk

Potential Contaminant Source Type	Status	Number of Sites Within DWSMA	Assigned Risk
Well	73-Active	95	High
Potential Contamination Site (Brownfield Site)	1-Active	1	Moderate
Spill (MPCA and MDA)	2-Active	5	Moderate
Above Ground Storage Tank	4-Active	5	Moderate
Underground Storage Tank	6-Active	12	Moderate
Leaking Underground Storage Tank	6-Active	7	Moderate
Storage and Preparation Area (EPA TRS Site)	2-Active	2	Moderate

Notes:

No sites of the following type were identified within the DWSMA per Moderate Water Scoping notices: Class V Wells, Pipeline Facility, Suspected Contaminant of Concern, Solid Waste Management Site, Waste – Metro Area

Table 8 – Expected Land and Water Use Changes

Expected Change (Physical Environment, Land Use, Surface Water, Ground Water)	Impact of the Expected Change on the Source Water Aquifer	Influence of Existing Government Programs and Regulations on the Expected Change	Administrative, Technical, and Financial Considerations due to the Expected Change
Land use changes within the DWSMA that are outside the jurisdiction of the City of Avon.	No negative changes are currently expected within the next 10 years or life of this plan.	The City's future land use indicates Avon Township land is to be developed into low density residential land.	The updated comprehensive plans should consider the WHPP issues especially for areas within the DWSMA.
There is potential for commercial business to be developed adjacent to the City's wellfield as determined by their Future Land Use Plan.	Changes to the conditions the land surface, a commercial well on site, or use of chemicals may have an impact on the quality or quantity of the public water supply.	Educational opportunities to inform new businesses that they are in a DWSMA and to follow best management practices. Additional opportunity by the City to provide spill kits via emergency responders or enact new ordinances for tanks.	Financial and time constraints with education, ability to provide spill kits, or changing city ordinances.
No changes to the physical makeup of the aquifer are expected.	No changes, therefore, no impact.	No changes, therefore, existing programs or regulations are adequate.	Because there are no expected changes to the physical makeup of the aquifer no additional administrative, technical or financial considerations required.
The City should remain aware of any land use changes over the course of the WHPP that may impact the source water aquifer.	Potential for water quality, quantity leading to unforeseen water supply changes.	EPA, MPCA, and DNR related programs and regulations will be updated in correspondence to new activity.	The City will need to review permits and activities as well as work cooperatively with MPCA, MDH, and DNR to prevent or minimize impacts from any land use or remedial activity if it is deemed applicable.
No anticipated increase of groundwater use.	WHPA will remain similar.	No changes, therefore, existing programs or regulations are adequate.	Continue to work with MDH and DNR staff.
Construction of private wells within DWSMA is a possible change in groundwater source.	Private wells have the potential to impact existing public wells and can become a source of contamination.	The MDH establishes best management practices for wells and may assist with permitting, sealing and locating of improperly managed wells.	City will need to monitor data for private wells constructed with the DWSMA.
Above ground and Underground storage tanks with known leaks through city limits.	Leaking tanks have the potential to impact water quality of the water recharging the aquifer.	Educational opportunities and additional opportunities by the City to provide spill kits via emergency responders or enact new ordinances for tanks.	Financial and time constraints with education, ability to provide spill kits, or changing city ordinances.

Table 9 – 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
Wellhead protection principles may not be incorporated into other plans developed by the City or other local government units.	Aquifer	Avon Township currently zones all portions of the DWSMA as urban expansion with City of Avon annexing these regions outside of City Limits.	Until the City annexes these areas, cooperate with other local government units to incorporate wellhead protection principles into other planning efforts	The Memorandum of understanding between the County of Stearns and the Town of Avon established land use and zoning ordinances outside of City limits. Coordinate efforts with any applicable local government units.
Future land use change near the well field with potential business development along with existing tanks and their potential to leak within the DWSMA.	Aquifer, Water Quality	water quality issues with any associated leak	Education of best management practices, providing spill kits, new City ordinances	Technical and funding assistance from the MDH and others. Additionally, a source water protection grant may be available.
Numerous private wells within the DWSMA	Water Quality and quantity	Private wells have the potential to impact existing public wells and can become a source of contamination.	The MDH establishes best management practices for wells and may assist with permitting, sealing and locating of improperly managed wells	Stearns SWCD and MDH both provide grants and cost sharing to help private entities seal abandoned or unused wells.
The MDH has compiled historical information, the Old Municipal Well Report, for use in the planning process.	Aquifer, Well Water Quality	No known Old Municipal Wells were identified in the report; however there is always a potential for unknown and unsealed old municipal wells.	With the assistance of MDH the city can locate, assess and seal the wells if they pose a threat to the city's drinking water supply.	MDH Well Management has the ability to require the city to properly address unused improperly sealed wells.
It is always difficult to foresee or plan for every threat or potential contaminant source which may affect the City in the future	Aquifer, Well Water Quality, DWSMA	The City of Avon may not be prepared technically or financially to address potential threats unknown to them at this time	If a critical issue or potential contaminant threat becomes an issue in the future for the City, the City can ask for assistance from the various state agencies	Not applicable

Table 10 – Controls and Programs of the City of Avon

Type of Control	Program Description
Zoning and Land Use	*Sets standards and orderly growth of various land uses within the City limits and allows the City to apply permit conditions to land uses they deem necessary.*
52.32 CONNECTION TO OTHER WATER SUPPLIES RESTRICTED.	*No water pipe of the water system shall be connected with any pump, well, tank, or piping that is connected with any other source of water supply except to service municipal systems.* *The City of Avon* will *explore the need to implement a cross connection control program.*
Memorandum of Understanding Between the County and Stearns and the Town of Avon	*Establishes land use and zoning ordinances for portions of the DWSMA outside of City of Avon limits. The City of Avon and the Town of Avon have signed such a joint resolution designating certain lands of the Town of Avon as an orderly annexation area.*

Table 11 – Local Agency Controls and Programs

Government Unit	Name of Control/Program	Program Description
Stearns County Environmental Services	Agricultural and Water Resources Division	Environmental Services was organized in 1993 to provide efficient customer service to the general public regarding environmental, land us, and environmental health issues. Environmental services provide many services and support for items such as hazardous waste recycling and management, shoreland management, feedlots, water planning, aquatic invasive species, and wetlands.
	Environmental Health Division	
	State Funded Program Reports	
	Land Use Division	
Stearns Soil & Water Conservation District	Agricultural BMPs, stormwater management, wetland management, residential BMPs.	Stearns SWCD may also be able to assist in Private Well sealing. The Stearns SWCD promotes the protection of water and soil resources in the County through educational programs, cost-sharing and collaboration with other local, state and federal agencies. The Stearns SWCD also maintains WHPP educational material that the City of Avon can use.
Minnesota Pollution Control Agency	Multiples programs to monitor and investigate contamination.	Multiple programs that investigate potential contamination, clean up, and remedial activities. Grant funding is available for select sites.
Sauk River Watershed District	Local organization	Annually hosts a water festival within City of Avon for public education.

Minnesota Rural Water Association	Regional/local organization	MRWA's Objective is to provide excellence in training and technical assistance to small municipal and non-municipal systems, rural water districts, and wastewater districts with populations less than 10,000. They provide support and educational content to administer WHPPs.

Table 12 – State and Federal Agency Controls and Programs

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

Table 13 – Management Strategies

Measure	Priority	Public Education and Outreach	Object Addressed	Cost Estimate	City Measure Unless Cooperation is Noted	Implementation Time Frame										
						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
1	High	The City of Avon will notify the residents and businesses within the City it has an approved WHPP. Notification will be completed through the City website, newspaper, or a newsletter.	A	<$1,000 and Staff Time	MDH	•										
2	High	The City of Avon will provide 1) WHP educational materials and 2) a copy of the WHP plan through the City website or mailings. This can be completed by creating a new section on the City's website. WHP educational materials will address general WHP principles and practices and provide best management practices for items such as private wells, PCSI sites, Water Conservation. Resources can be hyperlinked from many sources including local, state, Stearns County, and federal agencies. If on the City website, on a yearly basis, make sure hyperlinks of educational materials are still valid.	A	<$10,000 and Staff Time	MDH, MPCA, DNR, MRWA, EPA, Stearns County, SWCD	•	•	•	•	•	•	•	•	•	•	•
3	Moderate	The City will assist when feasible with water agencies, SWCD, 1W1P, and/or the MDH to address any water quality issues or educational needs. City can apply for grants if issues are identified.	D	<$10,000 and Staff Time	Watershed Districts, SWCD	As Needed										
4	Moderate	Annually offer a MRWA Water Week poster contest for the local 4th Grade School Teacher and ask their participation.	D	<$5,000 and Staff Time	MDH, City, MRWA, DNR	•	•	•	•	•	•	•	•	•	•	•

Measure	Priority	Public Education and Outreach	Object Addressed	Cost Estimate	City Measure Unless Cooperation is Noted	Implementation Time Frame										
						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
5	Moderate	Provide educational material to businesses/industries that are determined to have the potential for spills on the availability or the need to have spill prevention or spill cleanup kits. If funding is made available, inform such businesses that spill supplies are available from the City/emergency responders.	D	Staff Time	MDH, City, MRWA, DNR, Stearns County, Local Government	•	•	•	•	•	•	•	•	•	•	•
6	Moderate	Brief the mayor and city council about the potential contaminant sources (such as wells, spills, tanks) in the DWSMA. Describe status and resources needed and available to complete this effort.	D	Staff Time	MDH	•		•		•		•		•		•
7	Moderate	The City will explore the need to implement a cross connection control program. The MDH Source Water Planner or MDH District Engineer can assist the City in this effort.	D	Staff Time	MDH					•						
8	Moderate	Select wellhead protection education items from the MNRWA source water protection website, SWCD, Stearns County, or CMWEA, to use to educate the public about WHP in your community.	D	Staff Time	MDH, City, MRWA, DNR, Stearns County, Local Government, SWCD, CMWEA	•	•	•	•	•	•	•	•	•	•	•
9	Moderate	In case of drought, or as needed, provide information to residents about water conservation tips and water reuse practices.	D	<1,000	MDH, City, MRWA, DNR, Stearns County, Local Government, SWCD	As needed										

Measure	Priority	Public Education and Outreach	Object Addressed	Cost Estimate	City Measure Unless Cooperation is Noted	Implementation Time Frame										
						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
10	Moderate	The City will consider support for local water festivals. Support from the City may be contingent on outside solicitation for assistance, grant funding, and/or staff availability. Support could include, but is not limited to, methods such as financial, promotional, or staff contributions. If able, help sponsor the middle Sauk Water Festival (possibility of grant funding assistance).	D	<1,000	MDH, SWCD, Sauk River Watershed District	As needed and opportunities arise										
11	Moderate	The City will join then may choose to maintain its membership with and participate in appropriate events sponsored by CMWEA. Central Minnesota Water Education Alliance (CMWEA) is a coalition of central Minnesota cities, counties and other organizations that provides educational outreach to promote water quality stewardship. If at some point during the life of this Plan, the City determines that membership in the CMWEA no longer serves the needs of the City, it may choose to transfer membership to another, “water-education” focused organization or manage the education initiative itself.	A, D, G	<$2,500 and Staff Time	City, local organizations	As needed										

Table 13 (Continued) – Management Strategies

Measure	Priority	Potential Contaminant Source Management	Object Addressed	Cost Estimate	City Measure Unless Cooperation is Noted	Implementation Time Frame										
						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
12	High	Review the Old Municipal Well Report (OMWR) for well locations and assess any such location identified for sealing potential. (No known suspected old municipal wells for Avon).	B	<$1,000 and Staff Time	MDH	As Needed										
13	High	If an old municipal well is identified, obtain a cost estimate and apply for MDH SWP Grant or MDH Well Management funds to seal Old Municipal Wells if feasible and restore site as necessary.	B	>$2,500 and Staff Time	MDH	As Needed										
14	High	If any unused and unsealed wells are identified, apply for a MDH SWP Grant to seal the high priority or unused unsealed wells identified in the DWSMA. (If the land owner is willing) Have a certified contractor seal the wells if the grant funds are awarded. The City will share the contact information of agencies providing cost share funding options (Stearns SWCD).	B	>$2,500 and Staff Time	MDH, Landowners, SWCD	As Needed										
15	Moderate	If any Class V Well is identified within the DWSMA, work with MDH Planner to provide the Class V owner information regarding regulations to Class V Wells and to check status.	B	<$1,000 and Staff Time	MDH, EPA	As Needed										
16	High	The City will provide educational material about private wells by providing a link, reference, or digital copy of the MDH publication, “Well Owner’s Handbook”.	B	<$1,000 and Staff Time	MDH, MPCA, SWCD	On-Going										
17	High	The City will provide educational material by providing links about basic underground storage tanks requirements by providing the MPCA Fact Sheets. Information on tank monitoring and management is available through the MPCA tank unit. Provide information regarding proper containment areas for above and below-ground tanks, spill response and clean-up.	B	<$1,000 and Staff Time	MDH, MPCA	On-Going										

Measure	Priority	Potential Contaminant Source Management	Object Addressed	Cost Estimate	City Measure Unless Cooperation is Noted	Implementation Time Frame										
						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
18	High	The City will provide links for educational material or best management practices provided by the MPCA on above ground storage tanks.	B	<$1,000 and Staff Time	MDH, MPCA	On-Going										
19	High	Request MPCA files for PCS and STOR sites within **Appendix C** including Brownfields, Voluntary investigation and cleanup, Storage, and Leak sites registered within the DWSMA. Check for updates at year 3 and 8 of the plan and request when new files when available. Discuss with MDH source water planner or MPCA project managers if any contamination should be a concern for the City.	B	<$1,000 and Staff Time	MDH, MPCA			•					•			
20	Low	Update the PCSI database to include or remove potential contaminants if grant funding is provided. (Grant funding is eligible for updating the PCSI once during the lifetime of the plan.)	B	$10,000 and Staff Time	MDH, Consultant										•	

Table 13 (Continued) – Management Strategies

Measure	Priority	Land Use Management Strategies	Object Addressed	Cost Estimate	City Measure Unless Cooperation is Noted	Implementation Time Frame										
						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
21	High	As opportunities become available during updates of planning efforts, integrate wellhead protection principles into planning efforts, including 1W1P, local planning efforts, and comprehensive plans.	A, G	<$5,000 and Staff Time	1W1P, Township, City, Lake associations, SWCD	As Needed										
22	Moderate	The City will inform Stearns County that they have a completed WHP Plan and ask that planning efforts consider potential impacts or benefits to the City's source water aquifer. City will work cooperatively with the County on planning efforts and implementation.	A, G	<$1.000 and Staff Time	Stearns County	•										
23	Moderate	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.	A, G	<$1.000 and Staff Time	Stearns County, SWCD, Avon Township, MDH	As Needed										
24	High	Through direct correspondence with MnDOT, the County Emergency Manager, Local Fire Department, and local first responders alert them to the location of the DWSMA by providing them a map and informing them of City of Avon's WHP efforts. Request that strong consideration be given to the WHP area when responding to a spill. Various state and local agencies such as the MPCA, MRWA, MDH, and Stearns County and Stearns SWCD may have educational opportunities for spill response.	A, G	<$1.000 and Staff Time	City, Local and State Agencies, SWCD, Stearns County	•		•		•		•		•		•
25	High	On a yearly basis, ask first responders or fire department if any training and or supplies could be provided for spill response, cleanup, or prevention. Apply for a MDH SWP grant to help support any education or supplies needed for spill response. Spill supplies could be distributed to the public if extra supplies are available or if grant funding is obtained. High priority sites include properties with tanks and "STOR" sites as listed in **Appendix C.**	A, G	>$10.000 and Staff Time	City, Local emergency responders/Fire department	•	•	•	•	•	•	•	•	•	•	•

Measure	Priority	Land Use Management Strategies	Object Addressed	Cost Estimate	City Measure Unless Cooperation is Noted	Implementation Time Frame										
						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
26	High	The City should contact the DNR area hydrologist and ask if there have been any new appropriation permits within the DWSMA. Additionally, the City should request MN DNR notify them if any applications come in within the DWSMA. This will allow the City to comment on the permit application.	A, G	Staff Time	City, DNR			•					•			•
27	High	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.	A, G	<$2,500 and Staff Time	City	As Updates Occur										
28	High	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.	A, G	Staff Time	City	On-Going										
29	High	The City will continue to routinely monitor and record the static and pumping levels of the groundwater in the municipal wells. Water levels in all the municipal wells will be recorded at least monthly.	A, G	<$2,500 and Staff Time	City	Monthly										

Table 13 (Continued) – Management Strategies

Measure	Priority	Data Collection	Object Addressed	Cost Estimate	City Measure Unless Cooperation is Noted	Implementation Time Frame										
						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
30	High	Water Quality Monitoring: The standard assessment monitoring package should be analyzed at each of the city's primary wells during year six of plan implementation. MDH can provide sample bottles and cover analytical costs, assuming adequate resources exist at the time. The city may need to collect the samples and ship them to MDH.	D	<$5,000 and Staff Time	MDH					•						
31	High	This delineation is based on very little well data. If wells are constructed within two miles of the city or one mile of the DWSMA, their locations should be verified. This information may allow a better understanding of the extent and thickness of the city's aquifer, and could result in a more refined WHPA in the future.	D	<$5,000 and Staff Time	MDH, Consultant, SWCD	When Wells are Identified										
32	High	A video inspection of the city wells might reveal whether any casing flaws might be contributing to the low-level tritium detections seen at these wells. This would likely occur during routine well servicing and could be eligible for a Source Water Protection Implementation Grant if this measure is included in the city's wellhead protection plan. If such an investigation is to occur, MDH should be contacted in advance in the event additional down hole investigations can be conducted while the well is open.	D	>$10,000 and Staff Time	MDH, Consultant,	When SWP Grant is obtained										
33	High	If possible, collect pre-treatment arsenic samples from Well #4 and Well #5, followed by post-treatment samples.	D	<$5,000 Staff Time	MDH, Consultant		•									

Table 13 (Continued) – Management Strategies

Measure	Priority	IWMZ Management Measures	Object Addressed	Cost	City Measure Unless Cooperation is Noted	Implementation Time Frame										
						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
34	High	Assist MDH staff in completing future Inner Wellhead Management Zone (IWMZ) Inventories for the public water supply wells.	E	<$1,000 and Staff Time	MDH						•					•
35	High	Work with MDH to ensure that setback distances for new potential contamination sources are met.	E	>$10,000 and Staff Time	MDH	•	•	•	•	•	•	•	•	•	•	•
36	High	Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced	E	>$10,000 and Staff Time	MDH	On-Going										
37	High	For properties within the IWMZ, connection to a community sewer system could be considered (dependent on private owner corporation).	E	>$10,000 and Staff Time	MDH	As needed and opportunities arise										
38	High	For properties within the IWMZ not connected to sewer, the precise location of subsurface sewage treatment system components should be determined. This can help assess the potential impact on the water supply (dependent on private owner corporation).	E	>$10,000 and Staff Time	MDH	As needed and opportunities arise										

Table 13 (Continued) – Management Strategies

Measure	Priority	Planning and Reporting	Object Addressed	Cost Estimate	City Measure Unless Cooperation is Noted	Implementation Time Frame										
						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
39	Medium	City to convene annual wellhead protection meetings to evaluate and assess needs and grant opportunities. Maintain a "WHP folder" that contains documentation of WHP activities you have completed and plan to complete the next year.	D	<$2,5 00 and Staff Time	MDH, SWCD	•	•	•	•	•	•	•	•	•	•	•
40	High	<u>WHP Program Evaluation Plan Reporting:</u> Complete an Evaluation Report every 2.5 years that evaluates the progress of plan of action. This evaluation form is available on the MDH website, and the MDH Planner can assist with conducting and completing the Evaluation. City will contact MDH Planner upon 2.5 year review completion and will submit at the scoping 1 meeting for plan amendment.	D	<$5,000 and Staff Time	MDH			•			•					•

Figures

Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary

0 500 1,000 2,000 Feet

Drinking Water Supply Management Area

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 4/19/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 1

Path: X:\AE\A\AVONM\178036\GIS\AVONM_178036_WHPP.aprx

Spunk Creek
Koppy La
Waters Edge Circle
County Hwy 9
Ochotto Lake
Angelfish Ave
Princewood Rd
Parkwood Cir
Lower Spunk Lake
Lower Spunk La
AVON 5
AVON 4
Ochotto Lake Dr
5th St NW
Sundown Dr
Suncircle
Suncrest
4th St NW
Avon Ave N
Lake Ct
Char Ave NE
4th St NE
3rd St NE
2nd St NE
1st St NE
2nd St NW
County Hwy 54
Poverty Point Dr
Dorado Ave
Chinook Ave
1st St SW
Bluefin Ave SW
Avon Ave S
Baracouta Ave S
Char Ave SE
Dolphin Ave
1st St SE
Lake Anna
Shorewood Dr
Middle Spunk Lake
Norway Rd
Blattner Dr
6th St
County Hwy 50
AVON 3
Linneman Lake Rd
154th Ave
Minnie Lake
Linneman Lake
COUNTY 155 ROAD
COUNTY 157 ROAD
COUNTY 159 ROAD

Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary

DWSMA Vulnerability
- Moderate Vulnerability

Moderate vulnerability indicates that vertical recharge to the source water aquifer occurs over a time period of years to several decades.

0 500 1,000 2,000 Feet

DWSMA Vulnerability

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 4/19/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 2

Path: X:\AE\AVONM\178036\G\GIS\AVONM_178036_WHPP\AVONM_178036_WHPP.aprx

Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- Avon Township
- City of Avon
- Township Range Section
- Stearns County Parcel

The DWSMA is entirely within Stearns County

0 500 1,000 2,000 Feet

Political Boundaries

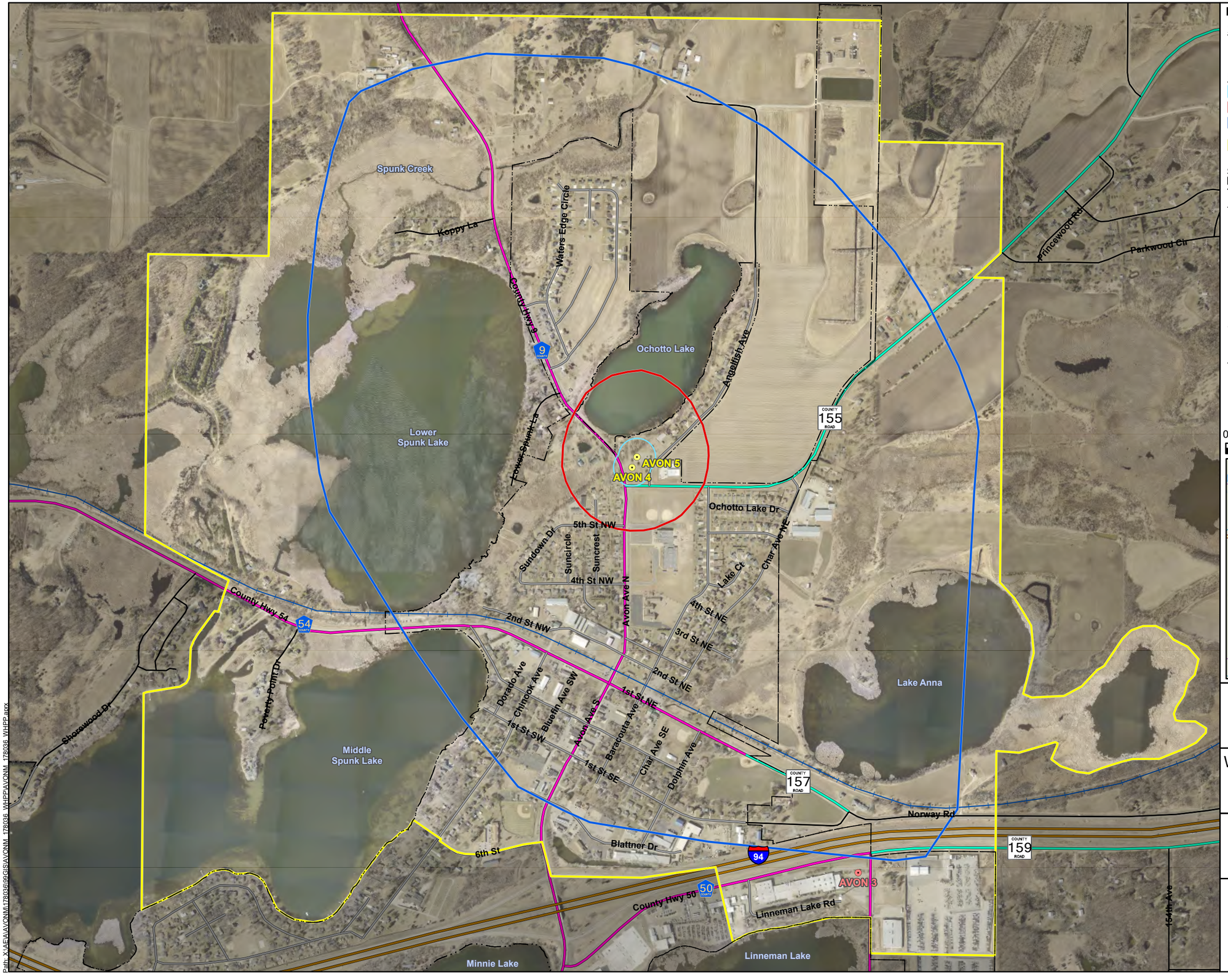
Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 4/19/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 3

Path: X:\AE\A\AVONM\178036\gis\GIS\AVONM_178036_WHPP\AVONM_178036_WHPP.aprx



Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary

Transportation Routes and Ownership
- Interstate Highway
- US Trunk Highway
- Minnesota Trunk Higway
- County State Aid Highway
- Municipal State Aid Street
- County Road
- Township Road
- Municipal Street
- Minor Roads
- Abandoned Railroad
- Active Railroad (none within City Limits)

0 500 1,000 2,000 Feet

Transportation Routes

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 4/19/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 4

Spunk Creek
Koppy La
Waters Edge Circle
County Hwy 9
Ochotto Lake
Angelfish Ave
Princewood Rd
Parkwood Cir
Lower Spunk Lake
Lower Spunk La
AVON 5
AVON 4
Ochotto Lake Dr
5th St NW
Sundown Dr
Suncircle
Suncrest
4th St NW
Avon Ave N
Lake Ct
Char Ave NE
4th St NE
3rd St NE
2nd St NE
1st St NE
2nd St NW
County Hwy 54
Poverty Point Dr
Shorewood Dr
Dorado Ave
Chinook Ave
Bluefin Ave SW
1st St SW
Avon Ave S
Baracouta Ave
1st St SE
Char Ave SE
Dolphin Ave
Lake Anna
Middle Spunk Lake
Norway Rd
Blattner Dr
6th St
AVON 3
County Hwy 50
Linneman Lake Rd
154th Ave
Minnie Lake
Linneman Lake
COUNTY 155 ROAD
COUNTY 157 ROAD
COUNTY 159 ROAD

Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary

Zoning
- R-1 - Single Family Residential
- R-2 - Two-Family Residential
- R-3 - Multiple Family Residential
- C-1 - Central Business District
- C-2 - Highway Business Commercial District
- C2/I-94 - Commercial Business District
- I1 - Industrial
- I2 - Industrial ONline Auto Auctions
- PUD/R1 - Planned Unit Development
- PUD - Waters Edge
- Parks
- Avon Township Urban Expansion
- Avon Township Ag-40

0 500 1,000 2,000 Feet

Index Map

Zoning

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 7/31/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 5

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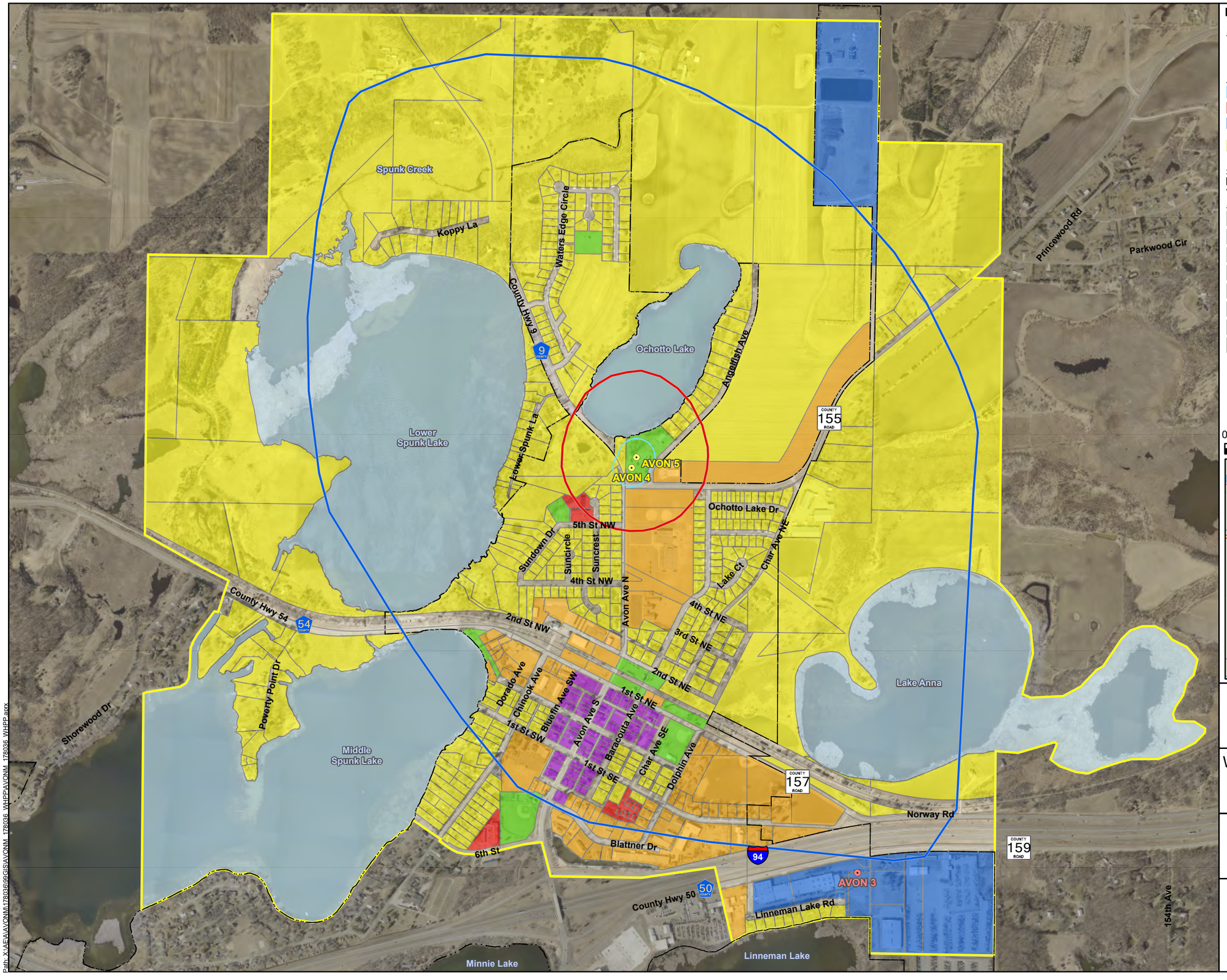


Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary

Future Land Use
- Industrial
- Highway Commercial
- Business District
- Low Density Residential
- High Density Residential
- Park
- Water
- ROW

0 500 1,000 2,000 Feet

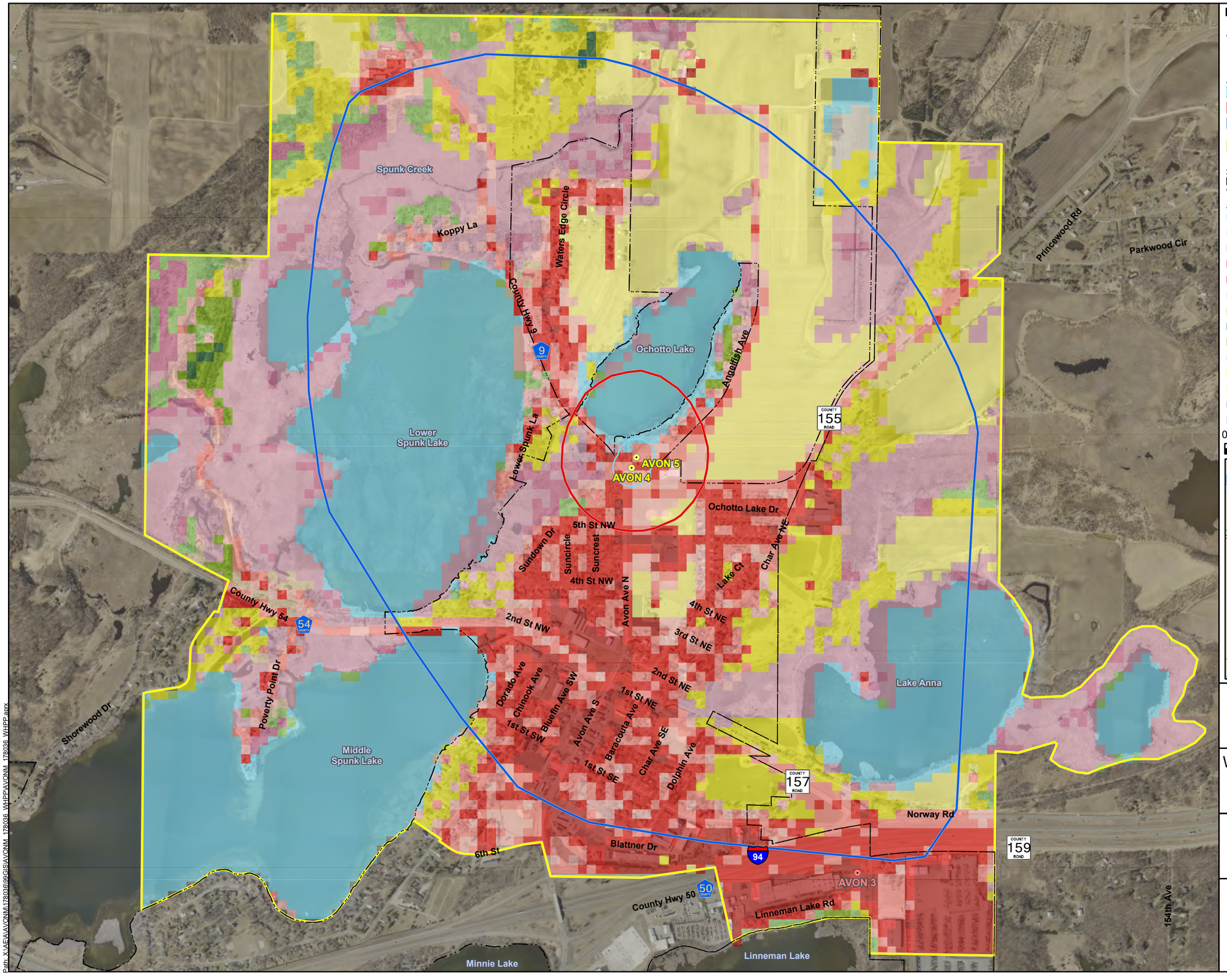
Future Land Use

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 4/26/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 6



Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary

Land Cover Class
- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land (Rock/Sand/Clay)
- Decidious Forest
- Evergreen Forest
- Mixed Forest
- Grassland/Herbaceous
- Pasture/Hay
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

0 500 1,000 2,000 Feet

NLCD Land Cover

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 4/19/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 7

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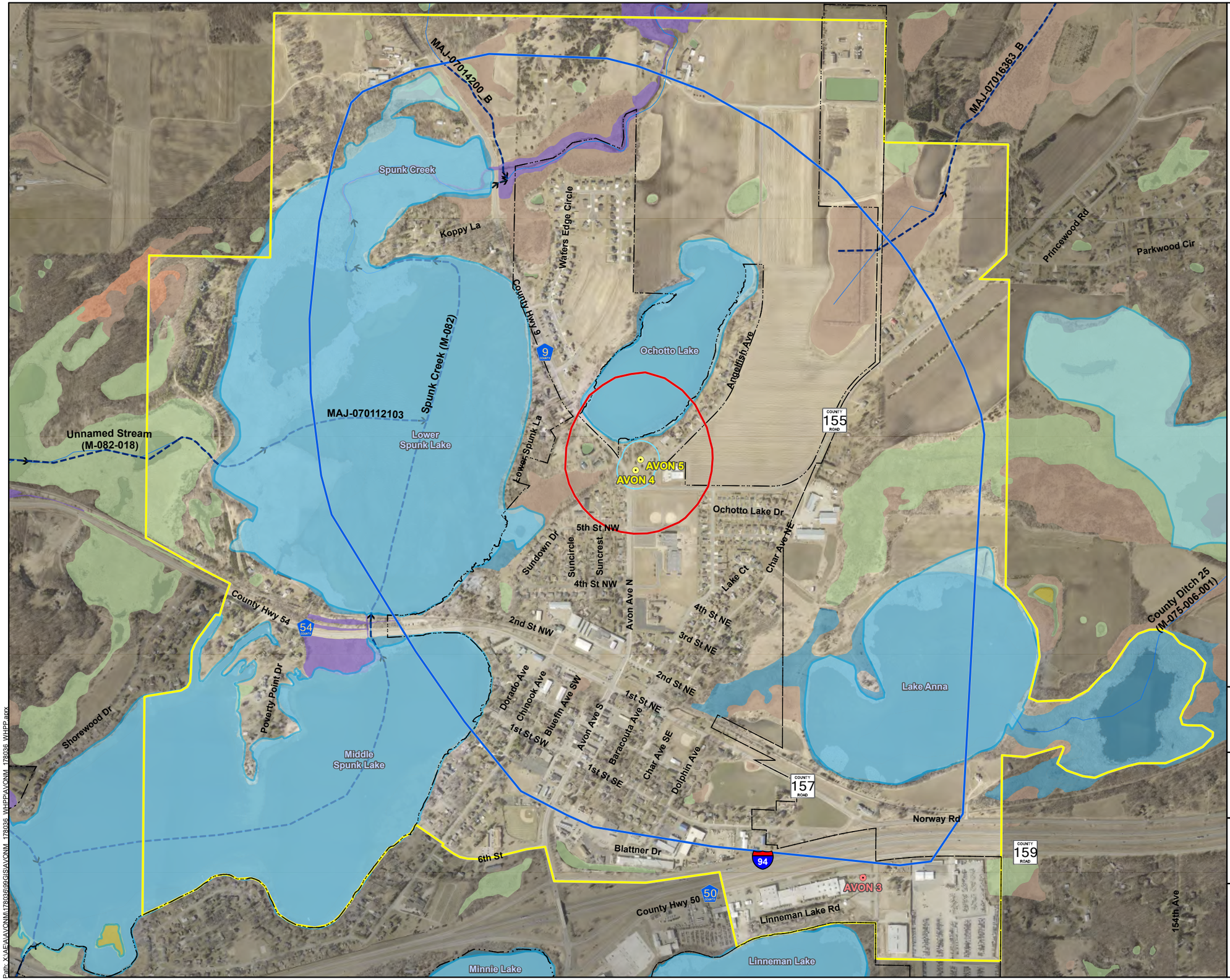

Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary

Buffer Protection Map (MnDNR)

Watercourses and Ditches
- 50-ft Buffer
- 50-ft Buffer
- Public Ditch/Altered Natural Watercourse
- Confluences and Flow Direction

National Wetlands Inventory (NWI) Simplified HGM Class
- Depression
- Lentic
- Lotic
- Mineral Flat
- Peatland
- Slope

0 500 1,000 2,000 Feet

Public Drainage Systems and Water Resources

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 4/20/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 8-1

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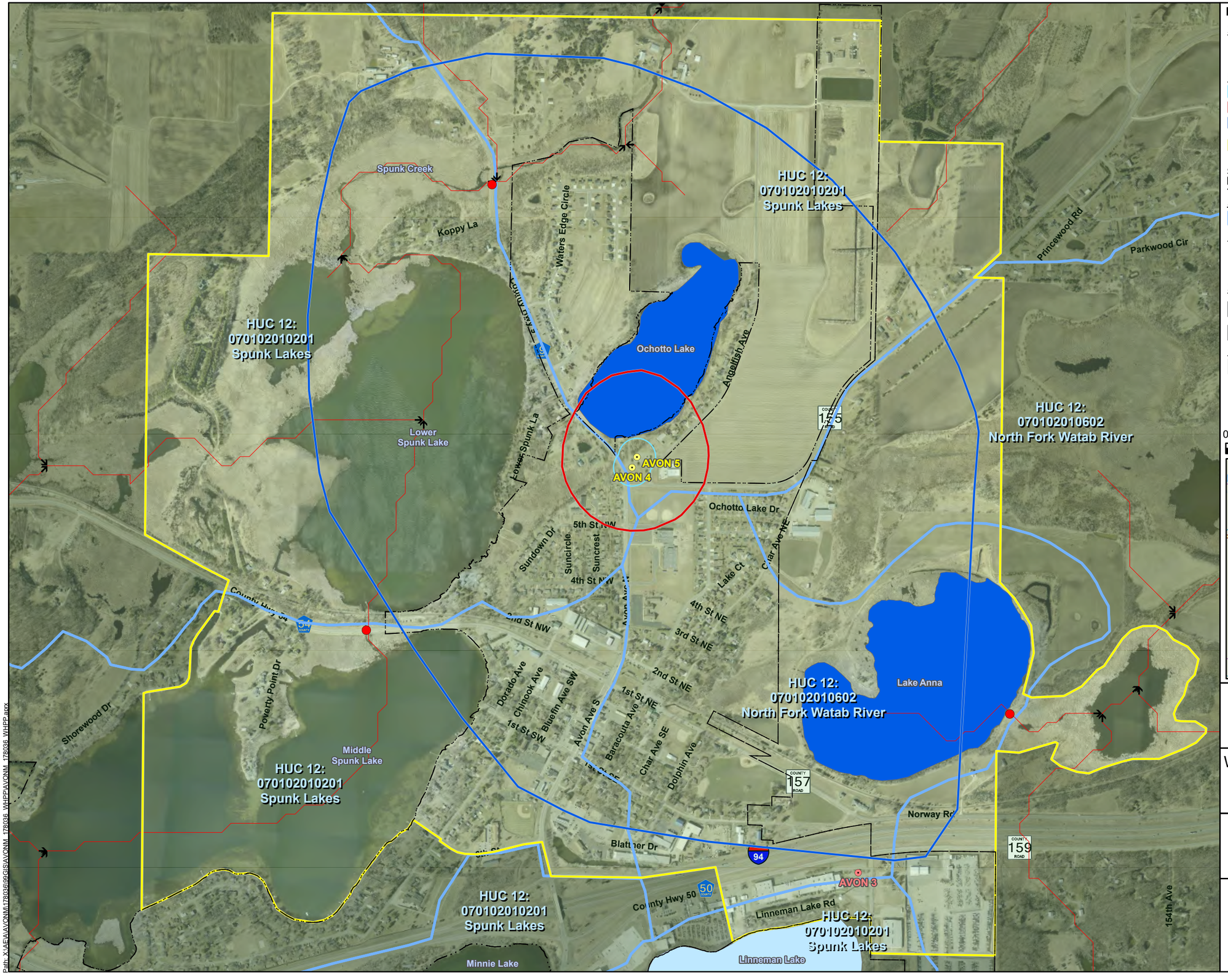

Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary

DNR Watersheds
- DNR Level 08 - All Catchments

Catchment Flow Network (synthetic)
- Catchment Flow Network (synthetic)
- Catchment Pour Points

MnDNR Groundwater Dominated Lakes
- 0 - 5 Very Likely Groundwater Dominated Lake
- 5 - 10 May be Groundwater Dominated Lake

One Watershed One Plan
- Planning Boundary ID 11

0 500 1,000 2,000 Feet

Public Drainage and Water Resources

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 4/20/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 8-2

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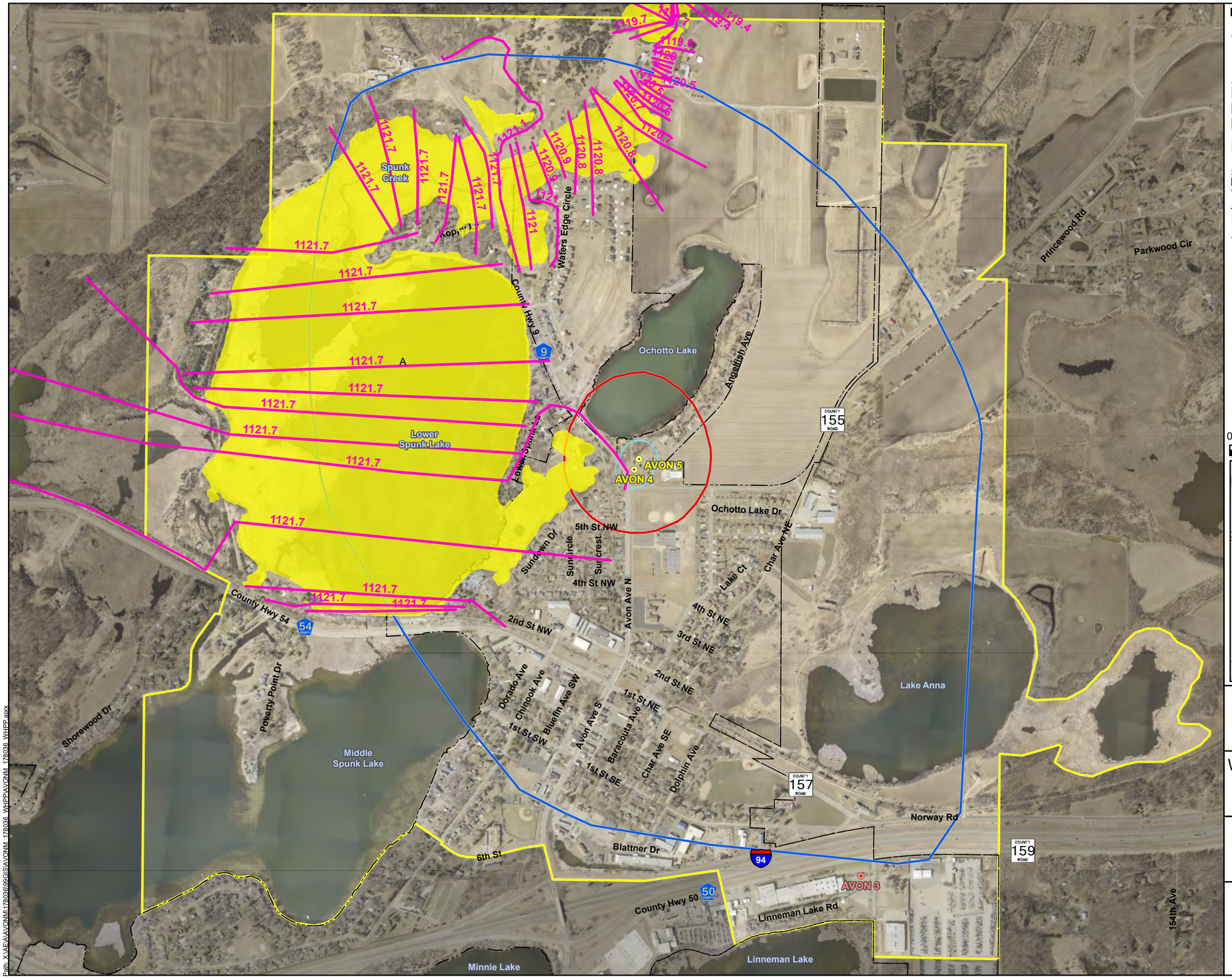

Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary

Federal Emergency Management Agency (FEMA)
- 100 Year Floodplain
- Estimated 1% Water Surface Elevations

No 500 year flood zone was depicted in FEMA or Stearns County Mapping.

0 500 1,000 2,000 Feet

Flood Zone Data

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 4/20/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 9

Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary

Utilities
- Sanitary Sewer
- Water Utility Network
- Storm Sewer

No Gas or Oil pipelines were observed from the National Pipeline Mapping System Public Viewer.

0 500 1,000 2,000 Feet

Utilities

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 4/26/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 10

Path: X:\AE\AVONM\178036\project\GIS\AVONM_178036_WHPP.aprx

Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary

Minnesota Well Index
- Verified Well Location
- Relocated Well Location (Previously Unverified location)

Hand Digitized
- Potential Well Location

Notes:
-See **Appendix C** for more details
- PCSI = Potential Contaminant Source Inventory
-No EPA Class V Wells were found within the DWSMA.

0 500 1,000 2,000 Feet

PCSI - Wells

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 4/21/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 11

Legend

Public Water Supply Well Locations
- Primary Well
- Emergency Well

Wellhead Protection Plan - Boundaries
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)

Jurisdictional Boundary
- City of Avon Municipal Boundary
- County Parcel

Minnesota Pollution Control Agency (MPCA)

MPCA Incident Report
- Spill

MPCA What's in my Neighborhood
- Potential Contamination Sites
  Potential Contamination Sites (PCS) include MPCA Brownfield and Voluntary Investigation and Cleanup Sites (VIC).
- Aboveground Storage Tank
- Underground Storage Tank
- Leaking Underground Storage Tank
- Storage or Preparation Area

Notes:
-See **Appendix C** *for more details*
- PCSI = Potential Contaminant Source Inventory

0 500 1,000 2,000 Feet

Index Map

PCSI - Other Point Sources

Wellhead Protection Plan Part II Amendment
City of Avon
Stearns County, Minnesota

SEH

Project: AVONM 178036
Print Date: 5/30/2024
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, Stearns County, ESRI City of Avon, MDH, 2021 Stearns County Aerial

Figure 12

Appendix A

Scoping Decision Notice and Assessment of Data Elements

DEPARTMENT OF HEALTH

Protecting, Maintaining and Improving the Health of All Minnesotans

November 14, 2023

Mr. Justin Kurtz, Water/Wastewater Foreman
Mr. Josh Blommer, Public Works Technician
City of Avon
P.O. Box 69
Avon, Minnesota 56310

Subject: Scoping 2 Decision Notice and Meeting Summary – City of Avon – 1730002

Dear Mr. Kurtz and Josh Blommer,

This letter provides notice of the results of a scoping meeting held with you, Wayne Cymbaluk (Stearns Soil and Water Conservation District Water Resource Specialist), and me (Minnesota Department of Health) on October 23, 2023, at Avon City Hall regarding wellhead protection (WHP) planning. During the meeting, we discussed the data elements that must be compiled and assessed 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. We also discussed a summary of planning issues and recommendations that were identified during the Part 1 WHP Plan development process which should be considered for inclusion in your Part 2 WHP Plan.

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 July 25, 2024 to complete its WHP plan.

It is our understanding that the city is still determining who will be working to develop a draft of the remainder of the WHP plan. I will be contacting you to review the progress of the development of Part 2 of your plan. Upon request, the Technical Assistance Planner can provide a glossary of terminology, identification of information sources for the required Data Elements, and other technical assistance documents. If you have any questions regarding the enclosed notice, contact me by email at chad.r.anderson@state.mn.us or by phone at 651-201-5847.

Sincerely,

Chad Anderson, Planner
Environmental Health Division
Source Water Protection Unit
3333 Division Street, Suite #212
St. Cloud, Minnesota 56301
CA:jk

Enclosures: Scoping 2 Decision Notice, PCSI Requirements, WHP Planning Issues Summary
cc: Hunter Blommer, MDH Engineer, St. Cloud
Jodi Austing-Traut, City Clerk, City of Avon (Letter Only)
Luke Stuewe, Minnesota Department of Agriculture

November 14, 2023

Name of Public Water Supply: City of Avon

PWSID:1730002

Name of the Wellhead Protection Managers: Justin Kurtz, Water/Wastewater Foreman and

Josh Blommer, Public Works Technician

Address: P.O. Box 69

City: Avon

Zip: 56310

Phone:320-342-8101

Primary Unique Well Numbers: 696861 (Well #4) and 696862 (Well #5)

DWSMA Vulnerability: ☐ Low ☒Moderate

The purpose for the second scoping meeting, as required by Minnesota Rules, part 4720.5340, is to discuss the information necessary for preparing Part 2 of a Wellhead Protection Plan. The Part 1 Plan identifies the area that provides the source of drinking water for the public water supply (PWS) and assesses how vulnerable that area is to contamination. The PWS can utilize that information to develop land use and management practices that protects their groundwater resource from contamination.

The wellhead rule (Minnesota Rules, part 4720.5340) refers to the information required for wellhead planning as data elements. This notice lists the data elements that are stated in Minnesota Rules, part 4750.5400 and are selected for the PWS because of the vulnerability of the drinking water supply management area (DWSMA) as determined in Part 1.

Scoping 2 Data Elements Needed for the Part 2

Data Elements are pieces of information in the form of a map, a list, records, tables, and inventories. Where appropriate, they should be reviewed and assessed in terms of their present and/or future implications on the 1) use of the well(s), 2) quality and quantity of water supplying the public water supply wells(s), and 3) land and groundwater uses in the DWSMA. It is important to discuss the relevance of the data elements to management of the DWSMA. Check the technical assistance comments for guidance on reviewing the data elements and conducting these assessments. Clearly identify in the plan which data elements are associated with which tables/figures. If a data element does not exist, state that in the narrative.

Submit –

The following information, highlighted with an asterisk* with blue text, MUST be submitted in the Part 2 by including it in the plan narrative and/or appendix.

- ☐ *A map that indicates the vulnerability and includes the DWSMA, WHP Area, and Emergency Response Area must be included in the Part 2. This map with vulnerability is a product of the Part 1 and provides a basis for planning activities in Part 2. SWP Planner can provide the DWSMA figure.

DATA ELEMENTS ABOUT THE LAND USE –

Land Use

- ☐ *An existing map of political boundaries.
- ☐ *An existing map of public land surveys including township, range, and section.

Technical Assistance Comments: A map or maps showing updated political boundaries and township, range, section with labels is required for determining land use authorities for the land within the DWSMA. DWSMA figure map provided by SWP Planner will also contain political boundaries with township, range, and section. Determine and discuss how the various land use authorities may affect the management of the DWSMA.

- A map and an inventory of the current and historical agricultural, residential, commercial, industrial, recreational, and institutional land uses and potential contaminant sources.
  - ☐ *The Potential Contaminant Source Inventory (PCSI) data in both a table and map format must be created and included in the Part 2. Include potential contaminant sources as listed on the PCSI attachment provided for each existing vulnerability within the DWSMA.
    - If DWSMA contains moderate vulnerability inventory all wells.
    - The inventory should include your community wells but not include any wells that are known to have been sealed according to the Minnesota Well Code (MN Rules 4725).
  - ☐ *A land use/land cover map and table. SWP Planner can provide a land cover map and data/table from federal sources. This data set should be used unless an alternative electronic data set that is more current and detailed is available. Assess and discuss changes in land use that could impact management of the DWSMA.

- ☐ *An inventory of the Inner Wellhead Management Zone (IWMZ). A recent IWMZ inventory (within six years) for each primary well with management recommendations on the Minnesota Department of Health (MDH) form, or a table that summarizes the number and type of contaminant sources with the management recommendations must be included. Incorporate or reference the recommendation(s) from the IWMZ into the Part 2. IWMZ will be completed by the SWP Planner with assistance from the PWS staff. A copy will be provided to the PWS.

Technical Assistance Comments: This section encompasses the Potential Contaminant Source Inventory known as the PCSI. See the Scoping 2 Decision Notice Potential Contaminant Source Inventory Requirement Attachment(s) and endorsement procedures/fact sheets for further information. Utilize the PCSI geodatabase attribute template provided by SWP Planner. Management strategies must be developed for potential sources of contamination that pose a risk to the drinking water supply.

- ☐ *An existing comprehensive land-use map.
- ☐ *An existing zoning map.

Technical Assistance Comments: This information can indicate areas in the DWSMA where growth or the addition of potential contaminant sources is likely to occur. Furthermore, the review of local zoning and comprehensive land-use maps facilitates the evaluation of the degree of compatibility current and future land uses have with the PWS goals of protecting the drinking water wells and aquifer

Public Utility Services

- ☐ *An existing map of transportation routes or corridors.

Technical Assistance Comments: Highway and railroad corridors can be used to move hazardous materials. These corridors should be evaluated to determine the level of risk they pose for spills in the DWSMA, considering their proximity to the wells, the local topography, and geologic conditions.

- ☐ *An existing map of storm sewers, sanitary sewers, and public water supply systems.

Technical Assistance Comments: Storm sewer systems and sanitary systems can be sources of contamination. Storm sewers are generally considered a public utility element designed to convey storm water runoff and use constructed features such as pipes and ponds. Evaluate the integrity and condition (age, type of material, any investigative work, etc.) of these systems in the DWSMA, noting the location of the water supply system and public water supply wells in relation to these potential contaminant sources. It is not necessary to include a map of your public water supply system in the Part 2 if you believe it would pose a threat to the security of your system.

☐ *An existing map of the gas and oil pipelines used by gas and oil suppliers.

Technical Assistance Comments: Petroleum pipelines can be sources of contamination (excluding liquefied natural gas pipelines). If possible, describe what is generally known about the condition of these pipelines in the DWSMA, and the readiness of the PWS to respond to an emergency. It is not necessary to include a map in the Part 2 if you believe it would pose a security threat.

Required to be discussed in plan-

The following information (if existing) MUST be reviewed and discussed in the development of the Part 2. The Part 2 narrative must contain a description identifying whether/how the information may influence the management of the DWSMA. The data element may be located in the public domain. While the map or document reviewed is not required to be included in the Part 2, the source of the data element must be provided in the plan narrative by indicating a web address or reference to its location. Provide a statement in the plan narrative if the data element does not apply or does not exist.

DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT –

Water Resources

- An existing map of the boundaries and flow directions of major watershed units and minor watershed units.

Technical Assistance Comments: Identify/list the major and minor watershed(s) in the Part 2 in order to become aware of local water planning efforts such as One Watershed One Plan (1W1P), Watershed Restoration and Protection Strategies (WRAPS), and/or Groundwater Restoration and Protection Strategies (GRAPS).

- An existing map showing those areas delineated as floodplain by existing local ordinances.

Technical Assistance Comments: Assess and describe any issues and management needed in the DWSMA based on the Federal Emergency Management Agency (FEMA) Floodplain 100-year FIRM (Flood Insurance Rate Map) and (or) other State and local floodplain or flooding information. Consult with the WHP Managers to evaluate any potential or historical flooding impacts on the public water supply wells or aquifer. The Inner Well Management Zone report and Sanitary Survey may be used to identify flooding issues and impacts.

DATA ELEMENTS ABOUT THE LAND USE –

Land Use

- An existing map of parcel boundaries.

Technical Assistance Comments: Parcel boundaries may have been used for delineation of the DWSMA in Part 1. In Part 2, parcel identification information must be included or linked and must be used for education or targeting activities or practices in addressing potential contaminants. In the narrative indicate if parcel data is available from the public domain (i.e., county GIS or associated website such as Beacon).

Part 1 -

The following information was reviewed and assessed in developing the Part 1. Some data elements may be in the public domain or non-existent, and others may have been determined by the MDH hydrogeologist to not be applicable to the physical setting, so discussion was not included in the Part 1. The Part 1 should be used as a data source for the Part 2. The technical assistance comments provide the requirements for how this information must be discussed and/or included in the Part 2. Include relevant excerpts or summaries from the Part 1 where indicated.

DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT –

- 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.
- Existing records of the geologic materials penetrated by wells, borings, exploration test holes, or excavations, including those submitted to the department.
- Existing borehole geophysical records from wells, borings, and exploration test holes.
- Existing surface geophysical studies.

Technical Assistance Comments: Provide a summary in the plan narrative (few sentences/paragraph) of the Description of the Hydrologic Setting from Part 1. Provide the conclusions regarding the Well and DWSMA Vulnerabilities related to the geologic conditions and how these conditions influence the management of the DWSMA.

DATA ELEMENTS ABOUT THE LAND USE –

Public Utility Services

- An existing record of construction, maintenance, and use of the public water supply well and other wells within the DWSMA.

Technical Assistance Comments: Well construction records indicate what is known about the well(s) and can indicate if the well(s) have structural integrity or groundwater protection issues. Briefly summarize in the plan narrative what is discussed about each well from the Assessment of Well Vulnerability in Part 1.

DATA ELEMENTS ABOUT WATER QUANTITY –

Groundwater Quantity

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

Technical Assistance Comments: This information, if known, was incorporated into the Part 1, and was used to assist in determining hydrologic boundary conditions and area static water levels. In Part 2, information about Department of Natural Resources appropriation permit holders and any known well interference problems or water use conflicts must be discussed, including how this information could affect the management of the DWSMA.

DATA ELEMENTS ABOUT WATER QUALITY –

Groundwater Quality

- An existing summary of water quality data, including: 1. bacteriological contamination indicators; 2. inorganic chemicals; and 3. organic chemicals.
- An existing list of water chemistry and isotopic data from wells, springs, or other groundwater sampling points.
- An existing report of groundwater tracer studies.

Technical Assistance Comments: This information, if known, was incorporated into the Part 1. Provide a summary of the assessment of well vulnerability and/or any relevant chemistry and isotopic composition data available from PWS wells and other wells/sources.

- An existing site study and well water analysis of known areas of groundwater contamination.
- An existing property audit identifying contamination.
- An existing report to the Minnesota Department of Agriculture and the Minnesota Pollution Control Agency of contaminant spills and releases.

Technical Assistance Comments: This information, if known, was incorporated into the Part 1. Discuss whether there are groundwater contamination areas that could pose a risk to the public water supply well(s) now or in the future. Include any relevant data and how this information may affect the management of the DWSMA.

Revised: 01/2022

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DEPARTMENT OF HEALTH

Avon Scoping 2 Meeting
Wellhead Protection (WHP) Plan Amendment
Summary of Planning Issues

This planning issues summary is intended to guide plan writers and WHP teams when developing their amendment. It highlights key issues identified to date that you should consider and discuss. It should not be considered a list of complete requirements for the amendment.

Summarize the management implications from minor changes in DWSMA or vulnerability:

- Overall, the new DWSMA is about 1.6 times larger than the previous delineation and expands more to the south and east (Figure 1). This is primarily due to changes in the model used for the current effort.

Community changes and implications for management:

- Avon has experienced population growth, with 1,215 people in 2000, 1,397 in 2010, and a population of 1,640 in 2020. Assuming the growth rate of approximately 17.3% from 2010 to 2020 remains the same, the population over the next 10 years will grow to 1,925.

Key management activities to carry forward:

Note to plan writer: Update current language so management strategies are SMART (Specific, Measurable, Achievable, Relevant/Realistic, Timing). Consider using the MDH Management Strategy Catalog.

- An evaluation of the activities proposed in the WHP Plan of Action from the 2014 WHP Plan (Chapter 9) suggests that seven of the activities proposed were not completed as of the time the evaluation was conducted (March 27, 2023). These activities include Measures 3,4,5,8,10,11,13,17,19,23,24,25,26,27,28,30,31,32,33,34 & 37. MDH recommends that Avon review each Measure to confirm that the activity was not completed or is indeed not applicable, and to determine whether each Measure should be a part of the next WHP Plan of Action.
- The March 2023 evaluation of the activities proposed in the 2014 WHP Plan indicates that Measures 1,2,6,7,9,12,14,15,16,18,20,21,22,29,35 & 36 were all completed. The nature of some of these actions is such that once they are complete, they may be eliminated, while the amended WHP Plan may be better with the continuation of several of the measures. MDH recommends that Avon analyze the management strategies that were written/included previously to determine which should be carried over to the new WHP Plan and if the language should be refined to fall in line more closely with Avon's experience with implementing the measure and their success/failure with it.

New management strategies to consider:

- Well Locating: This delineation is based on very little well data. If wells are constructed within two miles of the city or one mile of the DWSMA, their locations should be verified. This information may allow a better understanding of the extent and thickness of the city's aquifer, and could result in a more refined WHPA in the future.
- Water Quality Monitoring: The standard assessment monitoring package of the primary wells should be analyzed during year six, contingent on funding assistance from MDH for sampling and analysis. The city may need to collect the samples and ship them to MDH. Information generated by this sampling will be used to refine vulnerability assessments for the next amendment.
- Well Casing Investigation: A video inspection of the city wells might reveal whether any casing flaws might be contributing to the low-level tritium detections seen at these wells. This would likely occur during routine well servicing and could be eligible for a Source Water Protection Implementation Grant if this measure is included in the city's wellhead protection plan. If such an investigation is to occur, MDH should be contacted in advance in the event additional down hole investigations can be conducted while the well is open.
- If possible, collect pre-treatment arsenic samples from Well #4 and Well #5, followed by post-treatment samples.

Old municipal wells that need to be sealed:

- The Old Municipal Well report for Avon suggests there are no remaining old municipal wells that must be sealed.

Important partnerships to maintain or establish:

- Stearns County/Stearns SWCD/Stearns Highway Department.
- Sauk River Watershed District.
- Avon Fire Department.
- Pertinent Townships.
- MDH, DNR, MNDOT, MPCA, MRWA.

Water quantity issues and implications:

- Existing data do not suggest water quantity issues.

Water quality issues and implications:

- Existing data do not suggest water quantity issues.

Sanborn Maps:

☐ Sanborn Maps are available for this area.

☒ Sanborn Maps are not available for this area.

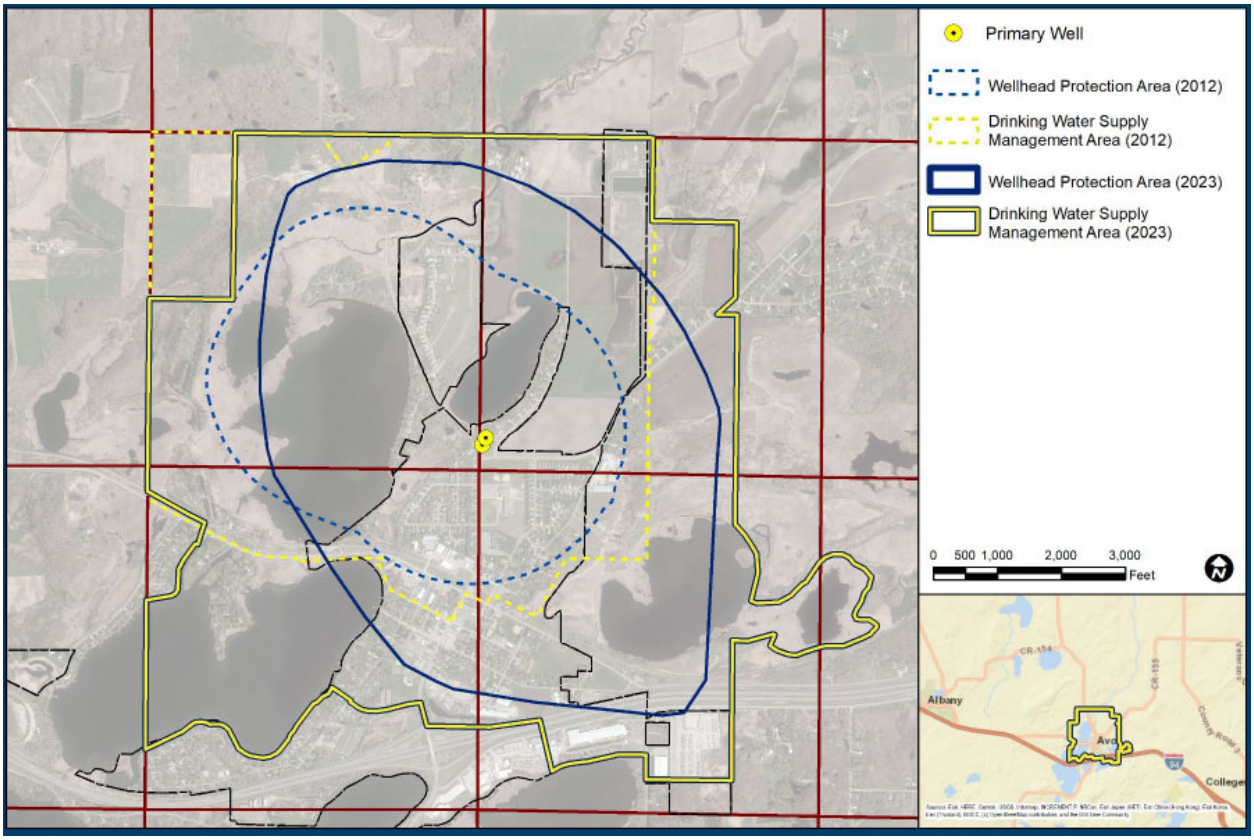

Figure 1: Amended and Prior Areas

Appendix B

Part I Wellhead Protection Plan

Drinking Water Source and Wells for the City of Avon

DELINEATIONS – WELLHEAD PROTECTION AREA AND DRINKING WATER SUPPLY MANAGEMENT AREA

VULNERABILITY ASSESSMENTS – WELLS AND DRINKING WATER SUPPLY MANAGEMENT AREA

August 2, 2023

Hydrogeologic Assessment of the Drinking Water Source and Wells for the City of Avon

Public Water Supply ID: 1730002

City of Avon
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Avon, Minnesota 56310
320-356-7922

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Contents

List of Tables

List of Figures

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

Signature: Luke Pickman Signature Digitally signed by Luke Pickman Signature Date: 2023.08.02 15:55:36 -05'00' Date: _____

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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 landmarks 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

MODFLOW - Three-Dimensional Finite-Difference Groundwater Model

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

Summary

Protection Areas - The recharge area for the wells is known as the wellhead protection area, or WHPA, and represents the area that contributes water to the city's wells within a 10-year time period. The area that contributes water within a one-year time period is known as the emergency response area, or ERA. Practical reasons require the designation of a management area that fully envelops the wellhead protection area, called the drinking water supply management area, or DWSMA. Each of these areas is shown in Figure 1.

Geology and Groundwater Flow – The city of Avon has two primary wells screened in a sand aquifer that is buried beneath a layer of clay-rich sediment. Such aquifers are known generically as Quaternary Buried Artesian Aquifers (QBAA). Regionally, groundwater flows towards Avon from the northwest and the south, draining to the northeast.

Table 1 – Supply Well Information

Local Well ID	Unique Number	Use/ Status	Casing Diameter (inches)	Casing Depth (feet)	Well Depth (feet)	Date Constructed/ Reconstructed	Aquifer	Well Vulnerability
Well #3	242069	Emergency	12	50	70	1979	QWTA[1]	Vulnerable
Well #4	696861	Primary	12	231	251	9/26/2003	QBAA	Vulnerable
Well #5	696862	Primary	12	220	240	8/11/2003	QBAA	Not Vulnerable

Note[1]: QWTA = Quaternary Water Table Aquifer

Well Vulnerability - The vulnerability of each well has been assessed based on 1) well construction details, especially conformance with standards required by the state well code, 2) the geologic sensitivity of the aquifer, and 3) past monitoring results. Both Wells #4 and #5 (696861 and 696862) meet current construction standards. Well #4 is considered vulnerable to contamination due to tritium being detected in the well water (Table 2). Detectable tritium indicates the presence of young (post-1953) water. This is reinforced by the chloride concentration and chloride/bromide ratios presented below (Mullaney et al., 2009). Higher concentrations or concentration ratios indicate recent recharge from the surface. Well #5 also shows evidence for human impact based on chloride and bromide, but apparently the proportion of young water at this well is lower due to the absence of detectable tritium.

Table 2 - Isotope and Water Quality Results (February 10, 2022)

Well Name (Unique Number)	Tritium	Nitrate (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Chloride/ Bromide Ratio	Arsenic (µg/L)
Well #4 (696861)	1.1	< 0.05	17.8	0.0316	563	5.72
Well #5 (696862)	< 0.8	< 0.05	11.8	0.022	536	7.68

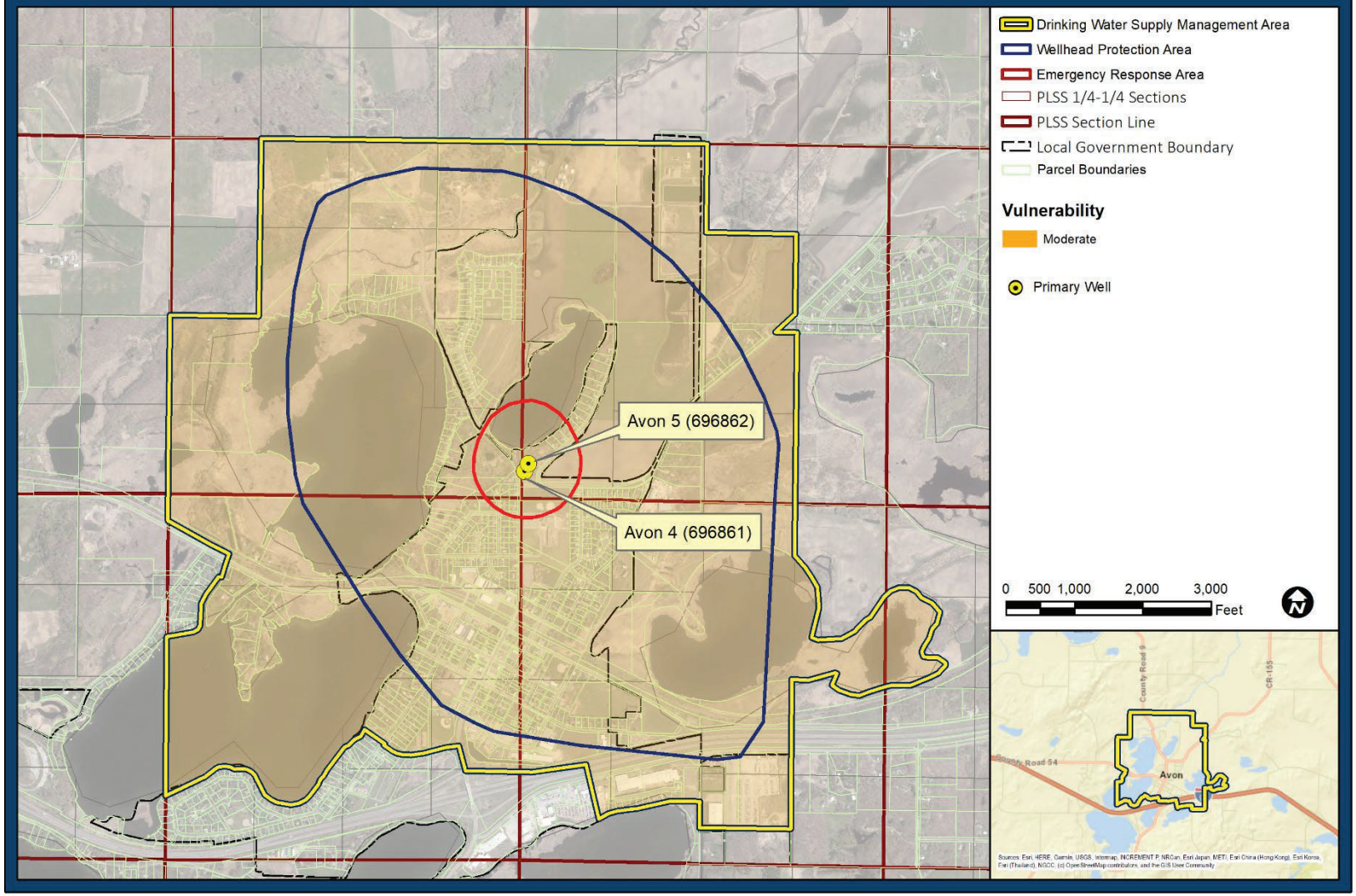
DWSMA Vulnerability - The vulnerability of the city's aquifer throughout the DWSMA is based on the geologic sensitivity ratings of wells and their monitoring data (Table 2). Based on this information MDH has assigned a moderate vulnerability to the DWSMA. This suggests that water and contaminants may travel from the land surface to the city's aquifer within a time span of years to decades. This rating reflects uncertainty about the pathway for young water reaching Well #4 (686861) and water elevated in chloride and chloride/bromide reaching both wells. Although this may be the result of a well casing problem, for the time being it is assumed that the clay-rich sediments that overlie the city's aquifer is leaky. Moderately vulnerable aquifers are prone to a variety of contaminant threats, including chemical storage tanks and abandoned wells which can provide conduits for contaminants to quickly reach the city's aquifer.

Water Quality Concerns - At present, none of the contaminants for which the Safe Drinking Water Act has established health-based standards is found above maximum allowable levels in the city's water supply. However, elevated levels of naturally occurring arsenic have been detected at both wells.

Recommendations - Recommendations have been generated to improve future delineations and vulnerability assessments and should be considered for inclusion as management strategies in the city's wellhead protection plan. These activities include: well locating, downhole well inspection, and water quality monitoring. Further details can be found in the Recommendations section of this report.

Stearns County
Minnesota

Figure 1
Drinking Water Supply Management Area and Vulnerability
City of Avon



Technical Report

Discussion

This document describes the amendments to Part 1 of the wellhead protection (WHP) plan for the city of Avon (PWSID 1730002). The purpose for amending the plan is to address the changes that have occurred since the plan was last approved, in order to update the WHP measures that are needed to protect public drinking water. In addition, the locations of the city's wells were adjusted for greater accuracy. The amended areas are slightly larger due to updated projected pumping and changes in modeling approach. 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 public water supply 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 one-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 used are provided in the "Glossary of Terms."

In addition, this report documents the technical information required to prepare this portion of the WHP plan in accordance with the Minnesota Wellhead Protection Rule. Additional technical information is available from MDH.

Table 1 lists all the wells in the public water supply system. Only wells listed as primary are required to be included in the WHP plan.

Assessment of the Data Elements

MDH staff met with representatives of the city of Avon on April 18, 2023, for a scoping meeting that identified the data elements required to prepare Part I of the WHP plan. Appendix A presents the assessment of these data elements relative to the present and future implications of planning items specified in Minnesota Rules, part 4720.5210.

General Descriptions

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.

Description of the Hydrogeologic Setting

The city of Avon is located west of St. Cloud along Highway 94 in Stearns County. The surrounding area is covered by sandy loam textured, unsorted sediment ranging from silty sand to cobbly gravel lenses associated with the Superior or Rainy Lobes (Meyer et al. 1995). The city of Avon wells draws groundwater from a Quaternary Buried Artesian Aquifer (QBAA) composed of sand found approximately 220 feet below land surface. The buried aquifer is separated from the land surface by clay-rich sediments that act as natural geologic protection against surficial contaminants. The aquifer thickness is estimated to be approximately 27 - 30 feet at the well sites but is spatially variable beneath the city of Avon and surrounding area.

A description of the hydrogeologic setting for the aquifer used to supply drinking water is presented in Table 3.

Table 3 - Description of the Local Hydrogeologic Setting

Attribute	Descriptor	Data Source
Aquifer Material	Sand	CWI database
Porosity Type and Value	0.20	Fetter, 2001
Aquifer Thickness	Estimated 27 - 30 feet	Well #4 (696861) Well #5 (696862)
Stratigraphic Top Elevation	Estimated 919 feet AMSL	Well #4 (696861)
Stratigraphic Bottom Elevation	Estimated 889 feet AMSL	Well #4 (696861)
Hydraulic Confinement	Confined	Well #4 (696861)
Transmissivity	Range of Values: 1,323 – 14,013 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.

Attribute	Descriptor	Data Source
Hydraulic Conductivity	Range of Values: 49 - 519 ft/day	The range of values was derived using specific capacity data obtained from well records and/or from additional aquifer test results listed in the "Selected References" section of this report.
Groundwater Flow Field	Groundwater flows to the southeast (117°) and to the north (354°) converging upon Avon with a gradient of 0.006 (Figure 2).	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.

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

Delineation of the Wellhead Protection Area

Delineation Criteria

The boundaries of the WHPA for the city of Avon are shown in Figure 1. Table 4 describes how the delineation criteria 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 flow boundaries close enough to the public water supply wells that may have an impact on their capture areas, although changes in aquifer thickness were incorporated in the flow model.

Criterion	Descriptor	How the Criterion was Addressed
Flow Boundary	Other High Capacity Wells	No known high-capacity wells exist within two miles of the city of Avon's wells.
Daily Volume of Water Pumped	See Table 5	Pumping information was obtained from the DNR, Appropriations Permit Number 1962-0203, and was converted to a daily volume pumped by a well.
Groundwater Flow Field	See Table 3	The groundwater flow field was determined from local well data.
Aquifer Transmissivity	Reference Value: 3,618 ft^2/day	The aquifer test plan was approved on May 19, 2023, and T was determined from specific capacity data. Uncertainty regarding aquifer transmissivity was addressed as described in the "Addressing Model Uncertainty" section.
Time of Travel	10 years	The public water supplier selected a 10-year time of travel.

Pumping data was obtained from the DNR Permit and Reporting System (MPARS) for the public water supply's Appropriation Permit Number 1962-0203. These values, confirmed by the public water supplier, were used to identify the maximum volume of water pumped annually by each well over the previous five-year period, as shown in Table 5. An estimate of the pumping for the next five years is also shown. The increase in usage is based on the expected new housing developments on the west side of town to begin construction in the coming years. 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)	2018	2019	2020	2021	2022	5-Year Projection	Daily Volume (cubic meters)
Well #3 (242069)	0.011	0.015	0.022	0.030	0.011	-	Emergency
Well #4 (696861)	22.897	23.043	23.093	25.321	24.566	**32.500**	337
Well #5 (696862)	22.413	16.786	22.948	30.169	26.058	**32.500**	337
System Total	45.321	39.844	46.063	55.520	50.635	**65.000**	674

(Expressed in millions of gallons. Bolding indicates greatest annual pumping volume.)

Method Used to Delineate the Wellhead Protection Area

The WHPA for the city of Avon's wells was determined using the software code MODFLOW (McDonald and Harbaugh, 1988; Harbaugh et al., 2000; Harbaugh, 2005). The resulting WHPA boundaries are a composite of the capture zones calculated from several different model scenarios using a stochastic method (Figure 1).

MODFLOW was developed by the United States Geological Survey and is publicly available. The specific software code used for this delineation was MODFLOW-2005 (Harbaugh, 2005). The program has been thoroughly documented, is widely used by consultants, government agencies, and researchers and consistently accepted in regulatory proceedings. MODFLOW is also an extremely versatile program capable of simulating groundwater flow in up to three dimensions while offering a variety of boundary condition options, confined or unconfined aquifer conditions and allowing for vertical discretization through the use of layering.

The numerical groundwater model that was constructed consisted of 180 rows, 205 columns, and three layers. The model incorporates a variable areal grid spacing ranging from 2 meters near the city's wells and grading to 160 meters at the boundaries of the model domain. Layer tops and bottoms were derived from CWI logs within the model domain. River head boundaries represent cells where water is flowing both into and out of the aquifer and were used to simulate the many lakes and rivers within the model domain within Layer 1. Vertical recharge was applied to Layer 1 of the model using modified values published by the U.S Geological Survey (Westenbrook et al., 2018).

Due to the heterogeneity of the unconsolidated sand and the lack of contiguous lenses for discretization of hydraulic conductivity zones, site specific data within the model domain was interpolated using the Parameter Estimation (PEST) tool. PEST is a calibration tool developed by John Doherty of Watermark Computing and is most commonly used to estimate aquifer hydraulic conductivity (Doherty, 2010). Typical zonation of hydraulic conductivity introduces zones of different hydraulic conductivity in the model domain at locations where the modeler feels they would be most effective. The parameter zonation process would then be repeated until the fit between model outcomes and field observations was acceptable. Characterization of geologic heterogeneity in the model domain by zones of piecewise uniformity is not in harmony with the nature of the alluvial material, therefore any zonation pattern that is finally decided upon is only defensible on the basis that it is better to employ such a zonation scheme than to ignore geologic heterogeneity altogether. To overcome this problem the distribution of hydraulic conductivity within the model domain was described by a set of pilot points. The pilot point locations and values in the model domain were derived from specific capacity data at domestic wells and aquifer test data for the city's wells. These values were then smoothed with the geostatistical method of kriging and input into the model. The pilot point method allowed for hydraulic conductivity values to be representative of the city's well data proximal to the well field and then be smoothed further away.

To determine the WHPA, the groundwater flow model was used along with a particle tracking program called MODPATH (Pollock, 2012). MODPATH is used to evaluate advective transport of simulated particles moving through the simulated flow system. A series of 72 particles were launched at each well. A porosity of 20 percent was used and a reverse time of travel was calculated at 10 years.

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 water elevation and/or flux. The sensitivity analysis quantifies the differences in model results produced by the natural variability of a particular parameter. Uncertainty analysis addresses the effects of poor data quality (lack of local detailed information or deficiencies in the data) on the model results. Together, sensitivity and uncertainty analyses are commonly used to evaluate the effects that natural variability and uncertainties in the hydrogeologic data have on the size and shape of the capture zones. In regard to the WHPA delineation, these analyses are used to document that the delineation is optimal, conservative, and protective of public health based on existing information.

Model Calibration

A qualitative evaluation of the calibration can be made by comparing the simulated potentiometric surface (Figure 2) with observed water level targets obtained from the CWI database. Upon review the calibrated flow model generally captures the major features of the groundwater flow system along with the elevation, shape, magnitude, and gradient of the CWI database observed flow field.

A quantitative measure by which to evaluate the success obtained during calibration is to compare the root mean square of the residuals (RMSE) and the maximum observed head difference of the calibration dataset. The calibration dataset included water level information from 291 wells in an approximate eight-mile radius of the city's wells. The residual root mean square (RMS) error of the calibration well set was approximately 2.6 meters with a normalized RMSE of 6.24 percent. It is noted that this error is smaller than the calibration target of 10 percent (Groundwater Calibration Policy, 2018). The calibration targets (wells) with the greatest residual difference between measured and simulated heads were generally at locations beyond the contribution area to the city's wells.

Sensitivity Analysis

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

- The **pumping rate** 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 and an expanded capture zone, proportional to the porosity of the aquifer materials.

  How Addressed and Results – The pumping rate is based on the results presented in Table 5 and, therefore, is not considered a variable factor that will influence the delineation of the WHPA. The modeled pumping rate is based on the projected pumping rate, as shown in Table 5.

- The **direction of groundwater flow** determines the orientation of the capture zone. 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 contributing water to the well.

  How Addressed and Results – General flow direction was determined based upon static water levels of similarly screened wells in the area of the model. Overall, the sensitivity of the WHPA to the direction of groundwater flow should not be significant, given the current knowledge of the hydraulic head distribution in the aquifer.

- The **hydraulic gradient** (along with aquifer hydraulic conductivity) determines the rate at which water moves through the aquifer materials.

  How Addressed and Results – The flow field shown 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 each well. The regional model has been calibrated to hydraulic heads. The sensitivity of the WHPA to the hydraulic gradient should not be significant given the current knowledge of the hydraulic head distribution in the aquifer.

- The **hydraulic conductivity** influences the size and shape of the capture zone. A decrease in hydraulic conductivity 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 on the well.

How Addressed and Results – Initial hydraulic conductivity was calculated from specific capacity and aquifer tests conducted throughout the region. In the model these were set to vary by +/- 50% and geostatistically smoothed across the model domain.

- The **aquifer porosity** influences the size and shape of the capture zone.

  How Addressed and Results – Decreasing the porosity causes a linear, proportional increase in the areal extent of the capture zone. The porosity for the alluvial aquifer was chosen to be 0.20, which is consistent with commonly reported values for the aquifer material (Fetter, 2001). The porosity is not considered a variable for this study.

- The **aquifer thickness** influences the size and shape of the capture zone.

  How Addressed and Results – Final aquifer thicknesses used in this model were the result of a multi-step statistical analysis. A cross-sectional analysis was done to determine the thicknesses of the aquifer at well points throughout the modeled extent. Layer thicknesses were interpolated between wells and unrealistic values were identified and disposed of at all steps by comparing with adjacent well data, where available, and by using hydrogeologic judgment. As a result, the model layering closely follows the overall stratigraphy through the region. In the area surrounding the city's wells the aquifer thickness was defined using area well logs and should reasonably represent the actual aquifer conditions. Therefore, aquifer thickness is not considered a variable for this study.

- The **recharge** influences the size and shape of the capture zone.

  How Addressed and Results – The recharge applied to the surficial clay and sand in the model domain and ranged from 0 to 7 inches and was based on the values reported by the USGS (Westenbrook et al., 2018) within the central model domain. Higher values of recharge tend to produce longer and narrower capture areas while lower values lead to shorter and wider capture areas.

Addressing Model Uncertainty

Using computer models to simulate groundwater flow involves representing a complicated natural system in a simplified manner. Local geologic conditions may vary within the capture areas of the public water supply wells, but the amount of existing information 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 steps employed for this delineation to address model uncertainty were:

1. Pumping Rate – For each well the five-year projection of pumping was used was used to represent the expected usage moving forward (Minnesota Rules, part 4720.5510, subpart 4).
2. Probability Analysis – The Monte Carlo approach was used to estimate capture zone probability as well as variability in hydraulic conductivity.

The input files for all realizations and related information are available at MDH upon request.

Table 6 – Model Parameters used in MODFLOW Base Case and Realizations

Well Name (Unique)	File Name	Discharge (m^3/day)	Hydraulic Conductivity (m/d)	Porosity (%)	Aquifer Thickness (meters)	Remarks
Well #4 (696861)	Base model	337	47.6	20	9.14	Base Case
Well #5 (696862)	Base model	337	49.9	20	9.14	Base Case

Note: 248 Final realizations

Conjunctive Delineation

The vulnerability of the ERA is not high; therefore, according to current MDH guidance, the need for a conjunctive delineation does not need to be assessed.

Delineation of the Drinking Water Supply Management Area

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

- Centerlines of highways, streets, or roads
- Parcel Boundaries
- Public Land Survey coordinates

Summary of Comparisons Between the Previous (2012) and Current WHPA and DWSMA Delineations

Overall, the new DWSMA (1,896 acres) is about 1.57 times larger than the previous delineation (1,208 acres) and expands more to the south and east (Figure 8). This is primarily due to the

resolution of the modeling efforts. With the previous delineation effort, a single layer analytic element groundwater model was used to determine the base case. A second approach used the stochastic analytical groundwater flow method Oneka to evaluate the uncertainty of the 10-year capture area. This addressed uncertainty in hydraulic conductivity by frequency distribution around a known mean K value.

In the current three-layer MODFLOW, a more localized domain was used. Head boundaries consisted of a larger number of lakes, rivers, and streams transcribed explicitly as model cells providing an increased amount of nearby potentiometric data. In addition, the dimensionality of the three model layers were determined by interpolation of stratigraphic information across the entire model domain. This provided an overall higher resolution porous media model to better simulate the complex hydrogeology of the Avon area. The use of PEST++IES (White et al, 2020) to optimize hydraulic conductivity combined with a Monte Carlo approach to address uncertainty resulted in a significant increase in the protection areas compared to the previous modeling approach.

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.

Assessment of Well Vulnerability

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

1. Well construction meets current State Well Code specifications (Minnesota Rules, part 4725), meaning that the wells themselves should 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, however it is not sufficient to prevent the vertical movement of contaminants.
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.
4. Water samples collected from both wells were analyzed for tritium, nitrate, chloride, and bromide (Table 2). Elevated tritium was detected in the sample from Well #4, confirming its vulnerable nature of the wells (Alexander and Alexander, 1989). In addition, the chloride and bromide results confirm that the well has been impacted by land-use activities (Table 2). Well #5 showed no detectable tritium but did show elevated chloride and chloride/bromide ratio, suggesting it is also capturing water impacted by human activities. It is presumed that it is capturing a smaller proportion of young, human-impacted water than Well #4 based on their differing tritium results.

Assessment of Drinking Water Supply Management Area Vulnerability

The vulnerability of the DWSMA is shown in Figure 7 and is based upon the following information:

1. Isotopic and water chemistry data from the Avon wells indicate that the aquifer is a mix of old and younger water with some evidence of human-caused contamination. The groundwater age as determined from tritium is mixed (DNR-MDH, 2020). Human-caused contamination is evidenced by elevated chloride and chloride/bromide.
2. Review of the geologic logs contained in the CWI database, geological maps, and reports indicate that the deep source aquifer exhibits a low geologic sensitivity throughout the DWSMA.

Therefore, given the information currently available, it is prudent to assign a moderate vulnerability rating to the DWSMA, in accordance with the Minnesota Wellhead Protection Rule (parts 4720.5100 to 4720.5590).

Recommendations

The following recommendations have been generated to inform the next amendment of the city of Avon's Wellhead Protection Plan.

1. Well Locating: This delineation is based on very little well data. If wells are constructed within two miles of the city or one mile of the DWSMA, their locations should be verified. This information may allow a better understanding of the extent and thickness of the city's aquifer, and could result in a more refined WHPA in the future.
2. Water Quality Monitoring: The standard assessment monitoring package of the primary wells should be analyzed during year six, contingent on funding assistance from MDH for sampling and analysis. The city may need to collect the samples and ship them to MDH. Information generated by this sampling will be used to refine vulnerability assessments for the next amendment.
3. Well Casing Investigation: A video inspection of the city wells might reveal whether any casing flaws might be contributing to the low-level tritium detections seen at these wells. This would likely occur during routine well servicing and could be eligible for a Source Water Protection Implementation Grant if this measure is included in the city's wellhead protection plan. If such an investigation is to occur, MDH should be contacted in advance in the event additional down hole investigations can be conducted while the well is open.

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Figures

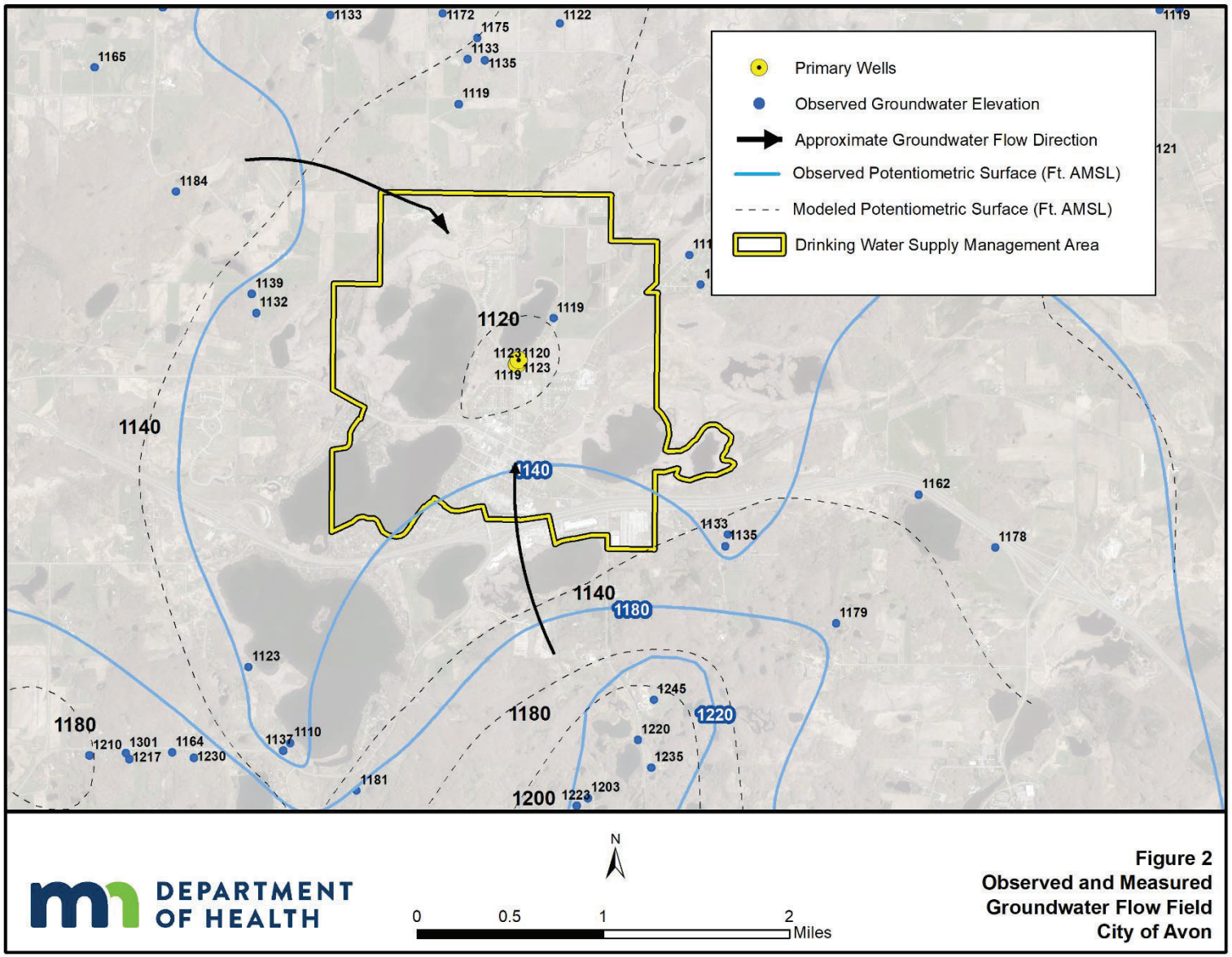
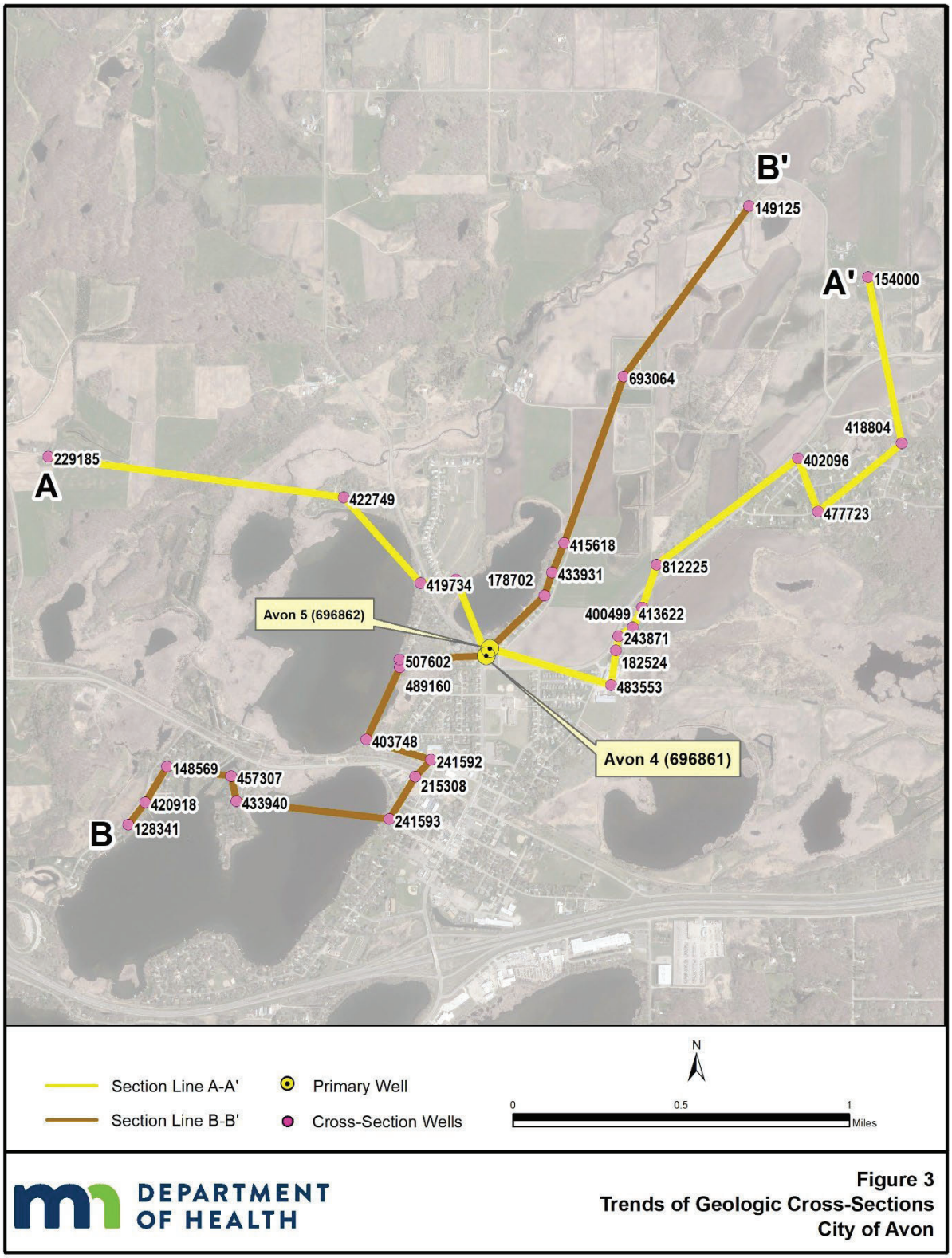
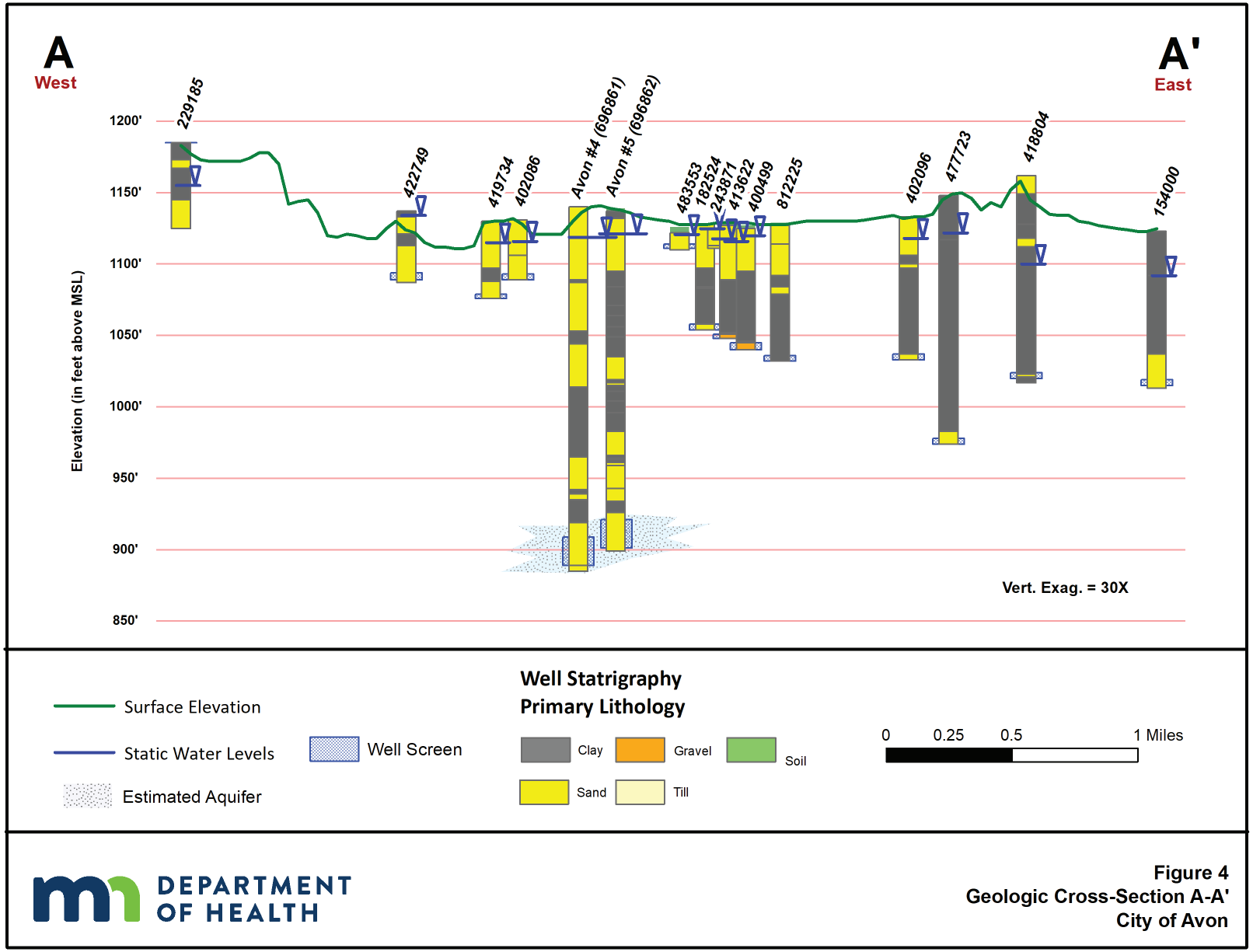


Figure 2
Observed and Measured Groundwater Flow Field
City of Avon



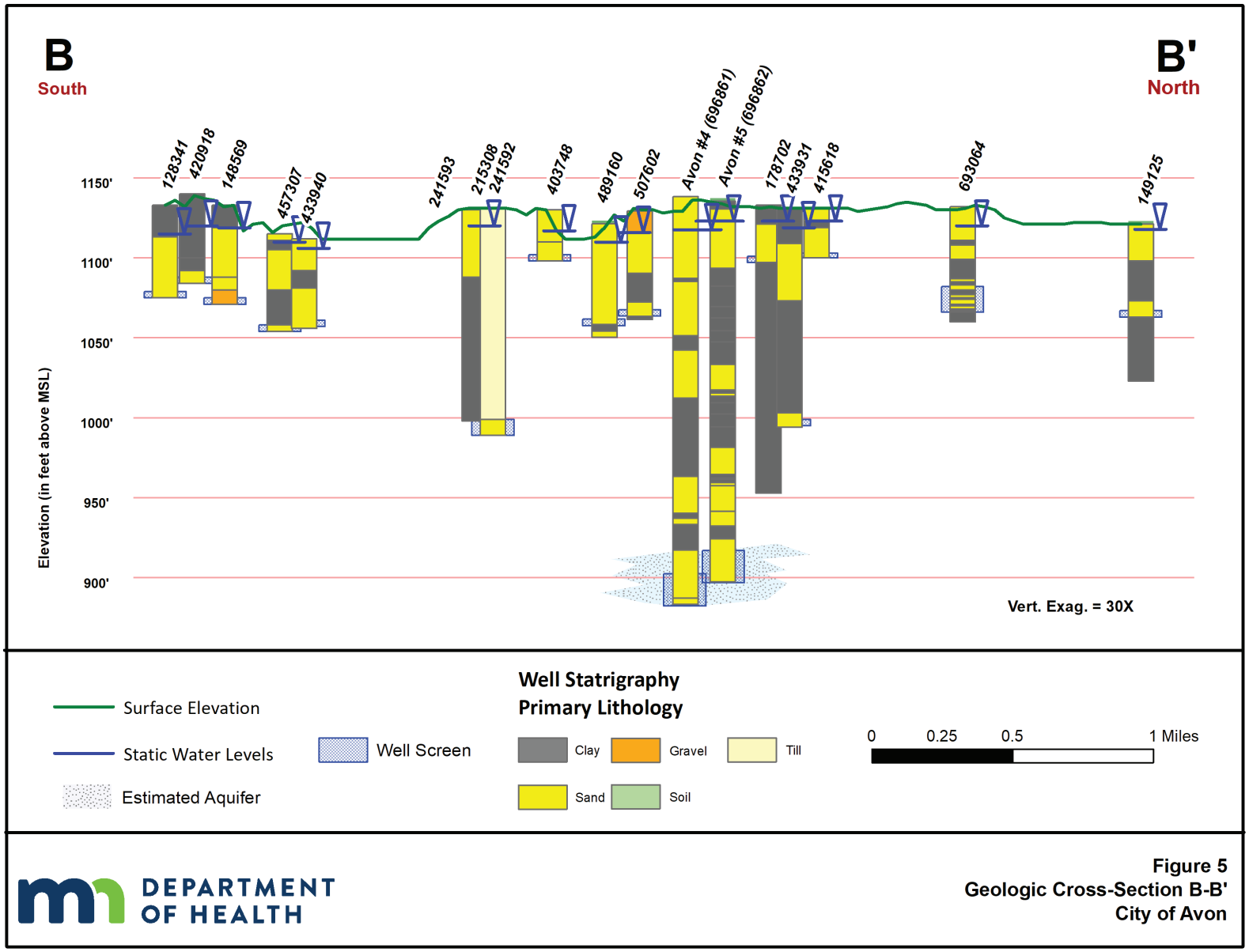
DEPARTMENT OF HEALTH

Figure 3
Trends of Geologic Cross-Sections
City of Avon



DEPARTMENT OF HEALTH

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



DEPARTMENT OF HEALTH

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

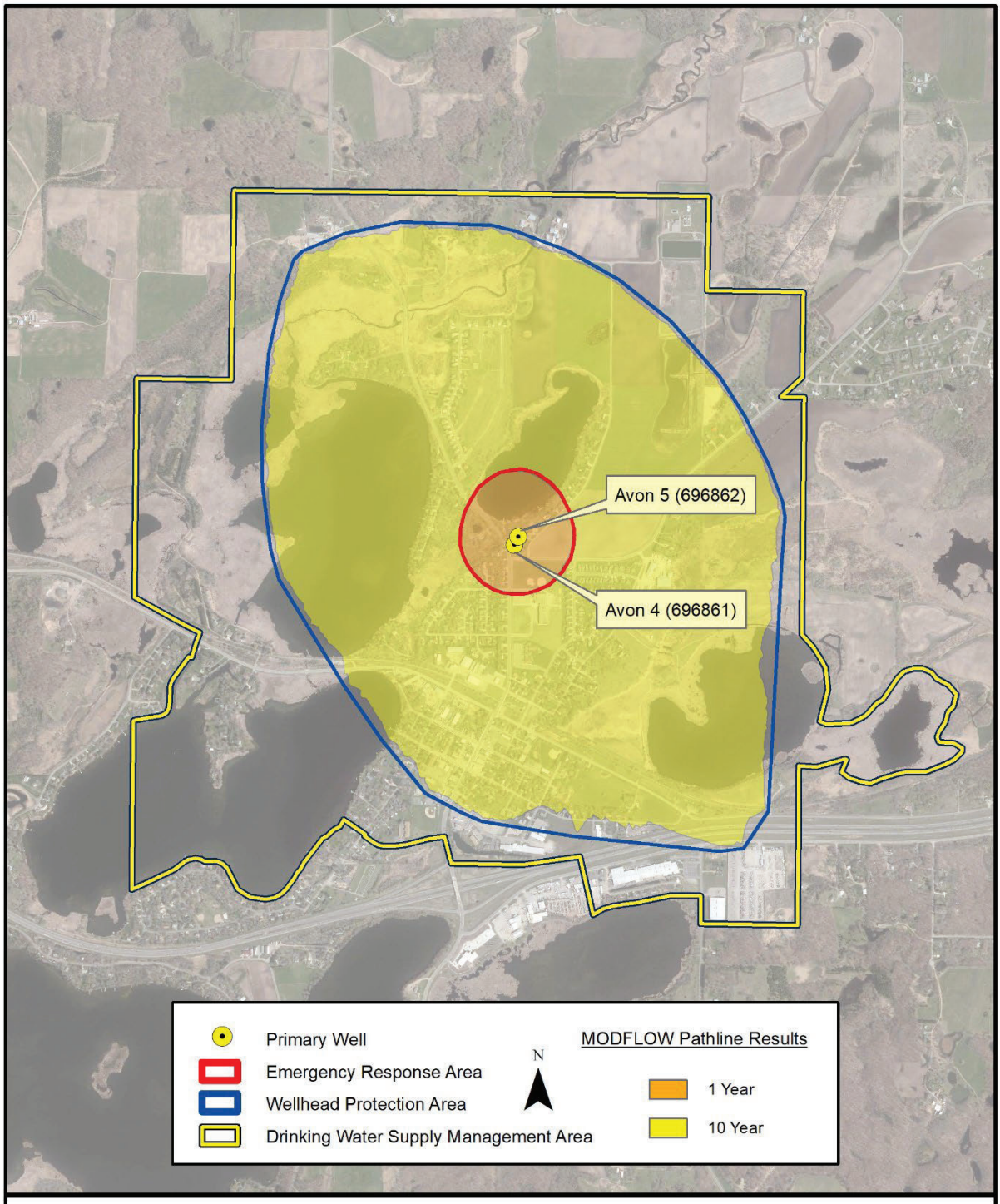


Figure 6
Groundwater Capture Zones
MODFLOW
City of Avon

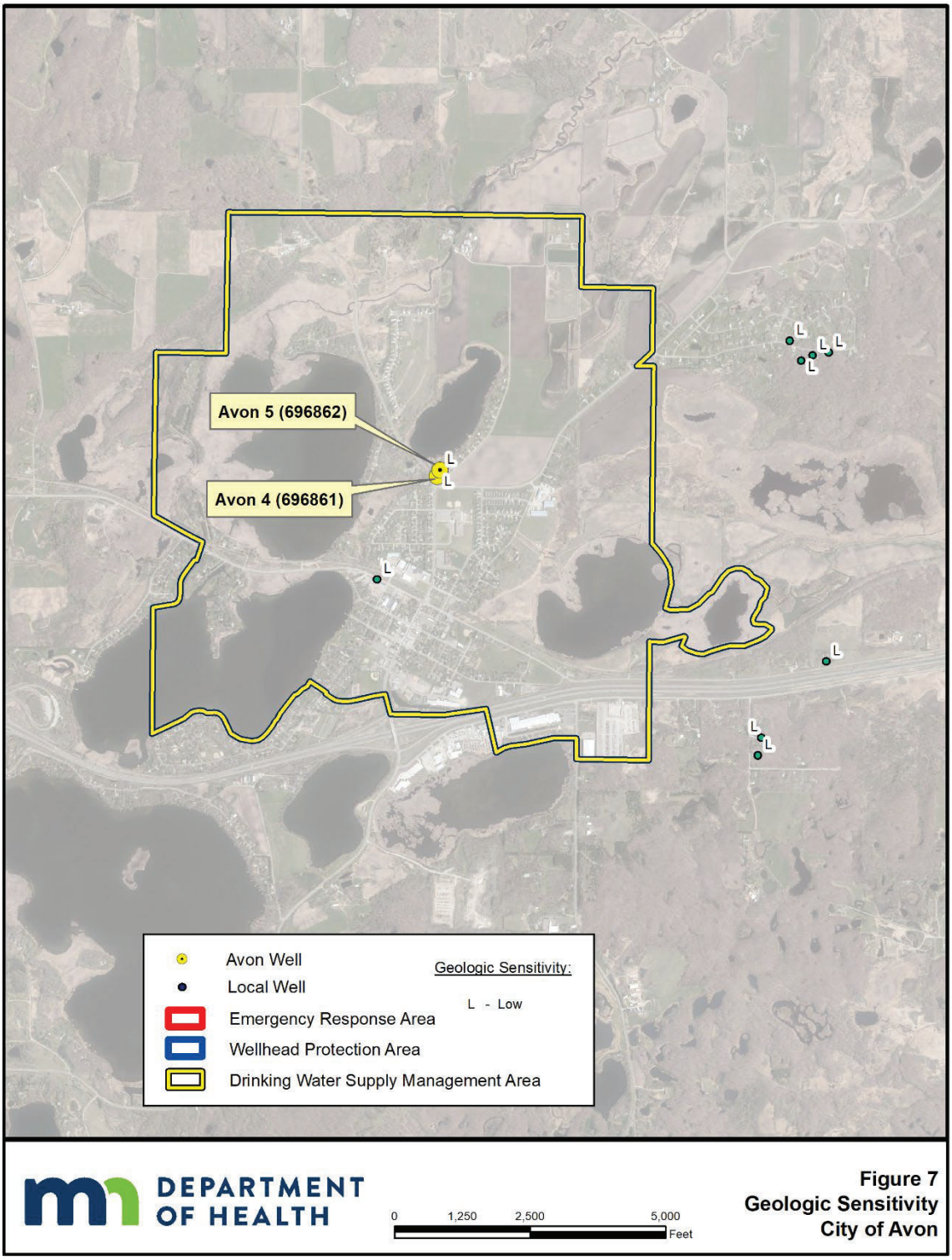
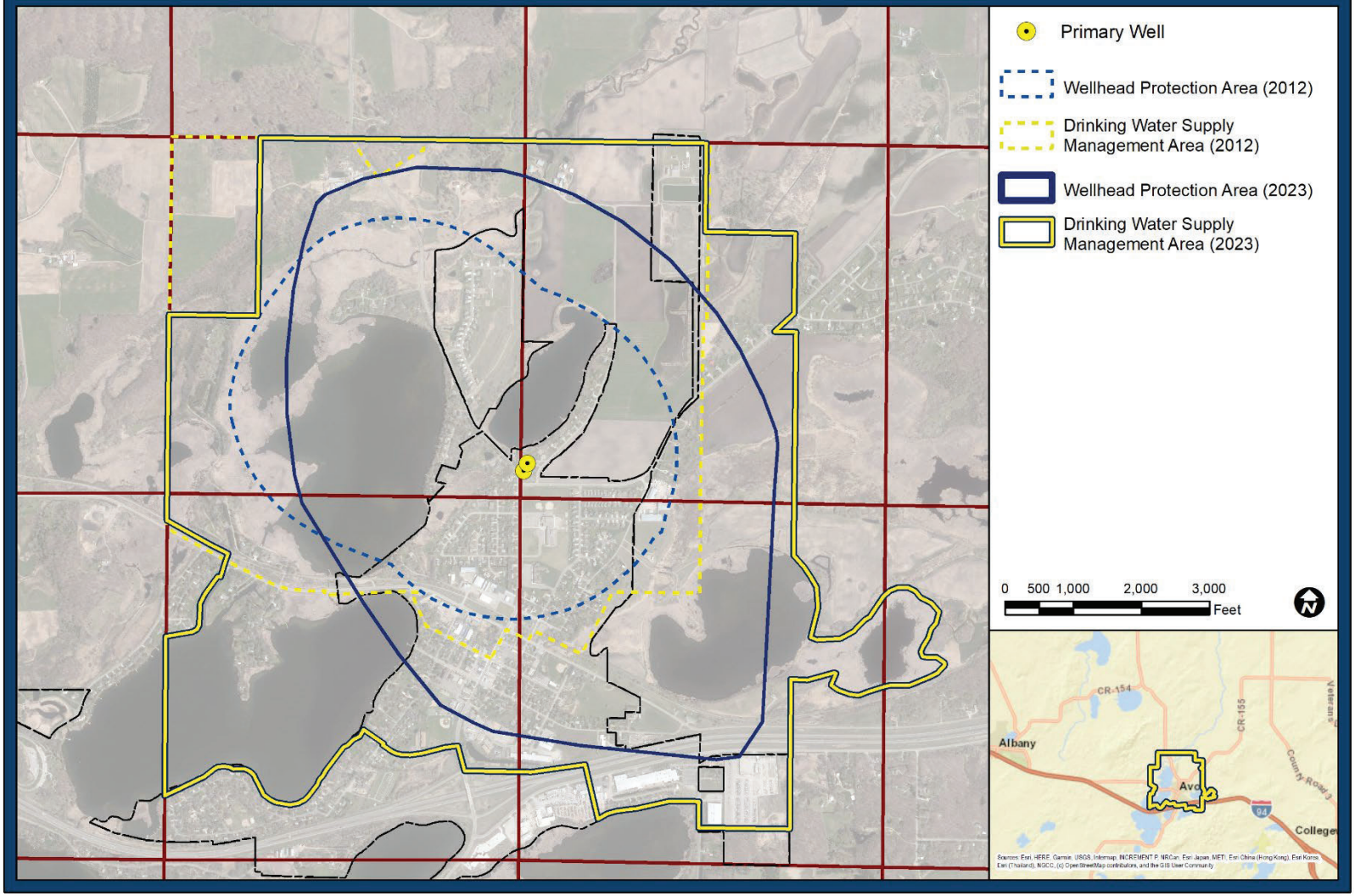


Figure 7
Geologic Sensitivity
City of Avon

Stearns County
Minnesota

Figure 8
Amended and Prior Areas
City of Avon



Appendix A: Data Elements Assessment

Data Type	Data Element	Use of the Well(s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	Data Source
Climate	Precipitation	H	H	H	H	MN Climatology Office, USGS
Geology	Maps and geologic descriptions	M	H	H	H	MGS
Geology	Subsurface data	M	H	H	H	MGS, MDH
Geology	Borehole geophysics	M	H	H	H	No relevant data found
Geology	Surface geophysics	L	L	L	L	No relevant data found
Soils	Maps and soil descriptions	L	H	M	L	NRCS
Soils	Eroding lands					
Water Resources	Watershed units	L	H	L	L	DNR, USGS
Water Resources	List of public waters	L	H	L	L	DNR, MDH
Water Resources	Shoreland classifications					
Water Resources	Wetlands map	L	H	L	L	No relevant data found
Water Resources	Floodplain map					
Land Use	Parcel boundaries map	L	H	L	L	Stearns County
Land Use	Political boundaries map	L	H	L	L	MnGEO
Land Use	Public Land Survey map	L	H	L	L	MnGEO
Land Use	Land use map and inventory					
Land Use	Comprehensive land use map					
Land Use	Zoning map					
Public Utility Services	Transportation routes and corridors	L	L	L	L	MnDOT, MnGEO
Public Utility Services	Storm/sanitary sewers and PWS system map	L	M	L	L	
Public Utility Services	Oil and gas pipelines map					
Public Utility Services	Public drainage systems map or list	L	H	L	L	No relevant data found
Public Utility Services	Records of well construction, maintenance, and use	H	H	H	H	City of Avon, CWI, MDH
Surface Water Quantity	Stream flow data	L	H	H	H	
Surface Water Quantity	Ordinary high water mark data	L	H	L	L	No relevant data found

Data Type	Data Element	Use of the Well(s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	Data Source
Surface Water Quantity	Permitted withdrawals	L	H	L	L	
Surface Water Quantity	Protected levels/flows	L	H	L	L	No relevant data found
Surface Water Quantity	Water use conflicts	L	H	L	L	No relevant data found
Groundwater Quantity	Permitted withdrawals	H	H	H	H	DNR MPARS
Groundwater Quantity	Groundwater use conflicts	H	H	H	H	No relevant data found
Groundwater Quantity	Water Levels	H	H	H	H	MDH, DNR
Surface Water Quality	Stream and lake water quality management classifications					
Surface Water Quality	Monitoring data summary	L	H	L	L	No relevant data found
Groundwater Quality	Monitoring data	H	H	H	H	MDH
Groundwater Quality	Isotopic data	H	H	H	H	MDH
Groundwater Quality	Tracer studies	H	H	H	H	No relevant data found
Groundwater Quality	Contamination site data	M	M	M	M	No relevant data found
Groundwater Quality	Property audit data from contamination sites					
Groundwater Quality	MPCA and MDA spills/release reports	M	M	M	M	No relevant data found

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 this delineation

Acronyms used in this report are listed after the Glossary of Terms.

Appendix C

Potential Contaminant Source Inventory Data

Appendix C

Potential Contaminant Source Inventory
Part II Wellhead Protection Plan
City of Avon, Minnesota
Drinking Water Supply ID 1730002

PCSI ID	PIN	Facility Name	Program ID	Address	City	Zip Code	PCSI Code	Status	Material	Total	Comment	Figure
1	42.26201.0010	CITY OF AVON	00581107	300 ANGELFISH	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 30 ft (unverified MWI file).	Figure 11
2	03.00942.0000	SMITH BROTHERS FARM	00666975	34905 COUNTY ROAD 9	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 88 ft (unverified MWI file).	Figure 11
3	42.26201.0010	AVON WASTEWATER	00693064	300 ANGELFISH	Avon	56310	WEL	A	-	1	Well Location drilled to 72 ft (MWI verified location).	Figure 11
4	03.00954.0000	KEPPERS, ELMER	Potential Well	34503 ANGELFISH	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
5	03.00945.0000	BOSL, TOM	00797221	34740 COUNTY ROAD 9	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 115 ft (unverified MWI file).	Figure 11
6	42.26201.0010	BERSCHEID, ALLAN & PATTY	00515197	300 ANGELFISH	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 103 ft (unverified MWI file).	Figure 11
7	03.00941.0010	JONAS, PETER	Potential Well	34759 COUNTY ROAD 9	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
8	03.01388.0000	Trevor Gertken	Potential Well	16872 KOPPY	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
9	03.01385.0000	GRUNLOH, PATRICK & CYNTHIA	Potential Well	16954 KOPPY	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
10	03.01385.0001	HANSEN, RICK	00422749	16938 KOPPY	Avon	56310	WEL	A	-	1	Well Location drilled to 50 ft (MWI verified location).	Figure 11
11	03.01387.0000	ACHMAN, BILL	00649382	16912 KOPPY	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 50 ft (unverified MWI file).	Figure 11
12	03.01372.0000	CHRISTIAN, THOMAS	Potential Well	16829 KOPPY	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
13	03.01376.0000	SOWADA, STANLEY & JANICE	Potential Well	16949 KOPPY	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
14	03.01374.0000	KLEINSCHMIDT, ROB & GLORIA	Potential Well	16891 KOPPY	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
15	03.01375.0000	NIERENHAUSEN, JAMES R	00568876	16923 KOPPY	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 54 ft (unverified MWI file).	Figure 11
16	03.01373.0000	Todd Whitney	Potential Well	16865 KOPPY	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
17	03.01377.0000	MONSOUR, RAYMOND	00731530	16975 KOPPY	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 43 ft (unverified MWI file).	Figure 11
18	03.00940.0000	DANZL, DOUGLAS & SHARON	Potential Well	34517 COUNTY ROAD 9	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
19	03.01379.0000	SMITH, DAVE & GAIL	00660253	17007 KOPPY	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 45 ft (unverified MWI file).	Figure 11
20	03.01379.0000	LANGES	00170094	17007 KOPPY	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 35 ft (unverified MWI file).	Figure 11
21	03.00956.0001	David Ehrlichman	Potential Well	34465 COUNTY ROAD 155	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
22	03.01251.0000	MUELLER, JONATHON	00862029	34319 COUNTY ROAD 155	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 34 ft (unverified MWI file).	Figure 11
23	03.01396.0000	CASPERS, JIM	00623014	17470 MARSCH LA , AVON, MN 56310	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 134 ft (unverified MWI file).	Figure 11
24	03.01413.0010	Mark Macarthur	Potential Well	34431 COUNTY ROAD 155	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
25	42.26491.0000	KOSTREBA, GENE	00415618	18 ANGELFISH	Avon	56310	WEL	A	-	1	Well Location drilled to 31 ft (MWI verified location).	Figure 11
26	03.01413.0015	KREMERS, GERALD	00537503	34373 COUNTY ROAD 155	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 54 ft (unverified MWI file).	Figure 11
27	42.26490.0000	BLONIGEN, DAVID	00461816	17 ANGELFISH	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 148 ft (unverified MWI file).	Figure 11
28	03.01251.0001	LUMBER ONE AVON/SPEC	00560550	34325 COUNTY ROAD 155	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 197 ft (unverified MWI file).	Figure 11
29	03.01251.0001	LUMBER ONE AVON	00561432	34325 COUNTY ROAD 155	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 192 ft (unverified MWI file).	Figure 11
30	03.01251.0001	LUMBER ONE	00812225	34325 COUNTY ROAD 155	Avon	56310	WEL	A	-	1	Well Location drilled to 97 ft (MWI verified location).	Figure 11
31	42.26488.0000	MERGEN, JACK & SANDY	00421821	15 ANGELFISH	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 128 ft (unverified MWI file).	Figure 11
32	03.01251.0001	LUMBER ONE AVON	00699137	34325 COUNTY ROAD 155	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 37 ft (unverified MWI file).	Figure 11
33	03.00944.0020	MARKMAN, THOMAS & KARA	Potential Well	17426 MARSH	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
34	03.00936.0000	FLOREN, PHILIPPI TRUST	Potential Well	34337 COUNTY ROAD 9	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
35	42.26630.0084	BRIX, BRIAN	00402086	34206 9 CR , AVON, MN	Avon	56310	WEL	A	-	1	Well Location drilled to 42 ft (MWI verified location).	Figure 11
36	03.00937.0000	NORBY, CHARLES	Potential Well	34289 COUNTY ROAD 9	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
37	03.00937.0000	BRINKMAN, RALPH	00419734	34289 COUNTY ROAD 9	Avon	56310	WEL	A	-	1	Well Location drilled to 54 ft (MWI verified location).	Figure 11
38	42.26486.0095	GROETSCH, WALTER	00453389	12 ANGELFISH	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 193 ft (unverified MWI file).	Figure 11
39	03.00938.0000	JAGIELSKI, MICHAEL	00859569	34275 COUNTY ROAD 9	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 58 ft (unverified MWI file).	Figure 11
40	42.26486.0090	COX, NEIL	00178702	11 ANGELFISH	Avon	56310	WEL	A	-	1	Well Location drilled to 180 ft (MWI verified location).	Figure 11
41	03.01227.0001	MUELLER, JOHN	00795254	34235 COUNTY ROAD 9	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 56 ft (unverified MWI file).	Figure 11
42	03.00952.0000	NELSON, MARLO	00400499	34232 COUNTY ROAD 155	Avon	56310	WEL	A	-	1	Well Location drilled to 87 ft (MWI verified location).	Figure 11
43	03.01227.0002	DAHMEN, WILL	00507871	34213 LOWER SPUNK	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 57 ft (unverified MWI file).	Figure 11
44	03.01227.0003	BUETTNER, LEE	00506224	34187 LOWER SPUNK	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 67 ft (unverified MWI file).	Figure 11
45	03.00947.0000	OLSON, RICHARD & JEANNE	Potential Well	34203 COUNTY ROAD 9	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
46	03.00952.0000	NELSON, MARLO	00413622	34232 COUNTY ROAD 155	Avon	56310	WEL	A	-	1	Well Location drilled to 80 ft (MWI verified location).	Figure 11
47	03.01227.0004	BOUNDY, KEVIN	00839555	34175 LOWER SPUNK	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 70 ft (unverified MWI file).	Figure 11
48	42.26486.0072	GERSCH, DARREN & PATTY	00544891	6 ANGELFISH	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 195 ft (unverified MWI file).	Figure 11
49	03.01227.0006	SCEPANIAK, RICHARD J.	00528263	34151 LOWER SPUNK	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 65 ft (unverified MWI file).	Figure 11
50	03.00947.0002	HOFFMAN, RANDY	00845068	34164 LOWER SPUNK	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 72 ft (unverified MWI file).	Figure 11
51	03.01227.0007	HALL, PEGGY	Potential Well	34139 LOWER SPUNK	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
52	03.01227.0008	JOHNSON, HUGO	00598869	34113 LOWER SPUNK	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 68 ft (unverified MWI file).	Figure 11
53	03.01227.0009	HOYER, DUANE & KAREN	Potential Well	34105 LOWER SPUNK	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
54	42.26463.0100	RAUSCH, NEIL	Potential Well	34122 COUNTY ROAD 9	Avon	56310	WEL	U	-	1	Potential Well	Figure 11

Appendix C

Potential Contaminant Source Inventory

Part II Wellhead Protection Plan

City of Avon, Minnesota

Drinking Water Supply ID 1730002

PCSI ID	PIN	Facility Name	Program ID	Address	City	Zip Code	PCSI Code	Status	Material	Total	Comment	Figure
55	03.01144.0000	GAMBLE, DAVE	00400473	34114 COUNTY ROAD 155	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 78 ft (unverified MWI file).	Figure 11
56	42.26486.0066	AVON 5	00696862	PO BOX 69	Avon	56310	WEL	A	-	1	Well Location drilled to 240 ft (MWI verified location).	Figure 11
57	03.01227.0010	MARTENI, LINDA	00513386	34097 LOWER SPUNK	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 70 ft (unverified MWI file).	Figure 11
58	03.01227.0011	KALLA, CLAUDE	Potential Well	34069 LOWER SPUNK	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
59	42.26486.0066	AVON P-2	00689581	PO BOX 69	Avon	56310	WEL	A	-	1	Well Location drilled to 197 ft (MWI verified location).	Figure 11
60	42.26486.0066	AVON P-2	00689580	PO BOX 69	Avon	56310	WEL	A	-	1	Well Location drilled to 197 ft (MWI verified location).	Figure 11
61	42.26486.0066	AVON 4	00696861	PO BOX 69	Avon	56310	WEL	A	-	1	Well Location drilled to 255 ft (MWI verified location).	Figure 11
62	03.00949.0004	BUDDE, BEN	00182524	34096 COUNTY ROAD 155	Avon	56310	WEL	A	-	1	Well Location drilled to 74 ft (MWI verified location).	Figure 11
63	03.01227.0012	DOHGAN, ELLIE	00507602	34053 LOWER SPUNK	Avon	56310	WEL	A	-	1	Well Location drilled to 68 ft (MWI verified location).	Figure 11
64	03.01227.0014	FRIE, CLARUS	00489160	34037 LOWER SPUNK	Avon	56310	WEL	A	-	1	Well Location drilled to 73 ft (MWI verified location).	Figure 11
65	03.01227.0013	CARLSON, BRUCE	00759190	34025 LOWER SPUNK	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 55 ft (unverified MWI file).	Figure 11
66	03.01010.0000	BUDDE TRUCKING, INC.	00484474	34082 CHAR	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 90 ft (unverified MWI file).	Figure 11
67	03.01010.0000	DNR OB 73047 (BUDDE TRUCKING, INC.)	00483553	34082 CHAR	Avon	56310	WEL	A	-	1	Well Location drilled to 16 ft (MWI verified location).	Figure 11
68	03.01030.0010	LUNDBERG, DANIEL & LISA	Potential Well	17295 MARSH	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
69	03.01030.0000	BECKER, BRIAN	00671379	17230 MARSH	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 54 ft (unverified MWI file).	Figure 11
70	42.26495.0085	GERADS, RUDY	00496561	401 SUN	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 84 ft (unverified MWI file).	Figure 11
71	03.01029.0000	SOENNUKER, CRAIG	00796879	17162 MARSH LN	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 57 ft (unverified MWI file).	Figure 11
72	42.26243.0000	AHLES, JERRY	00403748	941 2ND	Avon	56310	WEL	A	-	1	Well Location drilled to 32 ft (MWI verified location).	Figure 11
73	03.01029.0000	LUNDBERG, LISA	00550300	15295 MARSH LA , AVON, MN 56	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 59 ft (unverified MWI file).	Figure 11
74	03.01335.0000	RABIDEAU, DEAN	00842978	17281 CR 54	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 58.25 ft (unverified MWI file).	Figure 11
75	03.01339.0000	NOREEN, JON & LYNETTE	00579545	17239 COUNTY ROAD 54	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 60 ft (unverified MWI file).	Figure 11
76	42.26507.0000	AVON LUMBER	00178656	115 2ND	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 168 ft (unverified MWI file).	Figure 11
77	03.01337.0002	NETTER, SCOTT EDWARD	00649357	17227 COUNTY ROAD 54	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 78 ft (unverified MWI file).	Figure 11
78	03.01412.0058	BEUNING, ROBERT	00457307	33679 POVERTY POINT	Avon	56310	WEL	A	-	1	Well Location drilled to 61 ft (MWI verified location).	Figure 11
79	42.26559.0020	LANGE, DAVID	00215308	110 CHINOOK	Avon	56310	WEL	A	-	1	Well Location drilled to 290 ft (MWI verified location).	Figure 11
80	03.01412.0070	Michael J Quesnel	Potential Well	33704 POVERTY POINT	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
81	03.01412.0063	Avalon Homes Inc	Potential Well	33668 POVERTY POINT	Avon	56310	WEL	U	-	1	Potential Well	Figure 11
82	03.01028.0000	HIPP, RUTH AND AUGUSTUS	00697948	33642 POVERTY POINT	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 55 ft (unverified MWI file).	Figure 11
83	03.01514.9850	BEUNING, DON	00433940	33633 POVERTY POINT	Avon	56310	WEL	A	-	1	Well Location drilled to 56 ft (MWI verified location).	Figure 11
84	03.01026.0000	HYLLA, NATE	00802473	33599 POVERTY POINT	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 58 ft (unverified MWI file).	Figure 11
85	03.01027.0000	PHILIPPI, FLOREN	00673721	33557 POVERTY POINT	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 55 ft (unverified MWI file).	Figure 11
86	03.01019.0000	FISHER, MARK	00615686	33528 POVERTY POINT	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 54 ft (unverified MWI file).	Figure 11
87	03.01023.0000	BRAUN, PHIL	00839575	33543 POVERTY POINT	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 88 ft (unverified MWI file).	Figure 11
88	03.01015.0000	SEILER, GARY	00468313	33485 POVERTY POINT	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 58 ft (unverified MWI file).	Figure 11
89	42.26286.0004	BECKER, JOHN	00162527	307 CHINOOK	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 65 ft (unverified MWI file).	Figure 11
90	03.00997.0000	REMJESKE, MELVINA	00199883	525 1ST	Avon	56310	WEL	A	-	1	Well Location drilled to 95 ft (MWI verified location).	Figure 11
91	03.00998.0000	OLSON, DOUG	00866930	517 1ST	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 59 ft (unverified MWI file).	Figure 11
92	42.26225.0065	MELTON, LARRY	00581627	30502 COUNTY ROAD 41	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 66 ft (unverified MWI file).	Figure 11
93	42.26225.0050	AVON 3	00242069	600 COUNTY ROAD 50	Avon	56310	WEL	A	-	1	Well Location drilled to 70 ft (MWI verified location).	Figure 11
94	42.26205.0000	DINOS BALLLROOM	00455195	530 COUNTY ROAD 50	Avon	56310	WEL	A	-	1	MDH relocated Well drilled to 63 ft (unverified MWI file).	Figure 11
95	42.26620.0016	MORGEL, STEVE	00181289	16243 LINNEMAN LAKE	Avon	56310	WEL	A	-	1	Well Location drilled to 53 ft (MWI verified location).	Figure 11
96	42.26201.0010	Avon WWTP	182207	300 Angelfish Ave	Avon	56310	SPL	C	-	1	Closed Spill of unknown substance.	Figure 12
97	03.01010.0000	Budde Trucking Inc	TS0050035	34082 Char Ave NE	Avon	56310	AST	A	F000	1	2 aboveground tanks with used oil up to 1900 gallons.	Figure 12
98	03.01010.0000	Budde Trucking Inc	TS0050035	34082 Char Ave NE	Avon	56310	UST	A	F000	1	1 undergound tank with diesel fuel up to 10000 gallons.	Figure 12
99	03.01010.0000	Budde Leasing	200378	34082 Char Ave NE	Avon	56310	SPL	A	-	1	Unknown spill details.	Figure 12
100	42.26203.0030	Avon Elementary School	TS0019292	County Road 9 & 155	Avon	56310	UST	A	F000	1	1 underground tank with fuel oil up to 4000 gallons.	Figure 12
101	ROW	City of Avon	203666	Right of Way	Avon	56310	SPL	C	-	1	Closed Spill.	Figure 12
102	42.26559.0020	Lange Trenching Inc.	TS0005609	111 Dorado Ave NW	Avon	56310	AST	A	F000	1	9 aboveground tanks with diesel fuel, gasoline, used oil, lubricating oils, and hydraulic flued up to 1500 gallons.	Figure 12
103	42.26559.0020	Lange Trenching Inc.	TS0005609	111 Dorado Ave NW	Avon	56310	UST	A	F000	1	2 underground tanks with gasoline and diesel up to 2000 gallons.	Figure 12
104	42.26558.0000	Columbia Gear Co (mfg Facility)	LS0001551	640 Chinook Ave SW	Avon	56310	LUST	I	-	1	Leak Site	Figure 12
105	42.26558.0000	Columbia Gear Division	TS0013220	640 Chinook Ave SW	Avon	56310	UST	I	F000	1	1 underground tanks with gasoline up to 1000 gallons.	Figure 12
106	42.26530.0001	Avon Auto Repair	LS0006454	217 1st St NE	Avon	56310	LUST	A	-	1	Leak Site	Figure 12
107	42.26581.0000	Stearns Co Property	LS0016108	107 Avon Ave S	Avon	56310	LUST	A	-	1	Leak Site	Figure 12

Appendix C

Potential Contaminant Source Inventory

Part II Wellhead Protection Plan

City of Avon, Minnesota

Drinking Water Supply ID 1730002

PCSI ID	PIN	Facility Name	Program ID	Address	City	Zip Code	PCSI Code	Status	Material	Total	Comment	Figure
108	42.26228.0000	Former Schmidty's/Casey's General Store #3300	LS0019207	303 Avon Ave S	Avon	56310	LUST	A	-	1	Leak Site	Figure 12
109	42.26228.0000	Caseys General Store 3300	TS0020499	303 Avon Ave S	Avon	56310	UST	A	F000	1	4 underground tanks with gasoline, E85, and diesel up to 12000 gallons.	Figure 12
110	42.26593.0000	Dahlin's Supermarket	TS0016458	106 Avon Ave S	Avon	56310	UST	R	F000	1	1 underground tank with fueld oil up to 2000 gallons (lsited as removed).	Figure 12
111	42.26226.0000	Church Of Saint Benedict	TS0016003	212 1st St SW	Avon	56310	UST	A	F000	1	1 underground tank with fuel oil up to 10000 gallons.	Figure 12
112	42.26582.0000	Us West	TS0054241	113 1st St SW	Avon	56310	AST	A	F000	1	1 aboveground tank with diesel fuel.	Figure 12
113	42.26591.0000	Suchys Service	TS0012341	112 Avon Ave S	Avon	56310	UST	R	F000	1	3 underground tanks with diesel and gasoline up to 4000 gallons (listed as removed).	Figure 12
114	42.26591.0000	Suchy Service	TS0012510	112 Avon Ave S	Avon	56310	AST	R	F000	1	4 aboveground tanks with used oil (listed as removed).	Figure 12
115	42.26591.0000	Suchy Service	TS0012510	112 Avon Ave S	Avon	56310	UST	R	F000	1	4 underground tanks with diesel, gasoline, used oil up to 4000 gallons (listed as removed).	Figure 12
116	42.26446.0000	Avon Oil Quick Mart	LS0006118	304 Blattner Dr	Avon	56310	LUST	A	-	1	Leak Site	Figure 12
117	42.26446.0000	Avon Oil Quick Mart	TS0005554	304 Blattner Dr	Avon	56310	UST	A	F000	1	8 tanks with ethanol, gasoline, diesel, and alchol blends up to 12000 gallons.	Figure 12
118	42.26446.0010	Novae Corp	5631WNVCRP31BLA	310 Blattner Dr	Avon	56310	STOR	A	C001	1	Toxics Reduction for hazardous substances	Figure 12
119	42.26446.0060	Prefinishing Specialists Inc	VP22690	PO Box 9	Avon	56310	PCS	A	-	1	Minnesota Brownfields	Figure 12
120	42.26205.0000	Columbia Gear	94988	530 CR 50	Avon	56310	SPL	C	-	1	16 gallons Chemical Other Or Unspecified. Closed Spill.	Figure 12
121	42.26205.0000	Columbia Gear Corp	185891	530 County Road 50	Avon	56310	SPL	A	-	1	200 gallons Lubricating Oils.	Figure 12
122	42.26205.0010	Jansky Estate Property	LS0005630	530 1st St SE	Avon	56310	LUST	A	-	1	Leak Site	Figure 12
123	42.26205.0010	Columbia Gear Co	TS0005536	530 County Road 50	Avon	56310	AST	A	F000	1	3 aboveground tanks with kerosene, used oil, and other up to 1200 gallons.	Figure 12
124	42.26205.0010	Columbia Gear Co	LS0004315	530 County Road 50	Avon	56310	LUST	A	-	1	Leak Site	Figure 12
125	42.26205.0010	Columbia Gear Corp	5631WCLMBG53CUN	530 County Road 50	Avon	56310	STOR	A	C001	1	Toxics Reduction for hazardous substances	Figure 12
126	42.26205.0010	Columbia Gear Co	TS0005536	530 County Road 50	Avon	56310	UST	R	F000	1	2 underground tanks with waste oil and diesel fuel up to 4000 gallons (listed as removed).	Figure 12
127	42.26217.0003	Avon Body Shop	TS0019730	430 Co Rd 50	Avon	56310	UST	R	F000	1	1 underground tanks with gasoline up to 565 gallons (listed as removed).	Figure 12

Appendix D

Water Contingency Strategy
(DNR Water Supply Plan Approval)

MINNESOTA DEPARTMENT OF NATURAL RESOURCES
CENTRAL OFFICE
500 LAFAYETTE ROAD
SAINT PAUL, MN 55155
651-296-6157
888-646-6367

FEBRUARY 22, 2019

CITY OF AVON
JON FORSELL, SUPERINTENDENT
AVON PUBLIC UTILITIES
140 STRATFORD STREET E
PO BOX 69
AVON, MN 56310

RE: Water Supply Plan Approval, City of Avon, Stearns County

Dear MR. FORSELL:

Our office has completed the review of your Water Supply Plan for public water supply authorized under DNR Water Appropriation Permit #**1962-0203**. I am pleased to advise you that in accordance with Minnesota Statutes, Section 103G.291, Subdivision 3, and on behalf of the Commissioner of the Department of Natural Resources, I hereby **approve your Water Supply Plan**. We encourage cities to complete the attached "Certification of Adoption" form. Please upload the form to MPARS-Water Supply Plan tab as soon as the city officially adopts the Plan.

The DNR, Minnesota Rural Water Association, and The Metropolitan Council encourage the city to educate its customers on how they can reduce household water use. As mentioned at the Water Supply Planning Workshops, the DNR will be contacting you periodically about progress the city has made on their water conservation goals. We encourage you to keep records of your success.

Thank you for your efforts in planning for the future of the City of Avon water supply and for conserving the water resources of the State of Minnesota! If you have any questions or need additional assistance with the city's water appropriation permit, please contact me at 320-223-7844 or via e-mail at Nicola.blake-bradley@state.mn.us.

Sincerely,

Nicola Blake-Bradley
Area Hydrologist

Ec: Carmelita Nelson, DNR
Tim Crocker, District Manager
Dennis Fuchs, Stearns SWCD

Karen Voz, Minnesota Department of Health
Minnesota Permitting and Reporting System (MPARS)

Appendix E

Inner Well Management Zone

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 Utility Superintendent, Avon City Hall, PO Box 69, 140 Stratford Street West, Avon, MN 56310

FACILITY (WELL) INFORMATION

NAME	Well #3 Entry Point
SAMPLE POINT ID	S02
UNIQUE WELL NO.	242069
COUNTY	Stearns

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / SAMPLE POINT 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		

PWS ID / SAMPLE POINT 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				
*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	198	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		

PWS ID / SAMPLE POINT 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				
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		
*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.

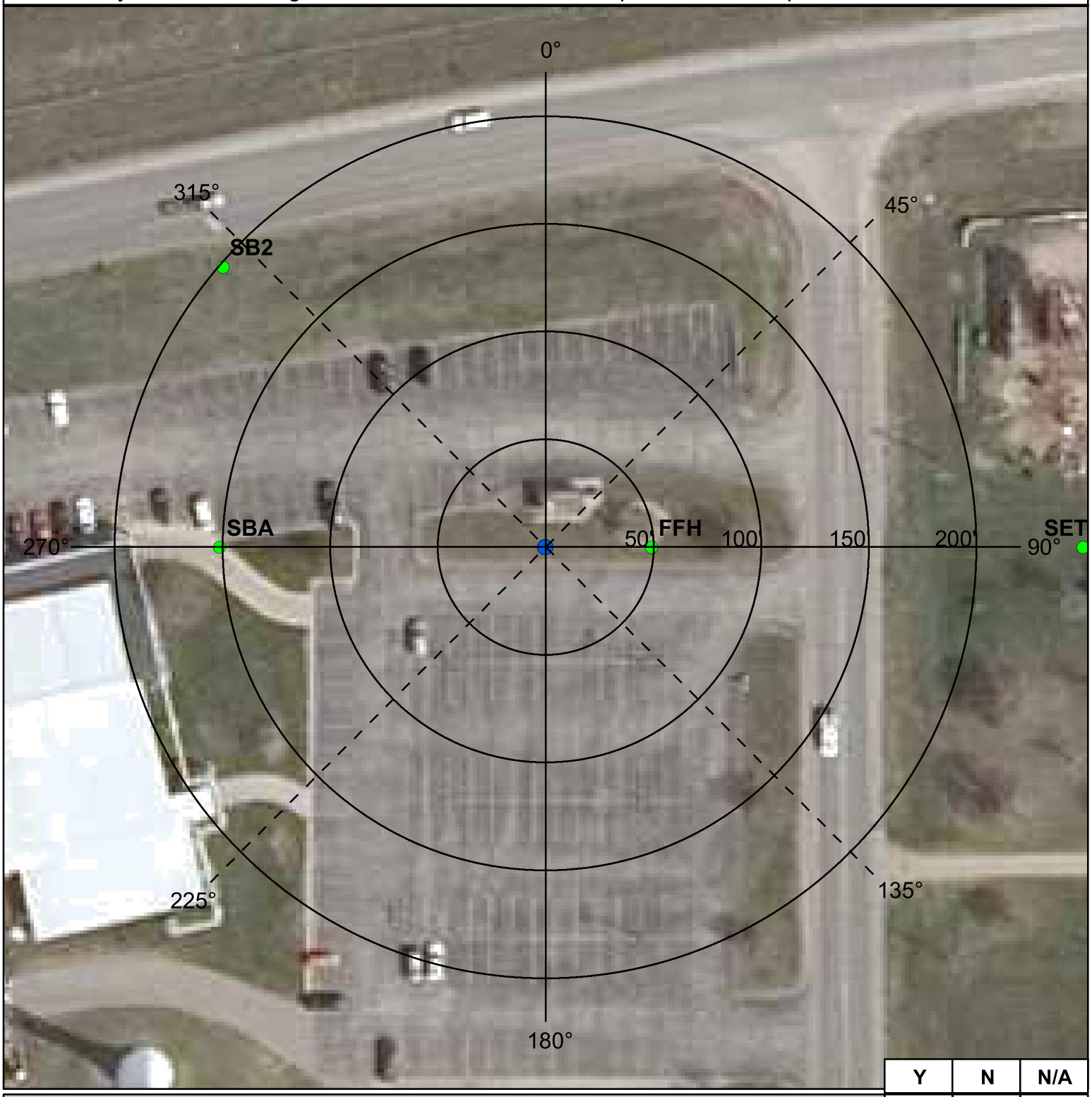
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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

PWS ID / SAMPLE POINT 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.



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

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

INSPECTOR	Anderson, Chad	DATE	6 - 8 - 2023

PWS ID / SAMPLE POINT 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

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 Utility Superintendent, Avon City Hall, PO Box 69, 140 Stratford Street West, Avon, MN 56310

FACILITY (WELL) INFORMATION

NAME	Well #4
SAMPLE POINT ID	S03
UNIQUE WELL NO.	696861
COUNTY	Stearns

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / SAMPLE POINT 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		

PWS ID / SAMPLE POINT 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				
*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	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		

PWS ID / SAMPLE POINT 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				
*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		
*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.

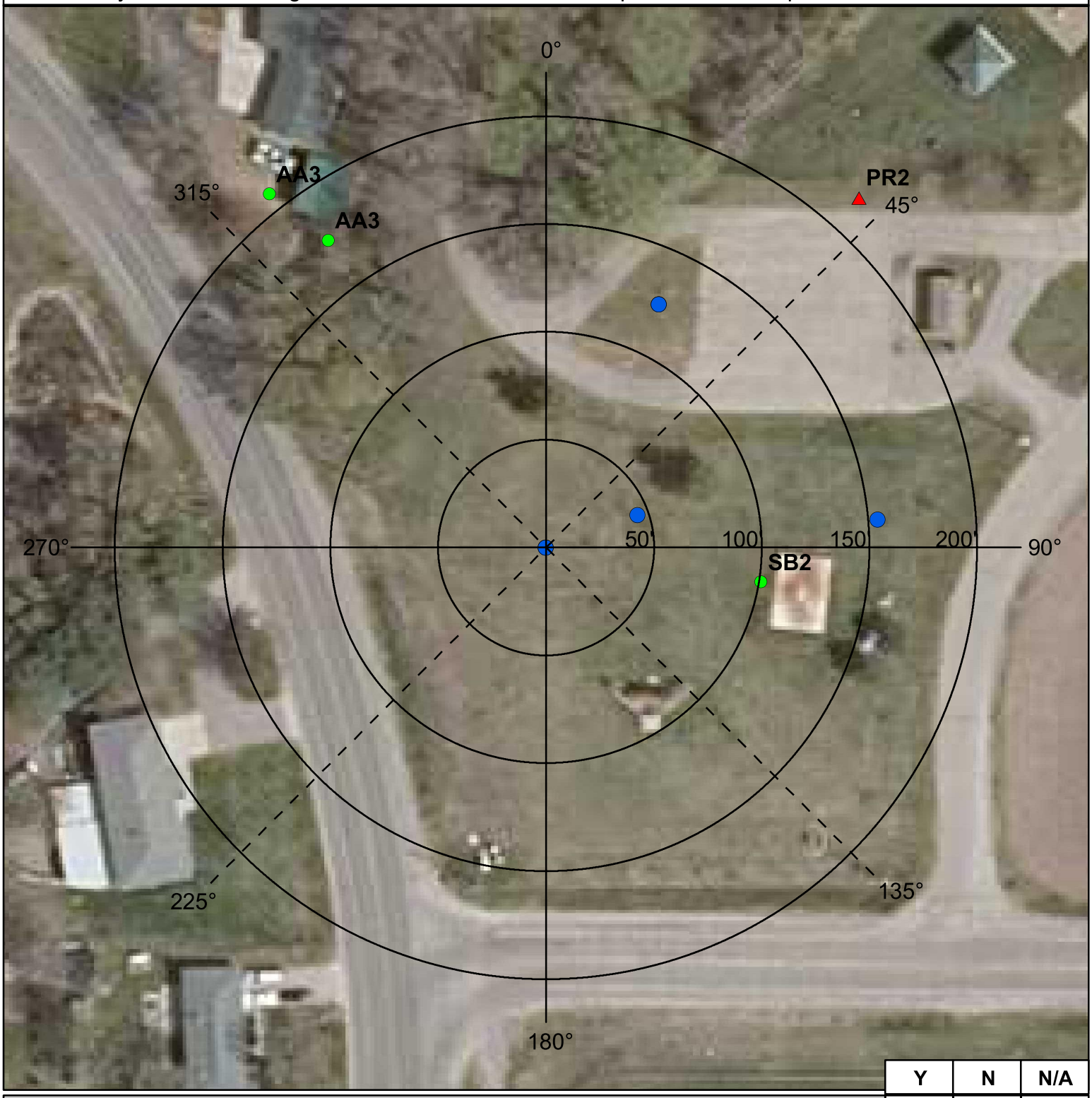
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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



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

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

INSPECTOR	Anderson, Chad	DATE	6 - 8 - 2023

PWS ID / SAMPLE POINT 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

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 Utility Superintendent, Avon City Hall, PO Box 69, 140 Stratford Street West, Avon, MN 56310

FACILITY (WELL) INFORMATION

NAME	Well #5
SAMPLE POINT ID	S04
UNIQUE WELL NO.	696862
COUNTY	Stearns

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / SAMPLE POINT 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	156	N
AA3	Absorption area of a soil dispersal system, average flow 10,000 gal./day or less	50	50	100	Y	188	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		

PWS ID / SAMPLE POINT 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				
*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		
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		Y	105	Y
*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	142	
WEL	Operating well	record dist.	record dist.		Y	124	
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		

PWS ID / SAMPLE POINT 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				
*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		
*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.

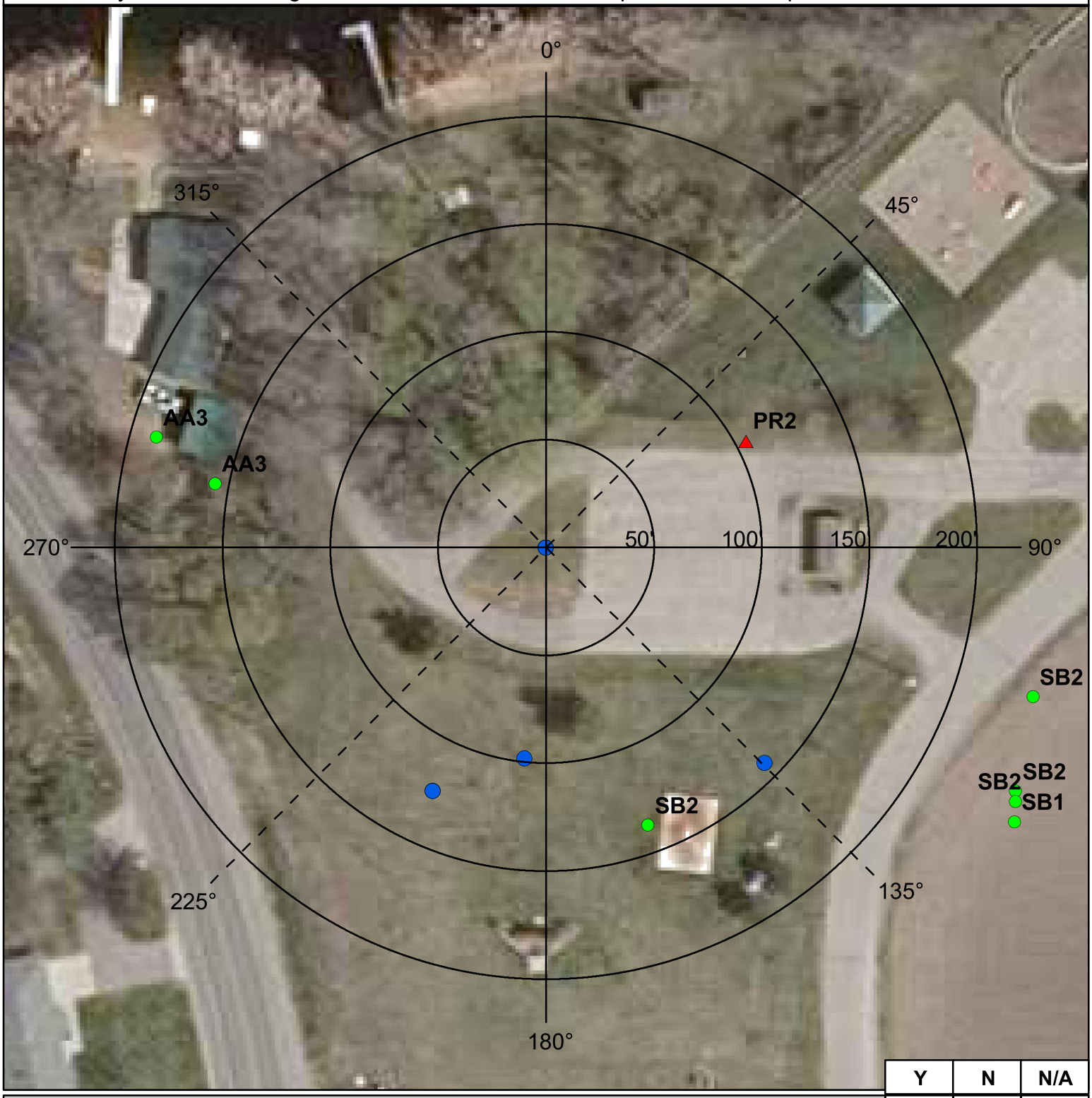
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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



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

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

INSPECTOR	Anderson, Chad	DATE	6 - 8 - 2023

PWS ID / SAMPLE POINT 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 F

Old Municipal Well Report

DEPARTMENT OF HEALTH

Protecting, Maintaining and Improving the Health of All Minnesotans

Old Municipal Well Report for Avon

PWSID: 1730002

MDH

May 2019

Minnesota Department of Health
Environmental Health in Minnesota

MDH Public Water Supply Sources Report

PWSID: **1730002**
PWS Name: **Avon**
PWS Type: **Community**
PWS Status: **Active**

Public Water Supply Sources: Information from MNDWIS and CWI (sorted by Sample Point ID)
Source Type Codes: **GW** = Ground water; **SW** = Surface water; **GUI** = Ground water under influence
Location Source: **MGS** = digitized by the MN Geological Survey; * indicates imcomplete records
O* = duplicate in Old Municipal Well Data; **R*** = duplicate in MNDWIS PWS Sources Removed from Flow; **S*** = duplicate in MNDWIS PWS Sources in Flow;

MNDWIS PWS SOURCES IN FLOW

Source Info							MNDWIS Data				CWI Data			
Sample Point ID	Name	Type	Availability	Status	Well No. (link to Well Log (s))	Location Info (link to Map)	Drill Year	Depth (in feet)	Case Depth (in feet)	Case Diam. (in inches)	Drill Date	Depth Completed (in feet)	Case Depth (in feet)	Case Diam. (in inches)
S02	**Well #3**	GW	Emergency	Active	242069 **O***	03/22/1999 (M. Howe)	1979	70	50	12	00-00-1979	70	50	12
S03	**Well #4**	GW	Primary	Active	696861 **O***	08/25/2005 (R. Soule)	2003	251	231	12	09-26-2003	251	231	12
S04	**Well #5**	GW	Primary	Active	696862 **O***	08/25/2005 (R. Soule)	2003	240	220	12	08-11-2003	240	220	12

MNDWIS PWS SOURCES REMOVED FROM FLOW

Source Info							MNDWIS Data				CWI Data			
Sample Point ID	Name	Type	Availability	Status	Well No. (link to Well Log (s))	Location Info (link to Map)	Drill Year	Depth (in feet)	Case Depth (in feet)	Case Diam. (in inches)	Drill Date	Depth Completed (in feet)	Case Depth (in feet)	Case Diam. (in inches)
S01	**Well #1**	GW	Sealed	Inactive	241592 **O***	03/22/1999 (M. Howe)	1962	142	132	16	00-00-1962	142	132	16

MNDWIS and CWI data value discrepancies in preceding tables are shown in **RED** (0 or null values excepted).

Old Municipal Wells

The following tables show information on wells whose existence (or previous existence) has not yet been confirmed.

OLD MUNICIPAL Well Data

Well Search Reference	Name (s)	Unique Well Number	Drilled Depth (ft.)	Completed Depth (ft.)	Depth Cased (ft.)	Casing Diameter (in.)	Year Constructed	Construction Type	Year Out of Service	Sealing Record?	Year Sealed	Location Info	Comments
Well A	Well No. 1	241592 **R***	142	142	132	16	1962				1989	NW of the settled portion of the village. See microfiche for full description of location.	Sealed 2003.
Well B	Well No. 2	241593	148			6					1989	Lot 17, Block 19.	Creamery well. Sealed 1989.

OLD MUNICIPAL Well Data													
Well Search Reference	Name(s)	Unique Well Number	Drilled Depth (ft.)	Completed Depth (ft.)	Depth Cased (ft.)	Casing Diameter (in.)	Year Constructed	Construction Type	Year Out of Service	Sealing Record?	Year Sealed	Location Info	Comments
Well C	Well No. 3	242069 S*	70	70	50	12	1979						Emergency active.

Databases Searched	Remarks
County Well Index (1-mile radius); MDH DWP Microfiche; MDH 1988-2002 Muni Well Inventory (1Suite); Biennial Report of the MN State Dairy and Food Commissioner-1907; Minnesota Geological Survey City Well File Folders; MGS Bulletin (22, 27, 31, or 32); MDH DWP MNDWIS; MN Historical Soc.- Fire Underwriters Insp. Bureau (Fisher) historical map ; Sanborn Fire Insurance Maps; MDH WELLS	

Old Municipal Well Data Compiled By: **Mara Boulanger** Compiled Date: **5/15/2019 11:12:21 AM**

OLD MUNICIPAL Well Data - the following data are from RAW HYDRO spreadsheets, and need to be processed accordingly.

Well Search Reference	Name(s)	Unique Well Number	Drilled Depth (ft.)	Completed Depth (ft.)	Depth Cased (ft.)	Casing Diameter (in.)	Year Constructed	Construction Type	Year Out of Service	Sealing Record?	Year Sealed	Location Info	Comments
A	* Well #1	241592 R*	142 ft		132 ft	16"	1962	Drilled	Sealed 2003			1963: 684 feet west of the intersection of the west lines of Fourth St and section 27, Avon Township, as measured along the north line of Vincent St. Sealing record: T125N, R30W, sec 28, NE-NE-NE	
B	Well #2 (Old Creamery Well)	^ 241593	148 ft			6"	unknown	unknown	Abandoned (sealed?) 1989			1969: "Located adjacent to the creamery building on the east side of the village" Abandoned record: T125N, R30W, sec 28, SE-SW-NW	
C	Well #3	242069 S*	70 ft		50 ft	12"	1979	unknown				CWI: T125N, R30W, sec 27, cadddc	
D	Well #4	696861 S*	251 ft		231 ft	12"	2003	Rotary	(Still in service)			CWI: T125N,	

OLD MUNICIPAL Well Data - the following data are from RAW HYDRO spreadsheets, and need to be processed accordingly.

Well Search Reference	Name(s)	Unique Well Number	Drilled Depth (ft.)	Completed Depth (ft.)	Depth Cased (ft.)	Casing Diameter (in.)	Year Constructed	Construction Type	Year Out of Service	Sealing Record?	Year Sealed	Location Info	Comments
												R30W, sec 22, cccbcc	
E	Well #5	696862 S*	240 ft		220 ft	12"	2003	Rotary	(Still in service)			CWI: T125N, R30W, sec 22, cccbbd	

Databases Searched	Remarks
Data Bases Searched: CWI MDH DWP Microfiche MDH DWP MNDWIS MDH Wells Database	* Sealing record calls this Well #2, but all well specs in the sealing record and 1963 engineer's report match up as Well #1. Aerial photos of Well #1 in are also identical to the drawing on the sealing record. ^ Written descriptions on abandoned well record and engineer's reports, along with the scanned map of the well locations, indicate that Well #2 corresponds with Unique # 241593.

Old Municipal Well Data Compiled By: **Steve Robertson** Compiled Date: **2/18/2011**

Source: MN Dep't. of Health - 5/15/2019

Use of MDH Public Water Supply Sources Report

The report you have received shows three classes of Public Water Supply wells:

- In Use (actively used)
- Removed From Flow (for back-up or emergency use; may be disconnected from PWS)
- **Old Municipal Wells (unused wells with no documented location, unique ID number, and/or well sealing record)**

Old Municipal Wells are unsealed, abandoned wells. These wells pose a risk of contamination to existing wells and aquifers. According to State Well Code and under the terms of your Wellhead Protection Plan, your PWS may need to identify, locate, and properly seal Old Municipal Wells within your Drinking Water Supply Management Area, to current MDH standards. While historical records may indicate that some of these wells were "capped", "abandoned", or "sealed" in the past, unless it can be shown that the sealing was performed to current standards, they may need to be located, cleaned out, and sealed properly with a well sealing record issued.

The report lists database references that were searched to compile the report. Under "Remarks" are notes and questions to help you with this process. State grant funding is available to help fund sealing of these old public water supply wells.

If you have questions, please talk to your MDH Planner or Hydrologist to address your PWS's specific issues. This report is not intended to be the "last word" on the status of Old Municipal Wells and your input will be critical in successfully finding and sealing these potential sources of contamination.

Restart

Avon

12/23/63

to

~~2/6/82~~

5/5/83

12-23-63

MINNESOTA DEPARTMENT OF HEALTH
District VIII
Little Falls, Minnesota

Report on Investigation of Municipal Water Supply
Avon, Minnesota
July 10 - October 31, 1963

Well A The public water supply for Avon is obtained from a drilled well located northwest of the settled portion of the village. Water from the well is discharged to a transmission main and thence to the distribution system and an elevated tank which floats on the system.

Location of Source

The well is located on a tract of land described as follows: Beginning at a point 684 feet west of the intersection of the west lines of Fourth Street and Section 27, Avon Township, as measured along the north line of Vincent Street (now vacated), North 26° 40' East, a distance of 15 feet; thence North 63° 20' West, a distance of 146 feet; thence South 36° 40' West, a distance of 133.6 feet; thence South 65° 12' East, a distance of 75.07 feet; thence North 80° 48' East, a distance of 87.6 feet; thence North 26° 40' East, a distance of 74.8 feet to the point of beginning. The well is located approximately 4 feet south of the south line of Vincent Street and 50 feet east of the west line of the above described tract. The location provides for a distance of at least 50 feet from all property lines.

The site is relatively high and has been graded to provide satisfactory surface drainage away from the well in all directions.

Well, Pump and Pumphouse

The well is 142 feet in depth and cased with 16-inch steel casing pipe to a depth of 132 feet. A 10-foot section of well screen is installed. The static water level is approximately 30 feet below the ground surface. A submersible pump, employing an underground discharge arrangement, and having a capacity of 60 gallons per minute, has been installed. The normal drawdown is 60 feet. The

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of Avon Municipal Water Supply

Date July 10 - October 31, 1963

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety / Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3½	3½	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39½	39½	
(B) Prime Moving Equipment				
Well or intake	8	6	8	2.
Pumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	2	3	1.
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	27	30	
(C) Distribution System				
Street mains	5	5	5	
Building services	2	2	2	
Plumbing	3	½	2½	3, 4.
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17½	19½	
(D) Operation and Operators				
Control of system	3	2	3	5.
Condition of system	2	2	2	
Operator qualifications	5	2	4	6, experience
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	6	9	
GRAND TOTAL AND RATING	100	90	98	

90 and upward - high degree of safety. Watchful maintenance needed.

85 to 89 - moderately high degree of safety. Correction and maintenance program continued.

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of Avon Municipal Water Supply

Date July 16, 1964

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety / Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3½	3½	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39½	39½	
(B) Prime Moving Equipment				
Well or intake	8	6	8	2.
Pumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	2	3	1.
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	27	30	
(C) Distribution System				
Street mains	5	5	5	
Building services	2	2	2	
Plumbing	3	½	2½	3, 4.
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17½	19½	
(D) Operation and Operators				
Control of system	3	2	3	5.
Condition of system	2	2	2	
Operator qualifications	5	2	4	6, experience
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	6	9	
GRAND TOTAL AND RATING	100	90	98	

90 and upward - high degree of safety. Watchful maintenance needed.

85 to 89 - moderately high degree of safety. Correction and maintenance program continued.

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of Avon Municipal Water Supply

Date_____

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety / Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3½	3½	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39½	39½	
(B) Prime Moving Equipment				
Well or intake	8	6	8	1.
Pumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	3	3	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	28	30	
(C) Distribution System				
Street mains	5	5	5	
Building services	2	2	2	
Plumbing	3	½	2½	2, 3.
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17½	19½	
(D) Operation and Operators				
Control of system	3	2½	3	4.
Condition of system	2	2	2	
Operator qualifications	5	2½	4	5, experience
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	9	
GRAND TOTAL AND RATING	100	92	98	

90 and upward - high degree of safety. Watchful maintenance needed.

85 to 89 - moderately high degree of safety. Correction and maintenance program continued.

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of Avon Municipal Water Supply

Date June 30, 1966

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety / Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3½	3½	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39½	39½	
(B) Prime Moving Equipment				
Well or intake	8	6	8	1.
Pumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	3	3	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	28	30	
(C) Distribution System				
Street mains	5	5	5	
Building services	2	2	2	
Plumbing	3	½	2½	2, 3.
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17½	19½	
(D) Operation and Operators				
Control of system	3	2½	3	4.
Condition of system	2	2	2	
Operator qualifications	5	2½	4	5. experience
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	9	
GRAND TOTAL AND RATING	100	92	98	

90 and upward - high degree of safety. Watchful maintenance needed.

85 to 89 - moderately high degree of safety. Correction and maintenance program continued.

MINNESOTA DEPARTMENT OF HEALTH
District VIII
Little Falls, Minnesota

Report on Investigation of Municipal Water Supply
Avon, Minnesota
August 15, 1967

Date of last investigation - June 30, 1966

Rating at last investigation - 92

Changes since last investigation -

Well B The creamery well has been acquired by the village as a possible stand-by or emergency source. The well is 6-inches in diameter, 148 feet in depth and is designated as Well No. 2. Data on the static water level, draw-down and well screen length were not available. Water from the well is discharged through an above-grade discharge pipe to the distribution system by means of a submersible pump having an estimated capacity of 75 gallons per minute. The seal for the annular opening between the casing and discharge pipe is not of entirely satisfactory water-tight construction. An inoperative 220 gallon pressure tank located in the pumphouse remains connected to the well discharge piping.

The pumphouse is constructed with the floor entirely above grade. The door is hung to open outward and no door sill is installed. A floor drain is installed; however, detailed information relative to its construction was not available at the time of the survey.

Analytical Data (see attached sheet)

Samples Nos. 250, 251 and 252 represent water collected from the wells and from a point on the distribution system. The bacteriological examination showed the water to be of good sanitary quality as evidenced by the fact that coliform organisms were not found in the 100 ml. samples examined.

Samples Nos. 9129 and 9128 represent water collected from Wells Nos. 1 and 2, respectively. The chemical examination of Sample No. 9129 (Well No. 1)

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of Avon Municipal Water Supply

Date August 15, 1967

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety / Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3½	3½	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40	39½	39½	
Hazard adjustment factor deducted	0	2	0	
Total	40	37½	39½	3
(B) Prime Moving Equipment				
Well or intake	8	6	8	1, 2
Pumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	3	3	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	28	30	
(C) Distribution System				
Street mains	5	5	5	
Building services	2	2	2	
Plumbing	3	½	2½	4, 5
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17½	19½	
(D) Operation and Operators				
Control of system	3	2½	3	3, 6
Condition of system	2	2	2	
Operator qualifications	5	2½	4	7 experience
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	9	
GRAND TOTAL AND RATING	100	90	98	

90 and upward - high degree of safety. Watchful maintenance needed.

85 to 89 - moderately high degree of safety. Correction and maintenance program continued.

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of Avon Municipal Water Supply

Date October 23, 1968

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3½	3½	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40	39½	39½	
Hazard adjustment factor deducted	0	2	0	3
Total	40	37½	39½	
(B) Prime Moving Equipment				
Well or intake	8	6	8	1, 2
Pumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	3	3	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	28	30	
(C) Distribution System				
Street mains	5	5	5	
Building services	2	2	2	
Plumbing	3	½	2½	4, 5
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17½	19½	
(D) Operation and Operators				
Control of system	3	2½	3	3, 6
Condition of system	2	2	2	
Operator qualifications	5	2½	5	7 Certification
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	10	
GRAND TOTAL AND RATING	100	90	99	

90 and upward - high degree of safety. Watchful maintenance needed.

85 to 89 - moderately high degree of safety. Correction and maintenance program continued.

70 to 84 - poor to dangerous condition. Prompt corrective action urgently needed.

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of Avon Municipal Water Supply

Date July 15, 1969

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety / Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3½	3½	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40	39½	39½	
Hazard adjustment factor deducted	0	2	0	3
Total	40	37½	39½	
(B) Prime Moving Equipment				
Well or intake	8	6	8	1, 2
Pumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	3	3	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	28	30	
(C) Distribution System				
Street mains	5	5	5	
Building services	2	2	2	
Plumbing	3	½	2½	4, 5
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17½	19½	
(D) Operation and Operators				
Control of system	3	2½	3	3, 6
Condition of system	2	2	2	
Operator qualifications	5	2½	5	7, Certification
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	10	
GRAND TOTAL AND RATING	100	90	99	

90 and upward - high degree of safety. Watchful maintenance needed.

85 to 89 - moderately high degree of safety. Correction and maintenance program continued.

70 to 84 - poor to dangerous condition. Prompt corrective action urgently needed.

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of **Avon Municipal** Water Supply

Date **February 4, 1970 and May 20, 1970**

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety / Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3½	3½	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40	39½	39½	
Hazard adjustment factor deducted	0	2	0	3
Total	40	37½	39½	
(B) Prime Moving Equipment				
Well or intake	8	6	8	1, 2
Pumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	3	3	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	28	30	
(C) Distribution System				
Street mains	5	5	5	
Building services	2	2	2	
Plumbing	3	½	2½	4, 5
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17½	19½	
(D) Operation and Operators				
Control of system	3	2½	3	3, 6
Condition of system	2	2	2	
Operator qualifications	5	2½	5	7,
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	10	
GRAND TOTAL AND RATING	100	90	99	

90 and upward - high degree of safety. Watchful maintenance needed.

85 to 89 - moderately high degree of safety. Correction and maintenance program continued.

70 to 84 - poor to dangerous condition. Prompt corrective action urgently needed.

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of **Avon Municipal** Water Supply

Date **December 14, 1971**

	Perfect Score	As Found	As Recommended	See Recommendation No. in Attached Report
(A) Source				
Sanitary Safety / Adequacy of treatment	20	20	20	
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3½	3½	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40	39½	39½	
Hazard adjustment factor deducted	0	2	0	3
Total	40	37½	39½	
(B) Prime Moving Equipment				
Well or intake	8	6	8	1, 2
Pumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	3	3	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	28	30	
(C) Distribution System				
Street mains	5	5	5	
Building services	2	2	2	
Plumbing	3	½	2½	4, 5
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	17½	19½	
(D) Operation and Operators				
Control of system	3	2½	3	3, 6
Condition of system	2	2	2	
Operator qualifications	5	2½	5	7, Certification
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	10	
GRAND TOTAL AND RATING	100	90	99	

90 and upward - high degree of safety. Watchful maintenance needed.

85 to 89 - moderately high degree of safety. Correction and maintenance program continued.

70 to 84 - poor to dangerous condition. Prompt corrective action urgently needed.

MINNESOTA DEPARTMENT OF HEALTH

REPORT ON INVESTIGATION OF PUBLIC WATER SUPPLY

Name of Water Supply: Avon Municipal Water Supply	PWS ID Number: 1730002
Street: Box 27	Telephone Numbers: City: 612/356-7922; Operator: 612/356-7106 Home; Engineer: ; Other:
City: Avon	State: MN; Zip Code: 56310
County: Stearns	District: Central
Water Superintendent: Joseph Hoppe	Classification: D
Other Operators: John Ehlinger	Classification: D
Plant Classification: D	Owner Type: Municipal
Plant Type: Community	Plumbing Permits and Inspections Required: ☐ Yes ☒ No
Date of Previous Survey: 7/20/79	Date of Survey: 10/30/80
City Engineer: Pauly & Olson Engineering	

SERVICE AREA CHARACTERISTICS:

- ☒ Municipal
- ☐ Mobile Home Park
- ☐ Company Town
- ☐ Institution
- ☐ School or College
- ☐ Hotel/Motel
- ☐ Resort
- ☐ Restaurant
- ☐ Recreation Area
- ☐ Campground
- ☐ Housing Development
- ☐ Other

Population Served: 1000	Service Connections: 266	Storage Capacity: (List Separately) 200,000 gal. elevated steel; 50,000 gal. elevated steel *
Design Capacity (gal/day):	Average Daily Production (gal/day): 70,000	
Emergency Capacity (gal/day):	Highest Daily Production (gal/day): 205,000	Total: 250,000 gal.

	Source Name	Source Code	Availability	TREATMENT: Disinfection	Aeration	Coagulation	Sedimentation	Filtration	Corrosion Con. Stabilization	Softening	Taste & Odor	Ammoniation	Fluoridation	Other	WELL DATA: Year Installed	Casing Diameter	Casing Depth	Screen Length	Well Depth	Water Bearing Formation	Static Level	Drawdown	Pump Type
Well A	Well 1	G	P										Va		1962	16"	132'	10'	142'				SUB 75
Well B	Well 2**	G	R													6"							SUB 40
Well C	Well 3	G	P	Dh									Va		1979	12"	50'	20'	70'		25'	32'	SUB 250@230

Remarks:

* To be taken out of service
** To be abandoned

Surveyed by: Thomas F. Scherer
Thomas F. Scherer

Approved by: James Feddema
James A. Feddema

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of Avon Municipal Water Supply

Date October 30, 1980

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety / Adequacy of treatment	20	19	20	1.
Bacteriological Quality	10	10	10	
Physical quality	2	2	2	
Chemical quality	4	3	3	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	38	39	
(B) Prime Moving Equipment				
Well or intake	8	6	8	2, 3.
Pumps	7	7	7	
Piping arrangement	5	4.5	5	8.
Reservoirs	7	7	7	
Equipment housing	3	3	3	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	27.5	30	
(C) Distribution System				
Street mains	5	5	5	
Building services	2	.5	1.5	4, 5.
Plumbing	3	.5	2.5	4, 5.
Hydrants	1	1	1	
Storage	4	4	4	
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	16	19	
(D) Operation and Operators				
Control of system	3	2	3	6, 7,
Condition of system	2	2	2	
Operator qualifications	5	5	5	
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	9	10	
GRAND TOTAL AND RATING	100	90.5	98	

90 and upward - high degree of safety. Watchful maintenance needed.

85 to 89 - moderately high degree of safety. Correction and maintenance program continued.

70 to 84 - poor to dangerous condition. Prompt corrective action urgently needed.

ELEVENTH BIENNIAL REPORT

OF THE

Minnesota State Dairy and Food Commissioner

TRANSMITTED TO THE LEGISLATURE

1907

1907
HARRISON & SMITH CO.
MINNEAPOLIS

SHERBURNE COUNTY.

Name of Creamery.	Shipping Station.	Name of Secretary or Manager.	Postoffice Address.	Name of Buttermaker.	Postoffice Address.
Clear Lake Creamery	Clear Lake	H. F. Cleveland	Clear Lake	H. F. Cleveland	Clear Lake.
Purity Creamery	Becker	F. R. Braisie	Becker	F. R. Braisie	Becker.
Grafton Creamery	Stewart	O. O. Holm	Stewart	G. G. Effertz	Stewart.
Big Lake Creamery	Big Lake	J. A. Gutzlar	Big Lake	J. A. Gutzlar	Big Lake.
Elk River Creamery	Elk River	Crescent Cry. Co	St. Paul	Geo. W. Finch	Elk River.
Victor Creamery Co	Princeton	E. Odegard	Santiago	E. Odegard	Santiago.
Orrock Co-operative Creamery	Big Lake	H. E. Cregg	Orrock	C. W. Parker	Orrock.

SIBLEY COUNTY.

Henderson Creamery Co	Henderson.	A. F. Pochler	Henderson	Budd Jache	Henderson.
Star Creamery Co	Henderson.	M. Strebel	Henderson, R. 1	Otto Vallrath	Henderson, R. 1.
Eagle Creamery Association	Arlington	Jack Hroells	Arlington, R. 1	George F. Lacher	Arlington, R. 1.
New Rome Creamery Association	Arlington	Aug. Duhlmeier	Arlington, R. 3	Edward Bach	Arlington.
Arlington Creamery Association	Arlington	Wm. Nagl	Arlington	A. F. Ryan	Arlington.
Gaylord Co-operative Creamery Assn	Gaylord.	H. C. Sylvester	Gaylord	L. H. Kuhlman	Gaylord.
New Auburn Creamery Co	Glencoe	C. P. Murphy	New Auburn	C. J. Meyer	New Auburn.
Green Isle Township Creamery Co	Green Isle	H. J. Maskok	Green Isle, R. 1	Bob Kuhnan	Green Isle, R. 1.
Gibbon Creamery Co	Gibbon	F. V. Burdorf	Gibbon, R. 2	Otto Hanson	Gibbon.
Bismark Creamery Association	Winthrop	Alonzo Bathrick	Winthrop, R. 2	Richard Engelhardt	Winthrop, R. 2.
Winthrop Creamery Association	Winthrop	A. J. Rignell	Winthrop	Thos. Moe	Winthrop,
Rush River Creamery Co	Rush River	M. Lokensgrad	Le Sueur, R. 5	C. Jensen	Le Sueur, R. 5.
Pohler	Henderson	Aus. F. Poehler	Henderson	H. N. Simmer	Henderson.

STEARNS COUNTY.

St. Wendal	Avon	M. J. Rooney	Avon	Geo. Weller	Avon.
St. Joseph Creamery Co	St. Joseph	B. Aschenbrenner	St. Joseph	B. Aschenbrenner	St. Joseph.
Lake Henry	Lintonville	P. Zimmermann	Lake Henry	J. R. Henneman	Lake Henry.
Unity Creamery	Sauk Center	Emil Karlen	Melrose	A. J. Arneson	Sauk Center, R. 3.
Spring Hill Creamery Association	Lintonville	J. Waldorf	Spring Hill	Peter Winter	Spring Hill.
Monitor Creamery Association	Sauk Center	Joe Jence	Sauk Center	Joe. Jence	Sauk Center.
Freeport Creamery Association	Freeport	.	.	J. J. Micklish	Freeport.
New Munich Creamery	New Munich	B. Frieler	New Munich	B. Frieler	New Munich.
Nelson Merc. Co	Brooten	.	.	.	.
Reed & Shelso	Brooten	.	.	.	.
Padue Creamery Co	Brooton				
Paynesville Creamery	Paynesville	R. F. Noonan	Paynesville	Erwin Nehring	Paynesville.
Albany Creamery	Albany	A. H. Wester	Albany	A. H. Wester	Albany.
St. Anthony Creamery Association	Albany	Adam Loehlien	St. Anthony	C. Recker	St. Anthony.
Melrose Creamery	Melrose	B. Frieler	New Munich	B. Frieler	Melrose.

Unique Well Number **241592**

County Stearns
Quad Avon
Quad Id 157C

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1992/09/08
Update Date 2014/03/10
Received Date

Well Name AVON 1 Well A

Township	Range	Dir	Section	Subsection	Field Located Elevation
125	30	W	28	AACDCD	MDH 1131.00 ft.

well and contact address AVON 1

AVON MN Changed

Description	Color	Hardness	From	To (ft.)
NO RECORD			0	132
SAND & GRAVEL			132	142

Remarks
WELL SEALED 10-10-2003 BY 73646

First Bedrock
Last Strat QHUU
Aquifer Quaternary undiff.
Depth to Bedrock ft.

Well Depth	Depth Completed	Date Well Completed
142.00 ft	142.00 ft	1962/00/00

Drillhole Angle

Drilling Method

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use community supply(municipal)

Casing Type Drive Shoe? ☐ YES ☐ NO
Diameter 16 Depth 132
16.00 in. from 0.00 to 132.00 ft. lbs/ft

Hole Diameter (in.)

Screen Yes
Make Type
Diamter Slot Length Set
0.00 10 132 ft. to 142 ft.

Open Hole(ft.) From to

Static Water Level
0.00 ft. Date measured

Pumping Level (below land surface)
ft. after hrs. pumping g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO ☐ NOT SPECIFIED

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity 75 g.p.m
Type Submersible

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 Cerfication
Minnesota Department of Health MDH
License Business Name Lic. or Reg No.

Name of Driller Date

Unique Well Number: **241593**

County: Stearns
Quad: Avon
Quad Id: 157C

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date: 1992/09/08
Update Date: 2014/03/10
Received Date:

Well Name AVON 2 Well B

Township	Range	Dir	Section	Subsection	Field Located Elevation	MGS
125	30	W	28	ACDACA	1122.00	ft.

well and contact address AVON 2

AVON MN Changed

Well Depth ft | **Depth Completed** ft | **Date Well Completed**

Drillhole Angle

Drilling Method

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use municipal

Casing Type | Drive Shoe? ☐ YES ☐ NO | Hole Diameter (in.)
Diameter 6 | Depth
6.00 in. from 0.00 to ft. lbs/ft

Screen
Make | Type
Diamter | Slot | Length | Set

Open Hole(ft.) From to

Static Water Level
0.00 ft. | Date measured

Pumping Level (below land surface)
ft. after | hrs. pumping | g.p.m.

Wellhead Completion
Pitless adapter manufacturer | Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO ☐ NOT SPECIFIED

Nearest Known Source of Contamination
feet | Direction | Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed | Date Installed
Manufacture's name
Model number | HP 0.00 | Volts
Length of drop pipe | Material | Capacity 40 g.p.m
Type Submersible

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 Cerfication
Minnesota Department of Health MDH
License Business Name | Lic. or Reg No.

Remarks
WELL SEALED 10-11-1989 BY 73025

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

Name of Driller | Date

Unique Well Number **242069**

County Stearns
Quad Avon
Quad Id 157C

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 1993/03/23
Update Date 2014/05/22
Received Date

Well Name AVON 3 Well C

Township	Range	Dir	Section	Subsection	Field Located	MDH
125	30	W	27	CADDDC	Elevation	1149.00 ft.

well and contact address AVON 3

AVON MN Changed

Description	Color	Hardness	From	To (ft.)
NO RECORD			0	50
SAND & GRAVEL			50	70

Remarks

First Bedrock
Last Strat QHUU

Aquifer Quat. Water Table Aquifer
Depth to Bedrock ft.

Well Depth	Depth Completed	Date Well Completed
70.00 ft	70.00 ft	1979/00/00

Drillhole Angle

Drilling Method

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use community supply(municipal)

Casing Type Drive Shoe? ☐ YES ☐ NO
Diameter 12 Depth 50
12.00 in. from 0.00 to 50.00 ft. lbs/ft

Hole Diameter (in.)

Screen Yes
Make Type
Diamter Slot Length Set
0.00 20 50 ft. to 70 ft.

Open Hole(ft.) From to

Static Water Level
25.00 ft. land surface Date measured 1984/00/00

Pumping Level (below land surface)
57.00 ft. after hrs. pumping 0.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☐ YES ☐ NO ☐ NOT SPECIFIED

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ YES ☐ NO

Pump
☐ Not Installed Date Installed
Manufacture's name
Model number HP 0.00 Volts
Length of drop pipe Material Capacity 250 g.p.m
Type Submersible

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 Cerfication
Minnesota Department of Health MDH

License Business Name **Lic. or Reg No.**

Name of Driller **Date**

Unique Well Number 696861

County Stearns
Quad Avon
Quad Id 157C

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 2004/05/19
Update Date 2014/03/10
Received Date 2003/12/19

Well Name AVON 4

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH
125	30	W	22	CCCBCC	1140.00	ft.

well address AVON, CITY OF
2 ANGEL FISH AV
AVON MN 56310

Description	Color	Hardness	From	To (ft.)
SAND & GRAVEL	BROWN	SOFT	0	51
CLAY	BROWN	MEDIUM	51	53
SAND & GRAVEL	BROWN	SOFT	53	87
CLAY	GRAY	MEDIUM	87	96
SAND	GRAY	SOFT	96	126
CLAY	BROWN	MEDIUM	126	175
SAND & GRAVEL	BROWN	SOFT	175	198
CLAY	BROWN	MEDIUM	198	201
SAND & GRAVEL	BROWN	SOFT	201	205
CLAY	BROWN	MEDIUM	205	221
SAND & GRAVEL	BROWN	SOFT	221	251
MARL	BLUE	MEDIUM	251	255

Remarks

First Bedrock
Last Strat
Aquifer Quat. buried artes. aquifer
Depth to Bedrock ft.

Well Depth 255.00 ft
Depth Completed 251.00 ft
Date Well Completed 2003/09/26

Drillhole Angle

Drilling Method Non-specified Rotary

Drilling Fluid Bentonite

Well Hydrofractured? ☐ YES ☑ NO
From ft. to

Use community supply(municipal)

Casing Type Steel (black or low Drive Shoe? ☐ YES ☑ NO
Diameter 12 Depth 231
12.00 in. from 0.00 to 231.00 ft. 53.52 lbs/ft

Hole Diameter (in.) 18.0(To 255.0

Screen Yes
Make JOHNSON
Diamter 12.00 Slot 100 Length 20 Set 231 ft. to 251 ft.

Open Hole(ft.) From to
Type stainless steel

Static Water Level
21.00 ft. land surface Date measured 2003/09/26

Pumping Level (below land surface)
251.00 ft. after 151.00 hrs. pumping 1200.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer ____ Model ____
☐ Casing Protection ☑ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☑ YES ☐ NO ☐ NOT SPECIFIED
Material neat cement From 0.0 To 221.0 ft. 8.50 Cubic yards

Nearest Known Source of Contamination
100 feet W Direction O Type
Well disinfected upon completion? ☐ YES ☑ NO

Pump
☑ Not Installed Date Installed ____
Manufacture's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ Material ____ Capacity ____ g.p.m
Type

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 Cerfication
Traut, Mark J. Wells 73646

License Business Name RYAN, R.
Lic. or Reg No.

Name of Driller **Date**

Unique Well Number 696862

County Stearns
Quad Avon
Quad Id 157C

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
MINNESOTA STATUTES CHAPTER 1031

Entry Date 0000/00/00
Update Date 2014/03/10
Received Date 2003/12/19

Well Name AVON 5

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH
125	30	W	22	CCCBBD	1137.00	ft.

well address AVON
2 ANGEL FISH AV
AVON MN 56310 Changed

Description	Color	Hardness	From	To (ft.)
TOP SOIL	BROWN	SOFT	0	2
CLAY	BROWN	SOFT	2	7
SAND	BROWN	SOFT	7	44
CLAY	BROWN	SOFT	44	55
CLAY	GRAY	SOFT	55	68
CLAY SAND	GRAY	SOFT	68	75
CLAY	GRAY	SOFT	75	83
CLAY SAND	GRAY	SOFT	83	90
CLAY	GRAY	SOFT	90	104
SAND	GRAY	SOFT	104	120
CLAY	GRAY	SOFT	120	122
SAND	GRAY	SOFT	122	124
CLAY	GRAY	SOFT	124	128
CLAY SAND	GRAY	SOFT	128	135
CLAY	BROWN	SOFT	135	143
CLAY	GRAY	SOFT	143	156
SAND GRAVEL DIRTY	GRAY	SOFT	156	173
CLAY	GRAY	SOFT	173	175
SAND	GRAY	SOFT	175	176
CLAY	BROWN	SOFT	176	178
SAND	GRAY	SOFT	178	180
DIRTY SAND	GRAY	SOFT	180	196
SAND GRAVEL	GRAY	SOFT	196	205
CLAY	BROWN	SOFT	205	213
SAND GRAVEL	GRAY	SOFT	213	240
GRANITE	RED	HARD	240	240

Remarks

First Bedrock
Last Strat
Aquifer Quat. buried artes. aquifer
Depth to Bedrock ft.

Well Depth 240.00 ft
Depth Completed 240.00 ft
Date Well Completed 2003/08/11

Drillhole Angle

Drilling Method Non-specified Rotary

Drilling Fluid Qwik gel

Well Hydrofractured? ☐ YES ☑ NO
From ft. to

Use community supply(municipal)

Casing Type Steel (black or low Drive Shoe? ☐ YES ☑ NO
Diameter 12 Depth 220
12.00 in. from 0.00 to 220.00 ft. 53.53 lbs/ft

Hole Diameter (in.) 18.0(To 240.0

Screen Yes
Make JOHNSON
Diamter 12.00 Slot 100 Length 20 Set 220 ft. to 240 ft.

Open Hole(ft.) From to
Type stainless steel

Static Water Level
14.00 ft. land surface Date measured 2003/07/07

Pumping Level (below land surface)
53.00 ft. after 1.00 hrs. pumping 600.00 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☑ 12 in. above grade
☐ At-grate (Environmental Wells and Borings ONLY) ☐ Basement offset

Grouting Information Well grouted? ☑ YES ☐ NO ☐ NOT SPECIFIED
Material neat cement From 0.0 To 230.0 ft. 75.00 Cubic yards

Nearest Known Source of Contamination
230 feet N Direction BOW Type
Well disinfected upon completion? ☐ YES ☑ NO

Pump
☑ Not Installed Date Installed
Manufacture's name
Model number HP Volts
Length of drop pipe Material Capacity g.p.m
Type

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 Cerfication
Mark J Traut Wells, Inc. 76343
License Business Name **Lic. or Reg No.**
KARASCH, L.

Name of Driller **Date**

Appendix G

LGU Written Comment

Stearns County Soil & Water Conservation District

Stearns County SWCD
110 2nd Street South – Suite 128
Waite Park, MN 56387

Tel. (320) 251-7800 ext. 3
Fax (855) 205-6907
www.StearnsCountySWCD.net

Date: July 1, 2024

To: Justin Kurtz and Josh Blommer, City of Avon

From: Stephanie Hatzenbihler, Stearns County Soil and Water Conservation District

Re: City of Avon Protection Program

The Stearns County Soil and Water Conservation District submits the following comments in response to the local review request of the Part II Wellhead Protection Plan draft dated May 30, 2024:

1. Page 19 section *7.4 Support provided by nonprofit organizations*:
    a. 1W1P, WRAPS, GRAPS, BWSR – these should be moved to section 7.3 State Agency and Federal Agency Support
    b. Stearns SWCD, Stearns County – these should be moved to section 7.2 Local Government Controls and Programs

2. Table 13, Measure 3 – remove the text "The City of Avon must participate in the 1W1P process to be considered for project funding." While it would be ideal for the city to participate it is not a requirement to access funding for projects.

Thank you for the opportunity to review and submit comments on the City of Avon draft wellhead protection plan, Part II. We look forward to continuing to be a community partner as the city continues to protect its drinking water supply. If you have any questions, please direct all communication to Stephanie Hatzenbihler at (320) 251 7800, extension 3.

Sincerely,

Stephanie Hatzenbihler

Stephanie Hatzenbihler, Water Plan Coordinator
Stearns County Soil and Water Conservation District

From: Anderson, Chad (MDH)
To: Mark Sherrill; Justin K - City of Avon
Cc: Melanie Niday
Subject: RE: City of Avon Wellhead Protection Plan Part II - Link to Plan for your Review
Date: Tuesday, June 4, 2024 3:10:16 PM
Attachments: image001.png
image002.png

Hi guys –

I know the draft went out for review, but I don't think it's too late to do this. When I took a look at the proposed management strategies to remove, #7 sort of raised a flag. I understand the perceived lack of support and understand why #s 8 & 9 would be difficult. But I chatted with Hunter Bloomer (MDH District Engineer) about #7 and I would like to ask that that stay in the Plan. It looks like the City's ordinances prohibit cross connections where private wells may be used (Section 52.06). According to Hunter, there are certain inspection requirements where private wells occur (the school and Casey's were examples he mentioned), and if there were to be contamination due to a cross connection, the city would be liable for cleanup, repairs, etc.

That said, please leave #7 in there, and Hunter and I would be happy to help you with the cross-connection program. Justin, Hunter said that if you have any questions, you are welcome to call him (same stands for me as well).

Thank you!
Chad

From: Mark Sherrill <msherrill@sehinc.com>
Sent: Tuesday, June 4, 2024 11:42 AM
To: Anderson, Chad (MDH) <Chad.R.Anderson@state.mn.us>
Cc: Melanie Niday <mniday@sehinc.com>
Subject: RE: City of Avon Wellhead Protection Plan Part II - Link to Plan for your Review

Hi Chad,

No rush on reviewing! One quick update for you – but no action required on your end.

I also wanted to update you that we have edited the management strategies on your recommendation on reducing management strategies - Justin decided that he'd like to remove measures 7, 8, and 9 from the plan (see snip below) which pertain to Tank Site PCS. It doesn't sound like he'd have a lot of support on getting these accomplished and would like to focus his efforts elsewhere. We **still** have management strategies for tank PCS codes in both measures 19 and 20. If you have any questions or concerns let me know.

7	Moderate	The City will explore the need to implement a cross connection control program.	D	Staff Time	MDH, consultant			•				•			
8	Moderate	Work with City Council to educate them on the importance to adopt the state's tank rules by local ordinance, so the local unit of government could enforce the state's rules locally but not confuse the tank owners and installers with differing requirements for tank installation, maintenance, and removal.	D	Staff Time	MDH, City of Avon	•		•		•		•		•		•
9	Moderate	Work with City Council to explore the need to implement and require new above ground and underground tanks to have corrosion protection, leak detection, spill overfill prevention, and/or secondary containment.	D	Staff Time	MDH, consultant	•		•		•		•		•		•

Thanks,

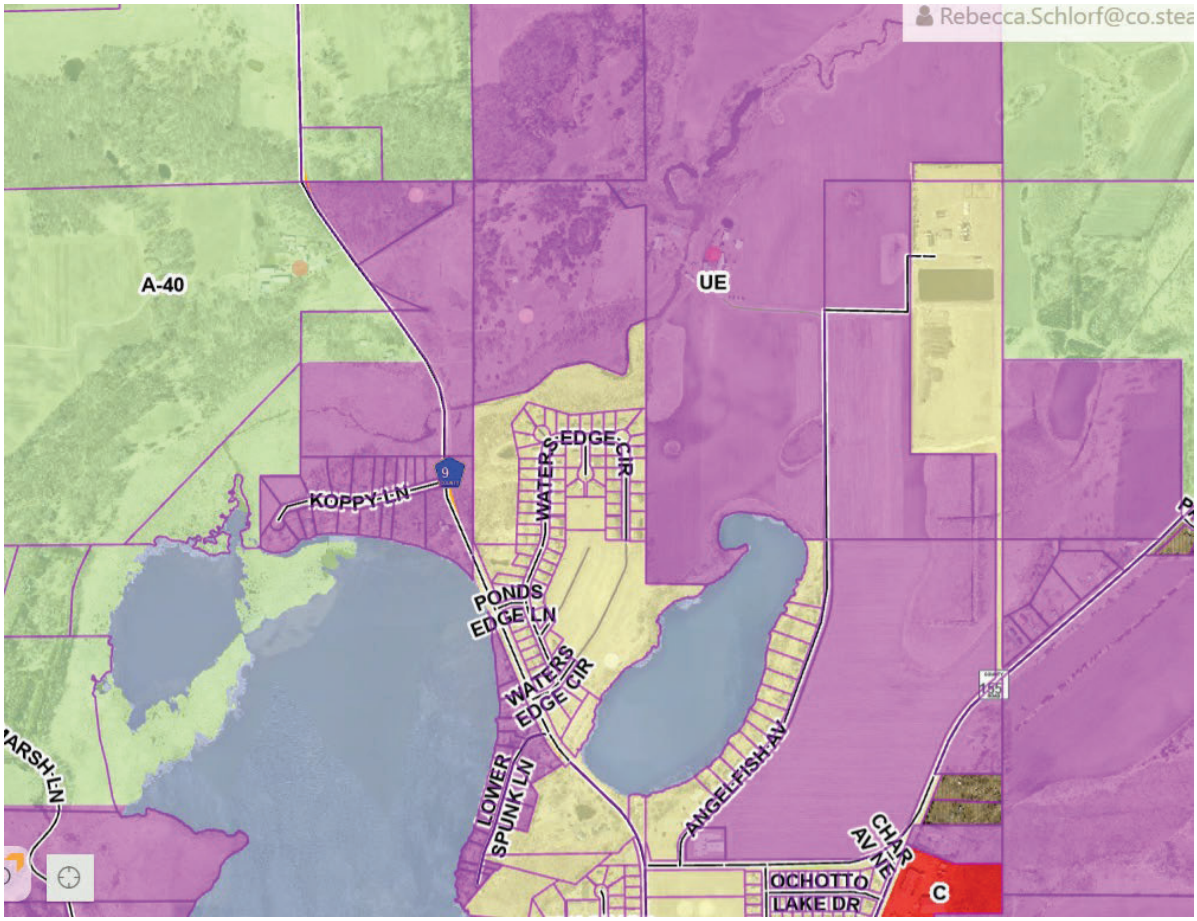
Mark Sherrill, PG (MN, WI)
Environmental Scientist
Short Elliott Hendrickson Inc.
651.262.6715 direct | 651.490.2000 main
Building a Better World for All of Us®

From: Anderson, Chad (MDH) <Chad.R.Anderson@state.mn.us>
Sent: Monday, June 3, 2024 4:59 PM

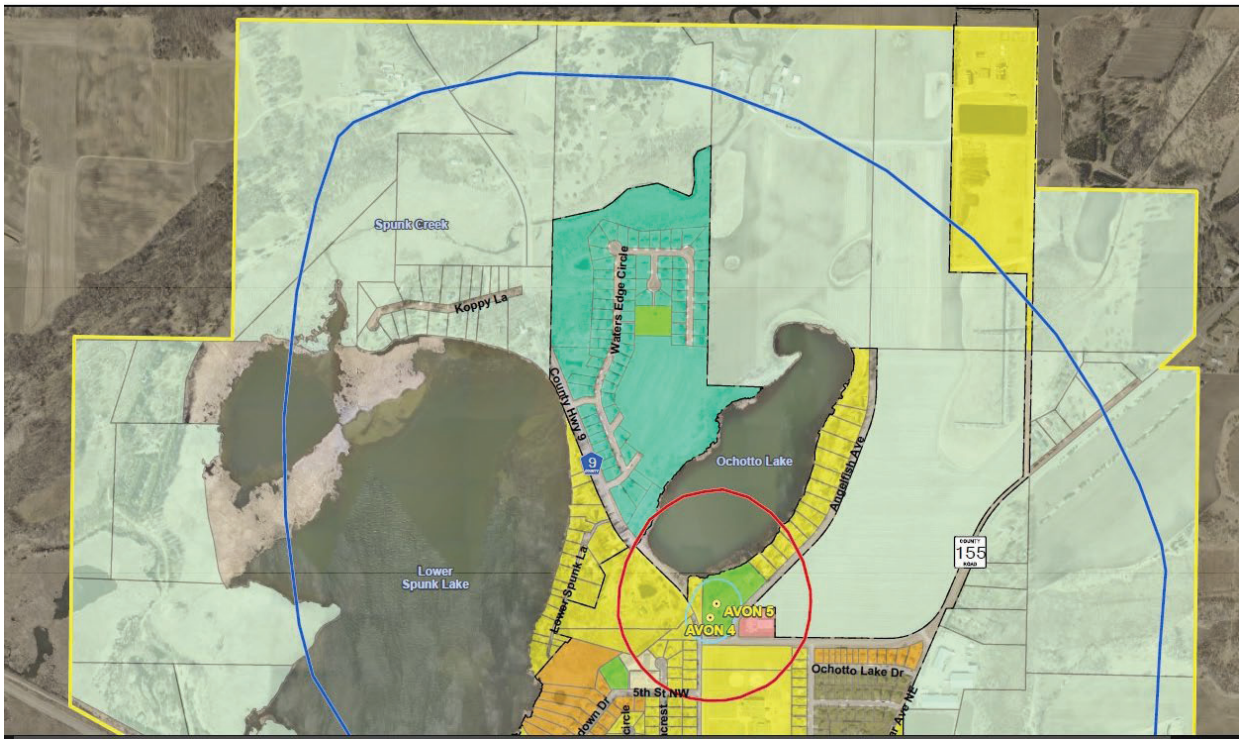
From:	Schlorf, Becky
To:	Mark Sherrill
Cc:	Blazek, Kyle; justin.k@cityofavonmn.com; Anderson, Chad (MDH)
Subject:	RE: City of Avon Wellhead Protection Program - 60-day comment period - Public Hearing on August 5th at 6.30 PM
Date:	Thursday, June 6, 2024 11:29:04 AM
Attachments:	image002.png image003.png image004.png

Hi Mark,

The zoning of Avon Township is not shown correctly. Below is the correct zoning shown from the Property Viewer available here: https://stearns-county-gis-stearns.hub.arcgis.com/apps/fbc70d782fc547f9b8220218eac3c966. There are some small areas in the NW area of the WHPA that are zoned Ag-40 (green) and are not Urban Expansion (purple).



The draft plan shows the Avon Township area as all Urban Expansion (light green).



Becky

Rebecca Schlorf | Environmental Services Supervisor

becky.schlorf@stearnscountymn.gov | (320) 656-3613 | 800-450-0852
www.stearnscountymn.gov
ENVIRONMENTAL SERVICES DEPARTMENT
STEARNS COUNTY SERVICE CENTER
3301 COUNTY RD 138
WAITE PARK MN 56387

Mission: Provide exceptional services to assure a safe, healthy, vibrant county for all
Values: Professional, Approachable, Responsive, Collaborative, Fair & Equitable

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From: Mark Sherrill <msherrill@sehinc.com>
Sent: Tuesday, June 4, 2024 1:28 PM
To: chad_klocker@avontownship.org; Perske, Joseph <Joseph.Perske@stearnscountymn.gov>; area1.stearnscountyswcd@gmail.com; avonarealakesassoc@gmail.com; jmanthe24@gmail.com; Abigail Parker <Abigail@srwdmn.org>; Cymbaluk, Wayne - FPAC-NRCS, MN <Wayne.Cymbaluk@mn.nacdnet.net>; Blazek, Kyle <Kyle.Blazek@stearnscountymn.gov>; Schlorf, Becky <Rebecca.Schlorf@stearnscountymn.gov>; Anderson, Chad (MDH) <Chad.R.Anderson@state.mn.us>; Justin K - City of Avon <justin.k@cityofavonmn.com>; Hatzenbihler, Stephanie - FPAC-NRCS, MN <stephanie.hatzenbihler@mn.nacdnet.net>
Cc: Melanie Niday <mniday@sehinc.com>; Witkowski, Trudi (MDH) <trudi.witkowski@state.mn.us>
Subject: City of Avon Wellhead Protection Program - 60-day comment period - Public Hearing on August 5th at 6.30 PM

On behalf of: Justin Kurtz & Josh Blommer, City of Avon

City of Avon Wellhead Protection Program

City of Avon is in the process of developing a wellhead protection plan for its drinking water supply wells. Enclosed for your review and comment is the draft wellhead protection plan, Part II, for this system as required in the Minnesota Wellhead Protection Rule (part 4720.5350, subparts 1-3). This portion of the plan includes information pertaining to:

1. The inventory of potential contaminants of concern within the drinking water supply management area;
2. The data that was considered in this portion of the plan;
3. Issues, problems, and concerns within the drinking water supply management area;
4. Goals, objectives, and action strategies to address the issues and concerns within the drinking water supply management area;
5. A plan evaluation strategy; and
6. A contingency strategy in the event of water system disruption.

You can view the plan in the following Sharepoint file for download and is also attached to this email:
Avon WHPP PartII

Your comments on this portion of the plan will be accepted through the 60-day comment period.
Email to Justin Kurtz justin.k@cityofavonmn.com and <msherrill@sehinc.com> or please send your written comments before August 5, 2024, to:

Justin Kurtz & Josh Blommer
City of Avon
140 Stratford St. E.
P.O. Box 69
Avon, MN 56310

Consistent with the Wellhead Protection Rule (part 4720.5350, subpart 4), a Public Hearing at the City of Avon City Hall has been scheduled to discuss issues and address all comments related to the enclosed document at **6:30 p.m. on Monday August 05, 2024,** at:

Avon City Hall
140 Stratford St. E.
Avon, MN 56310

We look forward to your participation.

Mark Sherrill, PG (MN, WI)
Environmental Scientist
Short Elliott Hendrickson Inc.
651.262.6715 direct | 651.490.2000 main
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